Telecommunications Law and Policy

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Telecommunications Law and Policy

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Preface

This book is an edited collection of papers combined in a cohesive fashion which I have written over the past twenty years on the topic of Telecommunications Law and Policy. The papers focus on many dimensions of telecommunications and all are still relevant today. There can be a great deal of value obtained from reading through the papers over time because they show the intensity of issues at the period in which they were most relevant. The issues of access, privacy, Internet Neutrality, wireless and local exchange carriage. All have remained current albeit morphed in a slight degree.

The reader can gain a great deal of current insight by examining all of the arguments made over this period.

I owe a great deal to many people. First is Gus Hauser who has helped me through many such analyses over the past thirty plus years, Rus Neuman who got me into policy issues, Irwin Jacobs who allowed me to combine technology and policy, Bob Pepper who opened the doors at the FCC at a very critical moment. Eli Noam who allowed me a year at Columbia and the many meetings he had over that period to express my thoughts, to Ivan Laska and Peter Mroczyk who gave me windows on Europe and further east, and to Sharon Gillette who gave me the chance to work with her group at MIT for many years, and to Dave Clarke who gave me the chance to sit on a few panels and see what the issues were from the technical perspective as compared to the business side. What is written is my view and often my view alone.

Terrence McGarty

Cambridge Massachusetts
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1 PROLOGUE

Telecommunications is a unique blend of technology and the law. Unlike almost any other technological development over the past one hundred years, telecommunications is bounded, molded, hindered, or otherwise influenced by the law. In the United States the FCC is the administer of the laws passed Congress and approved by the President. The Courts, especially the Supreme Court, is the final promulgator of the law. It is the Supreme Court which "interprets" what Congress meant. Thus there is a continual tension in the US Government over telecommunications and in turn the field is in a continual flux. In 2006 the United States lost its last large telecom manufacturer in the acquisition of Lucent by the French owned Alcatel. The US is almost alone in the company of large countries having no telecom manufacturer. It would be like General Motors, Chrysler and Ford disappearing and no one noticing. Is this a change for the good of for the worse. It is a change driven by US law. The papers contained herein address some of the basic issues driving this change.

1.1 Access Policy

Access policy has evolved over the past ten years in an environment pressured by competitive carriers and now with innovative technologies. A third dimension driven by new and innovative services will also effect the change in access. This section reviews the issues of access and uses specific case studies to demonstrate the effects that access can have on the development of new and innovative telecommunications infrastructures. The primary focus is on the developments in Personal Communications Services, PCS, a new wireless service offering in the 1.8 to 2.0 GHz bands. The section develops a set of detailed Microeconomic models for the new infrastructure and shows that access can have a dominant role to play on its rapid acceptance. The section demonstrates that the infrastructure has limited scale and scope in its economies and that access fees and policy present potential bottlenecks to competing service providers. The section concludes with a set of policy options that are a natural result of the detailed economic analysis of the new service.

1.2 Competition in Local Exchange

This section presents an overview of the implications of the new Telecommunications Act as applied to the Local Exchange Market. It focuses on the issues of; the Act and its statements of competition, the underlying technological changes that will create a new competitive environment, the implications of Antitrust Law to this new market, and the implications that the new law and the existing statues will have on the development of a new industry structure. This section also focuses on the various views that can be seen in the application of antitrust law and how these views are reflected in the legislation and the administrative rule derived therefrom. Unlike the deregulation of the long-distance market in 1984, the de-regulation of the local exchange market in 1996 will encompass a market that has three characteristic; it is three to five times the size of the long-distance market, it has survived in a monopoly structure protected under Clayton since its

inception, and it evolves in a technological environment that both regulators and law makers have limited understanding.

1.3 Access and Interconnection

In this section we also develop the concept of access because it is through access that competing carriers meet and it is through access that the dominant carrier may have the power to control the nondominant. We have discussed in the past few sections the issue of unbundling. We have viewed that from the perspective of the CMRS, which is an innovative way to do so since the FCC had not done this in their order. However the principles developed follow over directly to those elements that the FCC mandated as unbundled. In this section we develop the analysis for interconnection. This assumes that the provider, say a CMRS, has obtained all of the elements and has assembled them into a complete services offering. Now we ask the question, can we apply the Principle of Cost Based Pricing and if so what is the implications of that application. We have argued before that the direct consequence if Bill and Keep.

1.4 Comparative Regulation

The deregulation of telecommunications has taken a major step with the WTO agreements in February of this year. Namely, each of the major Far Eastern countries has agreed to open their market in some form of planned entry. These markets will allow for the introduction of competition of local and international services now currently restricted to the local PTT as well as allowing the entry of new services in what are generally closed markets. This section analyzes the implications of changes in several key Far eastern countries and discusses how this will impact the U.S. economy and the overall policy implications that this will focus on.

1.5 Municipal Broadband

This section discusses the viability of municipal owned and operated local broadband networks. The key issue is the viability of such networks as compared to the classic carriers implementing their own networks in a more open market fashion. This section develops the alternatives that are available to towns and municipalities in developing their own local broadband facilities. It discusses the alternatives, of design, operations, and financing. The conclusion reached is that each town represents a different case study, however, there are a wide class of municipalities for which a municipal broadband network is not only viable but is essential if the deployment of broadband is ever to be achieved. In addition, it is clear from the research performed, that in these municipalities, the deployment of a broadband system by and for the municipality is not only beneficial to the users but has the potential to create increased value, tax base, and higher return on the bond investment made.

1.6 Telecommunications Legal Issues

This section presents an overview of the current litigation and legislation that is driving the telecommunications market. There has been a hypothesis that the collapse of the stock market was driven by the telecommunications collapse, a $2 trillion loss of market cap to the industry. It has been further speculated that this loss was driven by poor legislation, poor administration, and excessive litigation. This section examines these issues in light of the current litigation across the spectrum of the telecommunications issues. The conclusions draw and in contrast to the accepted party line. The author contends that the litigation may have just begun, and that via successful approaches via antitrust litigation by individuals, the industry may see the greatest change. Specifically the author contends that litigation brings about good legislation from bad.

1.7 Broadband Hidden Costs

This section presents one of the most significant costs of implementing a broadband service but at the same time one of the least analyzed component in that process, franchising. Simply stated, for a town as small as a few thousand households, the time it take to obtain a franchise under the best of circumstances is often well in excess of one year and the amount of labor includes often two or more people dedicated to that effort plus other costs such as legal, engineering and other costs. If the incumbent decides to fight, the process may take longer. The municipalities always want to increase their returns so the process becomes an escalation of demands and delays. For towns of say 2,000 households, as the author demonstrates by specific case studies, costs of $400,000 to $500,000 are not unrealistic. This means readily an additional cost of $250 per HH or at 25% penetration, $1,000 per HH. In contrast the capital required to deliver broadband in such a community is $1,500 per HH. Thus the franchise costs are approaching the capital costs per HH in many communities. This clearly becomes a dramatic if hidden element but also becomes a real but avoidable barrier to entry for any and all new broadband entrants. This section details these costs and others and makes suggestions to remedy them.

1.8 Internet Neutrality

Internet Neutrality is a term which means many things to many people. In this section we look at the Internet from a technical, legal, and economic perspective. We look at the ways the various players are trying to position their view and we attempt to apply the factual elements of what actually exists as a set of tests and tools to analyze the options. We as a result of this detailed analysis have come up with a set of conclusion ans principles which re-interpret the concepts of Internet neutrality and present a set of principles which are based on the technological facts, the market realities, and legal precedents which go back more than a thousand years. Our concern is that some of the proposal are so self serving that if accepted of if implemented will do irreparable harm to what has been created in the Internet.

1.9 Privacy

Privacy is a complex issue and the Internet takes this issue and compounds it in many ways. In this section we take the issue of privacy, examine it in terms of current laws, US and European, and then examine the impact of the Internet on the broadly defined issue of privacy. This section evaluates the various definitions of privacy and at the same time examines how the Internet presents both a threat to these "rights" and an opportunity to expand these rights and to sustain them in a global economy and environment of living.

2 ACCESS POLICY

2.1 Introduction

The major objective of this section is to examine the basic structure of and justification for an access fee and from that structure develop several policy alternatives that must be considered as the Government and State Agencies work through the elements of new and innovative access structures. In preparing this section, the author has attempted to revisit many of the inherent assumptions that are the basis of access fees and ultimately the current economic and regulator structures of telecommunications. In addition the author was forced to reevaluate the basic economic tenets that are used in determining such things as sunk costs when such costs are not irrelevant in an environment that is rate base dominated. In such environments, the system has memory, and it is that memory that changes the basic economic tenets that we all accept so readily.

This section further relies on developing the theory into policy by focusing on the current examples prevalent in wireless Personal Communications Services, PCS. In addition, the author expends this into alternative access and Internet applications, although the focus is on PCS. The PCS focus is critical in that it is a technology that dramatically shifts the well understood paradigms that have shaped the world view of telecommunications. PCS allows for the delivery of telecommunications in an environment where there is limited economies of scale and scope. To do this PCS takes advantage of technology, existing infrastructure and equity in access fees. It is the combination of these three elements that has allowed PCS to have a dramatic impact in the telecommunications competitive environment.

2.2 Access Fee Structures

Current access fee structures are undergoing significant change. In this section, we shall present a few of the current structures and present some possible changes that may be in the offing. We shall focus on the wireless access tariffs that are in place. It is important to note that many of these tariffs are not the end product of access fees but are elements thereto. For example, in the cellular world, there are agreements, specifically contracts, that have tariffs embedded in them. The Agreements go beyond or delimit the tariff. We shall reference in this section several such tariffs between RBOCs and cellular carriers. In addition, these referenced tariffs further reference of the tariffs that have been in place in other areas of application. Thus it is not as simple as is first surmised.

2.2.1 *Local Access: Type 1 and Type 2 Connections*

The local access fees of type 1 and type 2 are developed for special use customers. The following table depicts the details of a typical Type 2 tariff.[1]

[1]This tariff is from a New York Telephone PSC No. 900 Tariff effective January 1, 1991.

General	Specific	One Time	Fixed	Variable (per unit)[2]
Trunk Group		$371.95		
	Multifrequency Outpulsing		$78.82	
	Dial Pulsing		$118.33	
Trunk Interconnect		$371.95	$83.06	
Trunks		$36.24/trunk		
Overflow Option		$36.24		
Intra LATA				
	1-8 Miles			$0.0291
	16-25 Miles			$0.0322
	50-100 Miles			$0.051

The tariff can then be described in terms of the cost per unit access in the following expression.

In the New York tariff, if we were to allocate all of the costs, the effective rate per minute approaches $0.10.

2.2.2 IEC Access: Tariffed Access

A more recent tariff for wireless has been issued in a transitional filing in the Massachusetts DPU.[3] The filing is summarized in the following tables.

Type 1

Present		Proposed	
Contract	**Charges**	**Tariff**	**Charges**
Type 1 Digital Facility	$1,163[4]	Flexpath	$941

Type 2A

Present		Proposed	
Contract	**Charges**	**Tariff**	**Charges**
Land to Mobile Originating	NA	Originating Switch Access Eastern LATA Western LATA	Reference[5] $0.020947 $0.005328

[2]The variable rates are in per minute or per mile, unless otherwise specified.

[3]Massachusetts DPU, Transitional Filing, DPU-1-13, Attachment II

[4]Average Monthly Charge per Digital Facility

[5]ARPMS are weighted for time of day.

Mobile to Land Terminating		Terminating SW Access	Reference
Per Minute ARPM	$0.07985	Eastern LATA	$0.035773
		Western LATA	$0.033974

Type 3A

Present		Proposed	
Contract	**Charges**	**Tariff**	**Charges**
Eastern LATA		Originating	Reference
Per Minute	$0.020000	SW Access	
Per Message	$0.060000		
		Eastern LATA	$0.020947
Western LATA		Per Minute	
Per Minute	$0.020000		
Per Message	$0.060000	Western LATA	$0.005328
		Per Minute	

Type 3B

Present		Proposed	
Contract	**Charges**	**Tariff**	**Charges**
100 Number Group	$13.00	100 Number Group	$1.00
Per Trunk Equipped	$9.00	DID Trunk	$31.52
Trunk	$49.00	Business Exchange Line	$13.00
Total	$71.00	Total	$45.52

What is seen in these most recent rates are two trends. First is the trend to tariff the access fee and not have it under contract. The second trend is an almost halving of the access fee. This was pressured by the Recent awarding of Common Carrier Status to the first PCS company in the Commonwealth of Massachusetts.[6] What is also seen is the apparent reduction from $0.08 per minute to about $0.04.

2.2.3 The Access Impact

The access fee was established to reimburse the provider of service with the imputed expenses of providing the service. In principle it is a cost based reimbursement scheme wherein the user of the service reimburses the provider on the basis of the cost of providing the service.

[6]Press Release from the Commonwealth of Massachusetts by the Secretary of State of the Commonwealth announcing the issuance of the first PCS Common Carrier status to Telmarc Telecommunications of Boston. New England Telephone was moot on the filing but there was extensive intervention from Southwest Bell. It was assumed that the SW Bell intervention in attempting to stop a nascent industry in the Commonwealth was a driving factor in the DPUs move forward. Telmar Telecommunications was the founder of the PCS Consortium called the National PCS Consortium, a Group in existence since June of 1992, and formally announced in April of 1993. Unlike any of the other consortia, NPC has been focusing on access from the start. The reader is referred to the Appendix on the Hausman Conjectures to see what Pacific Telesis tried to do through the FCC process.

Consider the case of an IEC. The IEC charges a rate R per minute that is based upon competitive factors. It costs the IEC a rate R_{IEC} to provide the service and it pays the LEC the amount $T_{IEC,LEC}R_{LEC}$, where T is the percent of the costs of the LEC allocated to provide the service. Thus the total IEC rate is;

$$R = R_{IEC} + T_{IEC,LEC}R_{LEC}$$

The IEC then carries the LEC costs through the access fee. Now consider the case of two competing LECs using the same formula. Let the rates be defined as follows:

$$R_{LEC1} = A_{LEC1}C_{LEC1} + T_{LEC1,LEC2}C_{LEC2}$$

and

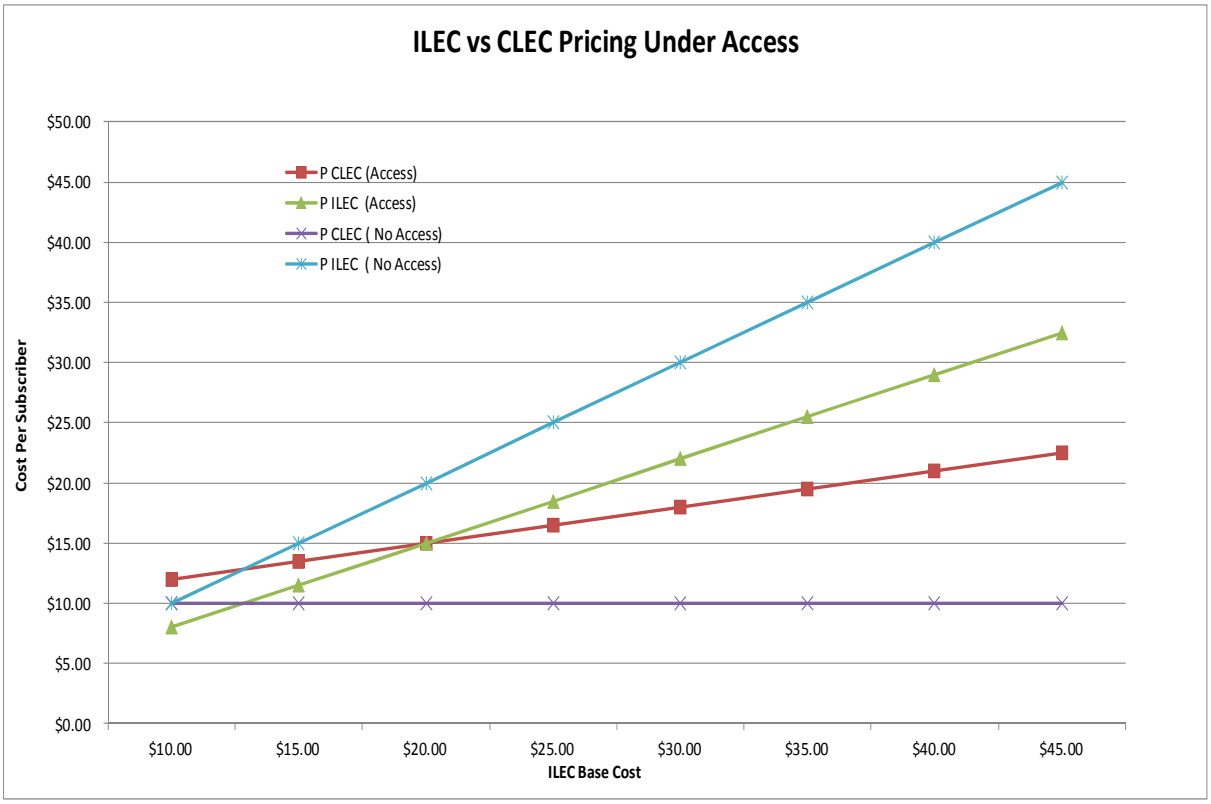
$$R_{LEC2} = A_{LEC2}C_{LEC2} + T_{LEC2,LEC1}C_{LEC1}$$

If LEC,1 is the less expensive, then the subscriber to LEC 1 will be paying a lower rate for the more efficient LEC based on its internal costs, but paying a premium for accessing the less efficient LEC through the access fee mechanism. In contrast the subscriber to LEC,2 will be paying a higher cost of LEC,2 operations but a lower cost of access to LEC,1 based on its efficiency. In effect, LEC,1, the efficient provider, is being "taxed" by the inefficient provider and this tax is becoming a subsidy to that provider.[7]

From an economic perspective, LEC 1 should always have the lower rates since it is the more efficient carrier. It is possible from the above series of equations to see that if LEC 2 is very inefficient, then at high rates for LEC 2 and high LEC 2 costs, it can drive LEC 1 process higher. This process is economically inefficient, since it does not clear the market of an inefficient player. This is the problem with access fees in general.

Let us consider a simple example. Assume that the A factors are equal and are 0.8. Assume that Bs are equal are 0.2. Let us assume that cost of the efficient producer is $10 and that the inefficient producer is greater than that. We can then plot the costs to the customers of the efficient and inefficient producers, as shown below.

[7]Appendix A discusses the Hausman Conjectures. This discussion is the basis of refuting the 16th Hausman Conjecture.



We now observe two facts. First, the Cost to the subscriber of the inefficient user is being subsidized by the efficient user. Second, the efficient user is being taxed by the inefficient user. This is not economically efficient. The reciprocity can still result in economic efficiencies. The solution is elimination of such fees altogether.

2.3 PCS Systems, Elements, Costs and Capital

In this section we build the model for the PCS business construct and provide support for each element of that model. Further, we develop and demonstrate the technology changes that make this a clear paradigm shift from the existing wire based telecommunications systems and services.

2.3.1 Costs; Short Term and Long Term

We review the short term and long term costs arguments that are found in both economic and regulatory theory. It is necessary to review these in the context of the access fee since it will be a convoluted argument in comparing the sunk costs of the monopolists with the opportunity costs of the entrepreneur.[8]

[8]We shall also be using these definitions as part of refuting the Hausman Conjectures presented in the Appendix.

Definition: Let q be any product, and let $x = [x_1, \ldots, x_n]$ be the set of inputs necessary to produce q. Let $q = f(x_1 \ldots x_n)$. We call q the production function based on the resources provided.

Definition: The ***unit market price*** of x_k is p_k, and this prices is based on obtaining the unit input from a totally competitive market where such an input is generally provided.

Definition: The ***cost of the product*** obtaining the unit inputs from a competitive market is given by $C(q) = h(x_i, p_i, b_i : i = 1, n)$, where x is the unit input, p the competitive market price, and b the fixed costs associated with each unit input.

Definition: A provider of services is said to deliver those service in a *profit maximized* fashion if;

$$P = pq - C$$

is maximized by the choice of x.

Theorem: Let f, a production function be dependent on a set of inputs, x, and let the cost of the quantity produced be a linear sum of the inputs priced independently at prices p which are obtained in a competitive fashion on the open market, and let the cost function be minimized constrained by the production function, specifically, let;

$$C(q) = C(x, p, q)$$

and,

$$C = \sum_{i=1}^{N} p_i q_i + b$$

and choose x to minimize;

$$V = \sum_{i=1}^{N} p_i q_i + b + \lambda(q - f(x))$$

then, there exist an expansion path g(x)=0, such that the set of production functions, and cost function, can yield the relationship for cost;

$$C_{ShortTerm} = \phi(q) + b$$

which is the short term cost function.

Proof: See Henderson and Quandt.

Definition: For a system of production, producing a quantity q, at unit prices, p, and at **fixed inputs**, x, define the cost function C as[9]. Then C is called the s*hort term cost function*.

The next set of issues relate to long run costs. These are the costs associated with the ability to vary the size of the plant and other inputs. Note in the above discussion, we have assumed that there was some fixed production capacity that allowed the delivery of the product. In this analysis we allow that to be augmented.

Let us extend the cost to long term costs wherein the size of the plant can be parameterized on a factor k. Let us assume that k is fixed for the short-term and is variable for the long term. Namely, the producer can change the capital base.

Definition: The *long run cost* is defined as the costs generated by the system as follows:

$$q = f(x)$$
$$C = \sum_{k=1}^{N} p_k x_k + \varphi(k)$$
$$g(x;k) = 0$$
$$x = vector\ x; x_1 \ldots x_N$$

where we have defined the variable long run factor k. Reduced the long run cost is:

$$C = \phi(q;k) + \varphi(k)$$

Definition: The *long run cost curve* is the envelope of the short run cost curves.

2.3.2 PCS System Design: The Capital Equation

The capital in the system will be divided into two major categories; local service infrastructure (LSI) and national service infrastructure (NSI). The LSI portion consists of all elements of the system up to and including the switch. The NSI portion is all elements from the switch on back. The NSI will also include elements that comprise the databases and computer support.

A generic architecture has been developed in several fora that is comprised of elements that is shown below. The intent of the architecture is to demonstrate that the elements can have a minimal set of functionality and that the interfaces can be open interfaces that can be established as standards. Six independent elements have been identified in the architecture. They are as follows;

[9]We assume that there also exists an expansion path function, g(...), as developed by Samuelson and as shown in Henderson and Quandt, that implicitly shows the movement of resources, x, constrained to producing quantity q in an optimal fashion, see Henderson and Quandt, p. 83.

1. **Portable**: Provides the end user access to the network for voice and or data services.

2. **Local Service Infrastructure (LSI)**: The LSI provides three elements. The first is the establishment of a virtual circuit between the portable and the LSI. The second is the interconnection within the LSI covered areas between portables. The third is access to the other network interfaces to allow off net connections to LECs and IECs. It is important to note that the LSI has a sense of switching but that the implementation of the LSI switching can be implemented in many ways. The LSI service functions can be described as follows:

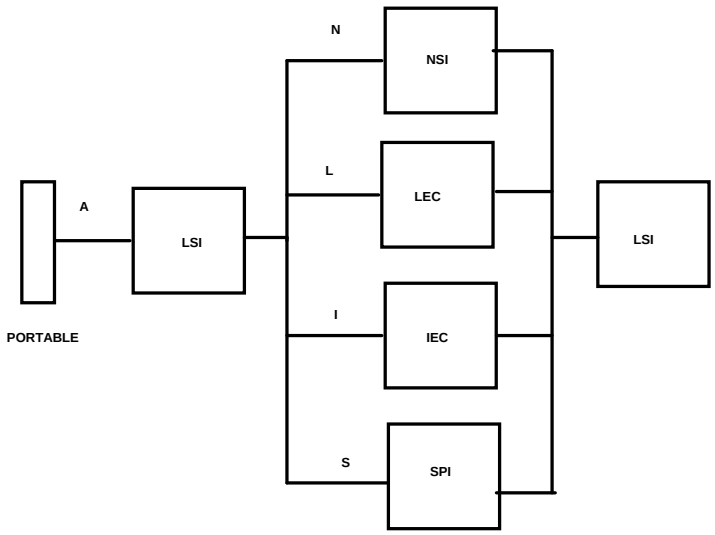
    - Call Set Up
    - Call Administration
    - Virtual Circuit Establishment
    - Call Hand Off-Intra LSI
    - Call Hand Off-Inter LSI
    - Monitoring and Control
    - Call Identification
    - Call Information Transfer

3. **National Service Infrastructure:** The NSI provides for the overall national amendment functions of the PCS network, including network management, customer service, billing, operator services and other elements.

4. **Service Provider Infrastructure (SPI)**: The SPI is a third party service node that can provide such services to the PCS users as may be found in Intelligent Network Services. These may be the services such as messaging, voice mail etc.

5. **Local Exchange Carriers (LEC)**: This is the access to the LEC and the LECs customer base. It allows LEC customer access to the LSI and the PCS customer access to the LEC customer.

6. **Interexchange Carriers (IEC)**: The IEC provides access to other inter LATA LEC customers and other PCS customers in different regions.



2.3.2.1 LSI Capital Elements

Let us first focus on the LSI elements. These elements of the capital side focus on providing the service up to and including the switching functions for the local network.[10] Let us assume that we have a given coverage area, A, and that the system has a customer base, B. Let us assume that;

$$A(t) = f_A(t, B(t))$$

and

$$B(t) = f_B(t, A(t))$$

That is the area and the base of customers are interdependent and time dependent. We define the population density as;

$$\rho(t) = \frac{B(t)}{A(t)}$$

Let us take the market numbers that we developed earlier and assume that B is the actual using customer base. Let us assume that each customer uses the phone T minutes per month, and that each call is L minutes in duration. We now define the average system load and the peak system load. Note that we will design for the peak load. The average load is:

[10]It should be noted that the local switch may be a physical reality such as a DMS 100 or 250, or it may be a virtual reality by having the Class 5 functions distributed in the cell controller elements. The author has proposed and designed systems that meet both implementation goals. Architecturally, the segmentation of the LSI into a switch begs the question of a physical switch. The reason that we have left it absent is that technology today allows for a distributed functionality. This distributed functionality makes for a dramatically different architecture.

$$\mathrm{E}_{Average} = \alpha\left(B(t)\frac{T}{30*24*60} \right) + \beta\_or;$$

$$\mathrm{E}_{Average} = \alpha\left(B(t)\frac{T}{\kappa} \right) + \beta;$$

$$where\_\kappa = 30*24*60\_(minutes\_per\_month),\ and:\ \alpha \geq 1, \beta \geq 0.$$

This yields the average number of instantaneously active channels. Clearly, this does not take into account limited time usage, nor does it take into account peak to average ratios. The peak traffic can then be written as;

$$E_{Peak} = \pi\delta E_{Average}$$

where

π *= Peak to Average Ratio*

and

$$\delta = \frac{\kappa}{DHM}$$

where

D = maximum days per month

H=maximum hours pre day

M=maximu minutes per hour

For example:

- Assume 100,000 users, each with 600 minutes of usage per month per user. The total time per month is 30 days, times 24 hours, times 60 minutes, or 43,200 minutes. If we divide 600 minutes by 43,200 we obtain, 0.0139 trunks per customer, on average. With 100,000 customers, we have 1388.9 trunks, of active circuits at any instant of time.

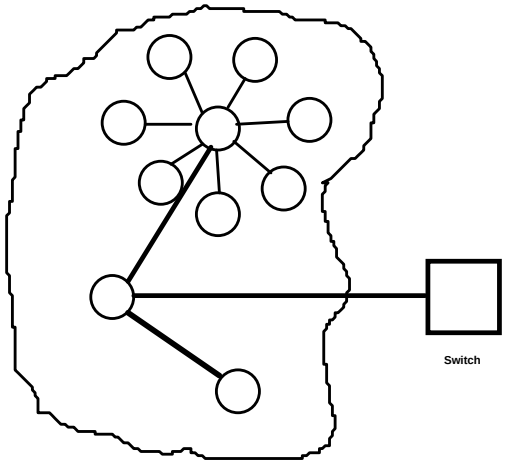
- Now assume that a customer is active only 5 days a week or twenty days a month, and only 12 hours per day, but all 60 minutes in an hour. The we have for δ, 43,200/(14,400), or 3. That is to handle this traffic we need three times the trunks, or 4166.7 trunks.

- Finally, if there is a peak too average factor that says that on any one day, we must have two times the capacity to deal with the peak loading for reasons that are related to customer call clustering, we have a need for 8,333.4 trunks for 100,000 users, using it 600 minutes per user per month.

- Using this logic all other scale numbers follow.

There are two factors that drive the design of the LSI elements; capacity and coverage. We have just described the capacity factor. It is driven by the number of customers and their usage characteristics, primarily minutes of usage per month per user. The coverage factor is generally the factor that drives the need for capital during the early stage. It is driven by the area covered, independent of the number of users covered. In PCS this will be the major factor in rapid expansion.

Consider the coverage area in the following Figure. Each cell has an effective radius R and the total area is A.



The number of cells needed to cover this area are:

$$N_{Effective} = \frac{A}{\pi r^2}\varepsilon$$

where

ε= the cell coverage efficiency factor

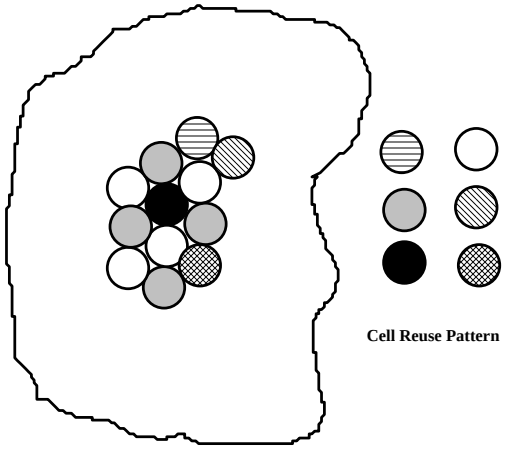
and $0<\varepsilon<1$

For example;

- Assume that the coverage area is 1,000 square miles.
- Assume that a cell can cover approximately 3 mi. radius.
- The area per cell is approximately 30 sq. mi. (actually 28.3).
- Assume the cell covering efficiency is 70%. This means that a cell can cover approximately 20 square miles.

- The number of cells needed for coverage is 50 cells.[11]

Let us now take one further step and overlay frequency. Let us assume the standard cellular bands of 1.25 MHz of bandwidth per frequency band. One band for transmit and one for receive. Let us assume that we use analog, with 30 KHz FM voice, yielding approximately 40 voice channels in this band. Let us assume that TDMA can provide for 5 times this number, namely 200 voice channels, and further assume that CDMA can do ten times, or 400. Now we must lay out the cells for coverage to ensure that the frequency is appropriately used. This is shown in the following figure.



What this says is that if we have 12.5 MHz, or ten 1.25 MHz slots, we need a pattern where there are anywhere from three to seven separate and distinct frequencies, because no two adjacent circles can have the same frequency assignment. This is the reuse of N problem.[12] However, this is not required for CDMA, only for TDMA.

Let us begin to build the capital model. Let us assume that the area is A, the customer base B, and that cells have radii of coverage of R. Let us further assume that cells are equal in coverage but come in two types, one a low capacity type and another a high capacity type. Let us define the following capital model:

$$C_{LSI} = C_{Cells} + C_{Interconnet} + C_{Switch} + C_{Backhaul}$$

where

$$C_{Cells} = N_{Type1}C_{Type1} + N_{Type2}C_{Type2}$$

Now we can define;

[11]This assumes that a cell radiates with an effective radius as stated. The definition of what is a cell will be further developed. A cell may not be what we normally expect a cell to be in the cellular context. It may be nothing more than a re-radiator of RF energy, see TTI Quarterly Report to the FCC, July 1, 1993.

[12]Lee, Cellular Communications.

$$N = N_{Type1} + N_{Type2}$$

where

$$N = \frac{A}{\pi r^2}$$

We shall not focus on the interconnect in detail and shall defer it to a reference to the detailed model. Suffice it to say that the interconnect may be telco wire, fiber (lease or build), microwave, or any other choice available such as coax.

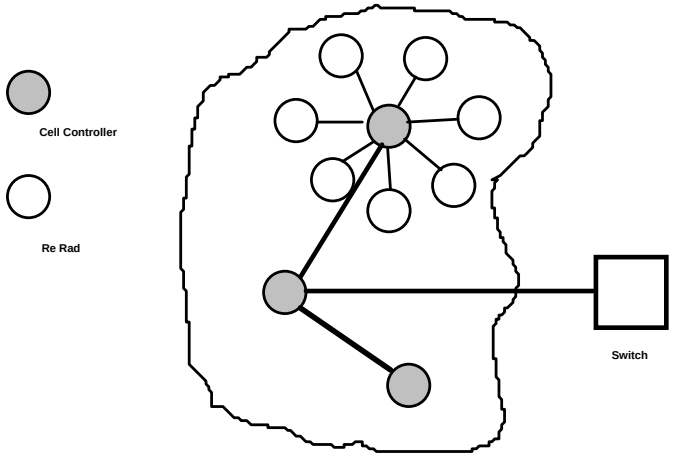
Let us no define the capital per subscriber:

$$c_{LSI} = \frac{C_{LSI}}{B}$$

since

$$B = Total\ Number\ Customers$$

Let us take this set of capital requirements and apply them to a specific case. In the Figure below, we have detailed the typical architecture for a cell system layout. It includes the following elements; cell controllers, re-radiators, cell-controller and rerad interconnects, switches, switch to cell controller interconnect. The input is from a portable that connects to a rerad or cell controller. The output is a toll tandem trunk with appropriate signaling to connect to another telephone carriers.



We shall use the example of CDMA technology to demonstrate how this new technological infrastructure can enable the new market. We shall briefly describe the CDMA system and then proceed to the financial implications of using this new technology. The CDMA system described is that of QUALCOMM [13].

[13]See the works by Gilhousen for the QUALCOMM approach. Also see the section by Pickholtz et al for a differing approach to CDMA. The latter approach is Broad band CDMA compared to mid-band.

A simple calculation will show how this new technology dramatically reduces the capital per subscriber.

- Assume that there are 1,000 square miles of coverage and 48,000 subscribers.

- Assume that a cell controller or a re-rad handles a 3 mi. radius or about a 30 mi. cell coverage area. This implies that 3 cell controllers and 30 re-rads will cover the area.[14]

- Assume that the cell-controller is equipped to handle 800 trunks per cell controller. Assume that the peak usage ratio is 5%. Thus each cell controller can handle 16,000 subscribers, 800 instantaneously active in the busy hour.

- Assume that the cell controller are about $1 million each and that the re-rads, with microwave back haul are at $50 thousand each. The total capital is $4.5 million. This is about $100 of capital per subscriber.

Now this can be compared to the capital per subscriber in the LEC and cellular environments. In the LEC world the capital per subscriber is almost $1,800. This is split between switch and transport as follows; $400 for the switch and $1,400 for transport. Namely, the LEC is outside plant dominated. Moreover, under rate of return regulation, the LEC makes most of its profit off of its outside plant. In the cellular world the capital per subscriber is $750. This includes the cells and the MTSO, Mobile Telephone Switching Office. It does not include access to the LEC Class 5 switch.

2.3.2.2 3.2.2 NSI Capital Elements

The NSI capital elements are generally computers, workstations, memory units and other MIS type systems. The capital is composed of initial fixed capital and then incremental growth capital. These have been sized and are part of the overall model. We will show their impact when we develop the design of the system.

[14]This is only possible with CDMA. If it were TDMA you could not use the Re Rads. Each coverage cell must be a TDMA cell site. This accounts for the difference between TDMA and CDMA. CDMA is the ONLY technology that allows the use of ReRads in the K=1 reuse pattern that we have been discussing. In a recent discussion with Gilhousen of QUALCOMM, on August 23, 1993, the author questioned why this was not generally understood. Neither the author or QUALCOMM staff knew why. In a recent section by Lusiginan at Stamford, the author totally neglected the reuse of 1 for CDMA and thus fell short by almost a factor of ten in his calculation. QUALCOMM has already demonstrated a reuse of 12 or greater for the past two years.

2.3.3 PCS Expenses: The Allocation of Resources

The operations of a PCS system, or any telecommunications system, for that matter, has intrinsically several costs to be included. We divide these costs into the following categories;

Cost of Goods: The costs associated with the provision of materials that may find themselves inventory. We shall consider in this case that provision of the terminal, namely the portable, as a cost of goods.

Cost of Service: This will be the costs associated with the access costs.

Cost of Sales: This is the cost of all of the elements of acquiring and maintaining the customer. It includes:

- Advertising
- Telemarketing
- Marketing
- Product Development
- Billing
- Customer Service
- Promotion

Cost of Operations: This includes the LSI Operations as well as the NSI Operations. Specifically:

1. **Local Service Infrastructure (LSI):** The operations functions of the LSI are as follows:

- Installation
- Local Operations
- Local Engineering
- Carrier Support

2. **National Service Infrastructure (NSI)**: The NSI provides a set of comprehensive functions. These are:

- Network Management
- Customer Service
- Billing
- Network Management
- Telemarketing
- Roaming
- Inventory Management

- Operator Services

The cost model for the above elements can be developed as follows. We have developed and used a three part model. It consists of a revenue driver, a productivity factor and a unit cost approach. In this model we assume that all costs are revenue driven, name market driven. That is the entrepreneur will not invest until such time that there is a clear and simple market opportunity. It assumes further hat the entrepreneur will allocate costs on the basis of a know risk, and that risk is general the appearance of a new customer. It further assumes that Long Run costs can be achieved by the near real time optimization of costs in the system rollout.

We define the three element as follows:

Revenue Driver, R: The revenue drive may be as simple as the number of customers or the number of new customers. Clearly the customer service and billing functions are driven by the number of customers. The sales effort is driven by the number of new customers. The cell maintenance function is driven by the number of cell sites which in turn is driven by the number of customers.

Productivity Factor, P: The productivity factor reflects how the operations reflects revenue drivers into human resources. For example in customer service it is in terms of the calls per customer per day, the holding time per call, the hours per day per customer service representative. This results in the number of customer service representatives per unit revenue driver.

Unit Costs; U: The unit costs are the costs associated with the labor and other units of production used in the operations model.

This then yields a cost for unit k as:

$$C_k = RD_k PF_k UC_k$$

Then the total operations costs are;

$$C = \sum_{k=1}^{N} C_k = \sum_{k=1}^{N} RD_k PF_k UC_k$$

Then we have for the total cost function the following, where we have parameterized it on time units, k, and have further included all cost elements. We can simplify this and wecan be placed in the general cost form as we have used before. This then is the general cost equation for LRC.

2.4 PCS Case Studies

This section presents the results of analyzing the costs from the model developed in the last section. We have considered two cases; CDMA and TDMA. In both cases we have developed a detailed model of the service and the system and have used the technology that is described in the previous sections.

2.4.1 Several CDMA Cases

The following are the results of the CDMA case analysis. We have assumed that CDMA is implemented as we have shown before. We have determined the average and marginal costs and expenses, respectively, for the case of no access and for the case of access. We have assumed 600 minutes of usage per customer per month, an area of coverage of 2,000 square miles and a population of 4 million in that density. We have included the following elements in the deployment strategy:

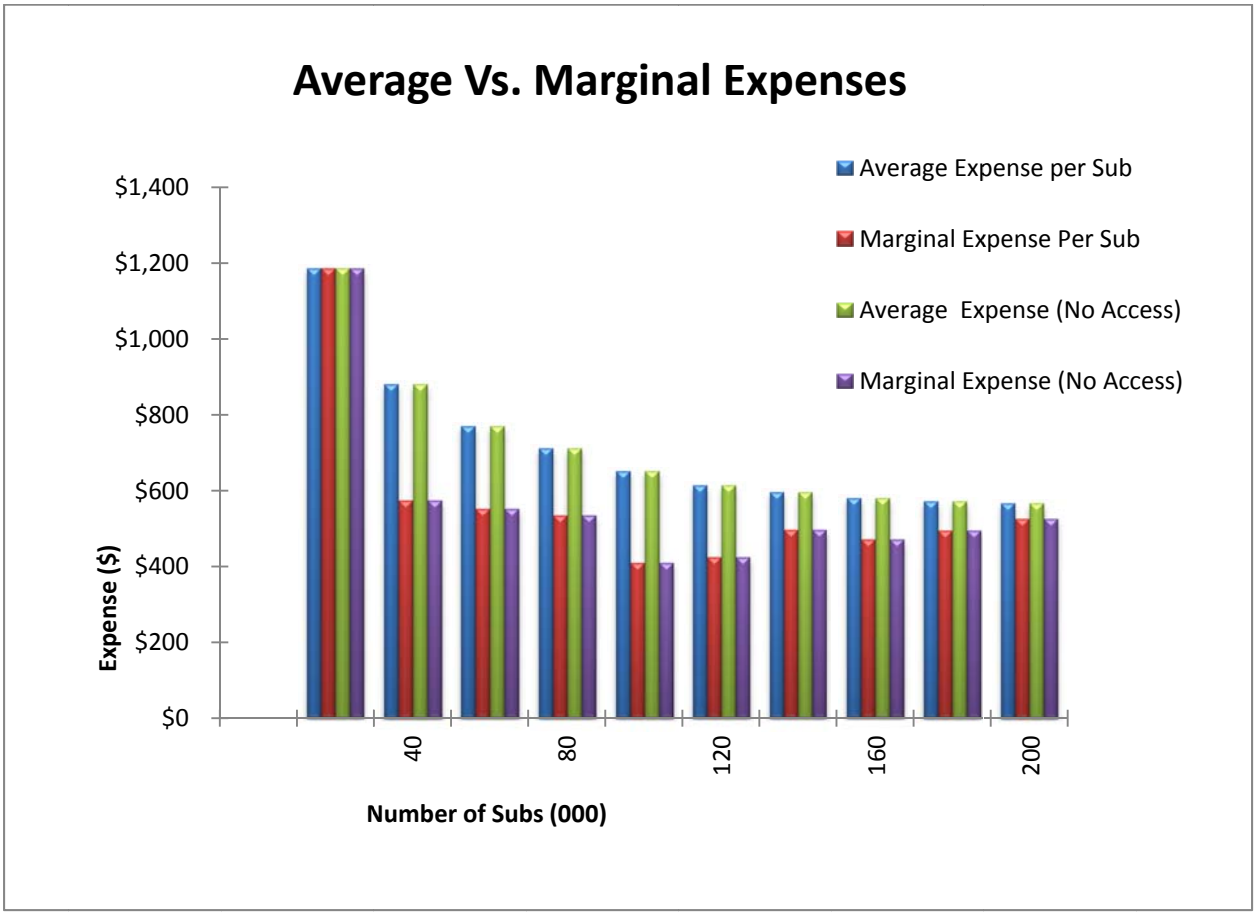
- Assume that the set is part of the sales, namely a cost of goods. There is no separate buy of the set.

- Assume that the sales channel is a direct advertising sales channel that takes inbound telemarketing calls and directly ships the set.

- Assume that the access fee are averaged at $0.05 per minute.

The following figures shown the results of this analysis. The first is the cost per subscriber.

Figure: CDMA Costs Per Sub



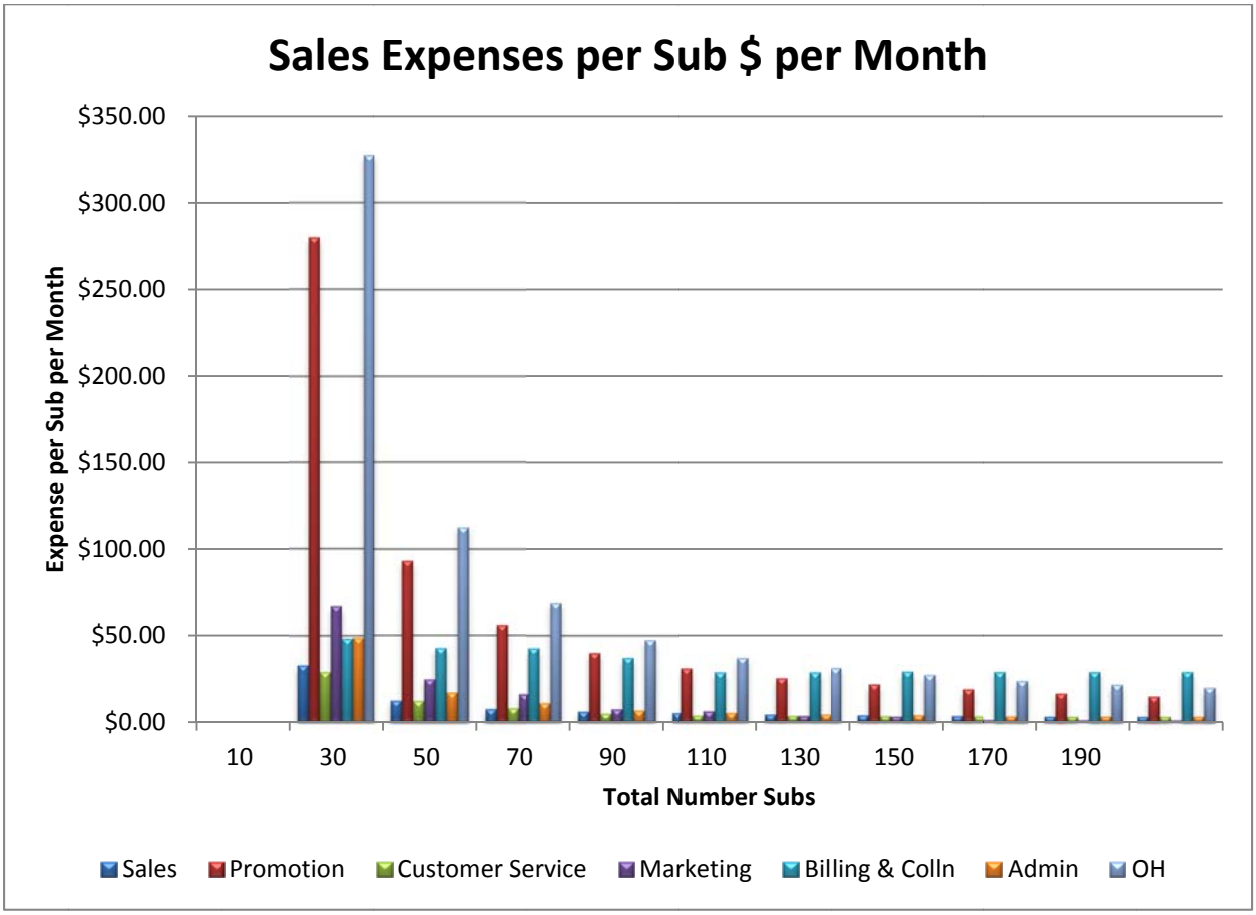
Note in the above figure that the average and marginal costs are approximating each other in a fairly short time period.[15] The costs include capital averaging. Note also that there is a wide gap due to access fees that offset the two numbers by more than $400 per sub per year. This offset is significant, and as reflected in the costs will cause a barrier to entry.

The next figure shows the expense numbers. This reflects depreciation rather than capital. Note that with the assumption of giving the set away, with establishing a new infrastructure, with acquiring the new customers, that the access free case shown a cost base that can compete very well with the LEC in cost based elements. In addition, note that the marginal and average costs approach each other very rapidly thus eliminating scale.

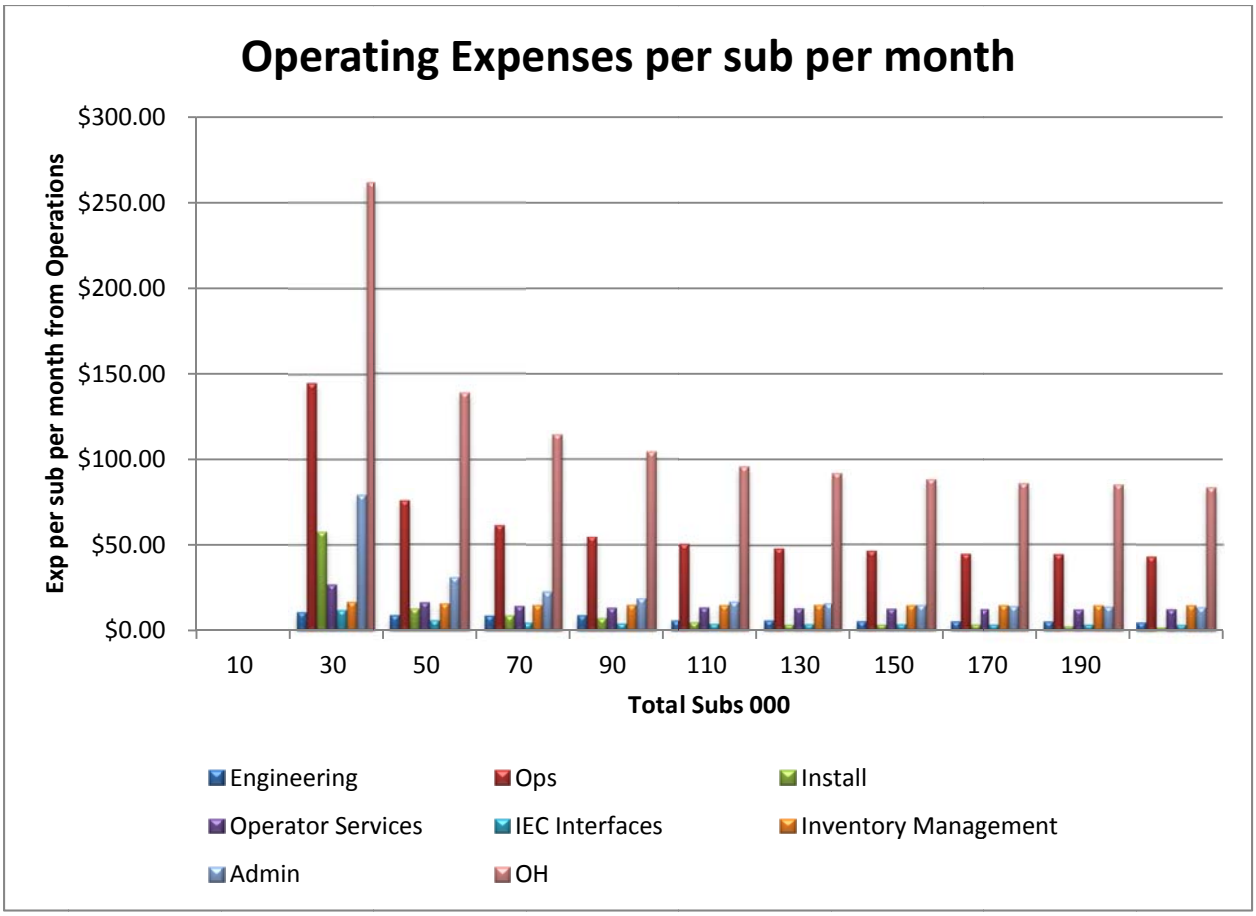
[15]It should be noted in these figures that the marginal costs are not smoothed and show significant "noise" due to the resolution of the model. This can be improved upon by a more complex analysis of the marginal analysis.

Figure: CDMA Expenses Per Sub

First for Sales related costs we have.

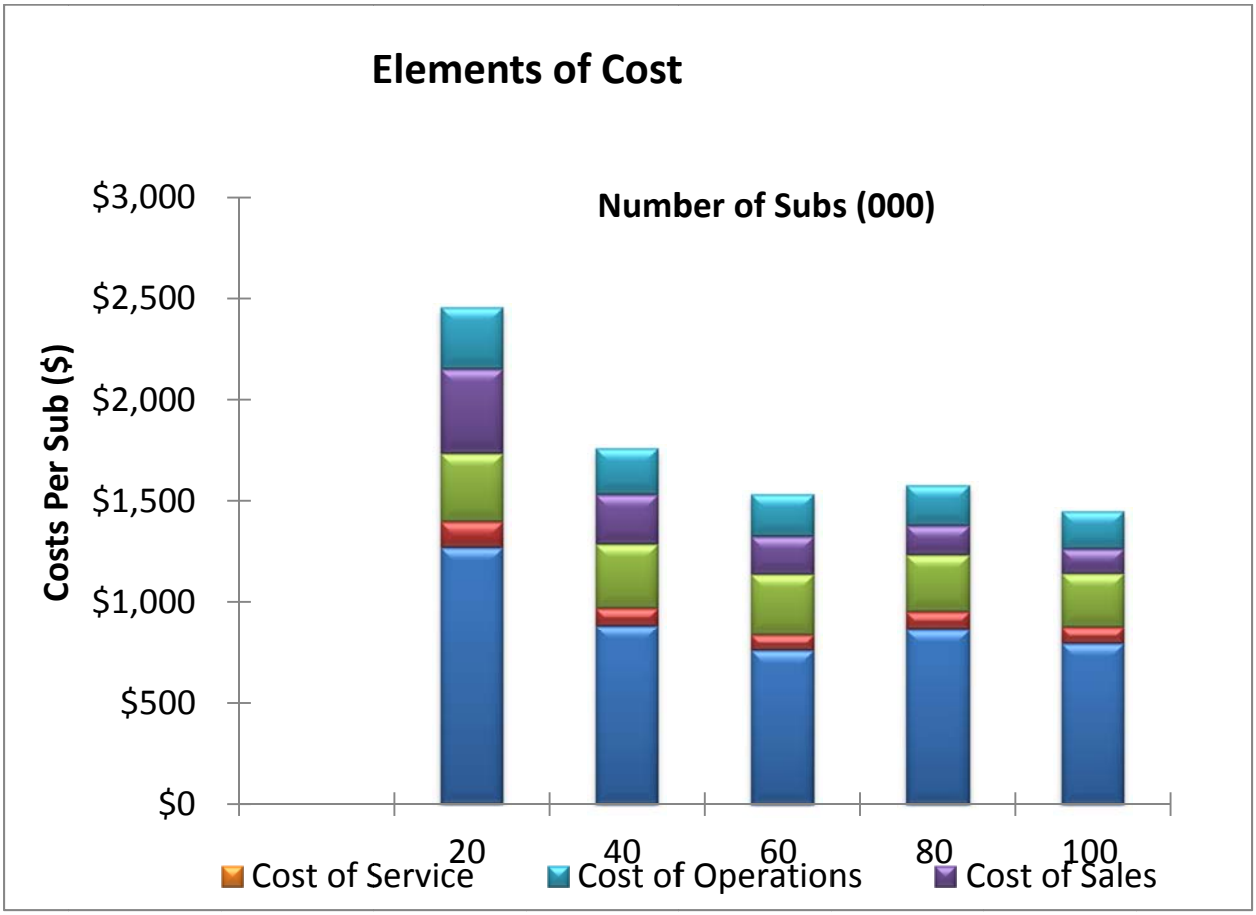


Then for operating expenses we have.



The next figure shows the flow of costs and expenses as we progress in the development of the system.

Figure: CDMA Cost Breakout



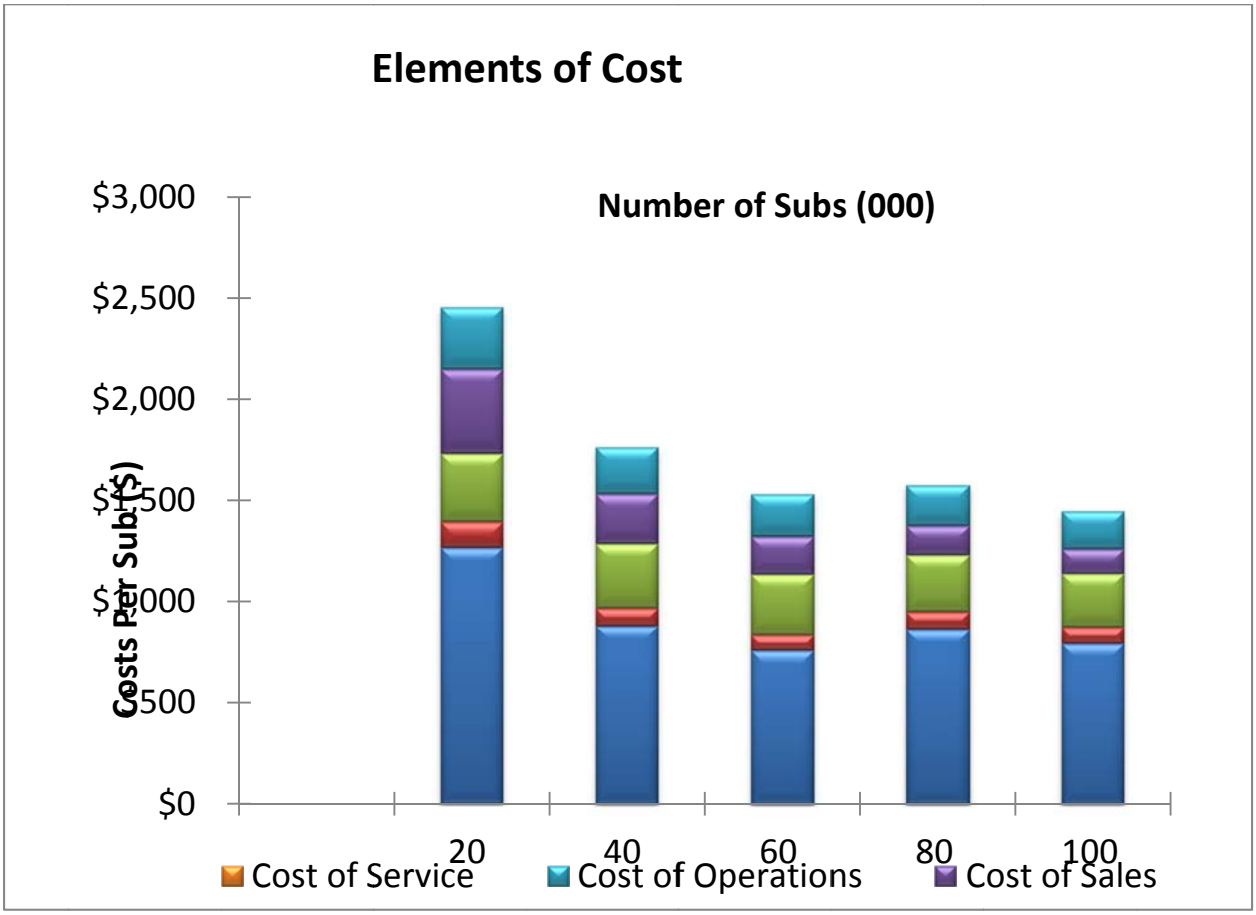
The three largest elements are capital, cost of goods and cost of service. The cost of the service, namely access is the second largest cost element. We have assumed that the set is bundled with the costs of the product offering, and thus is the third largest costs element. Sales, Operations, and Depreciation are nominal in comparison to this cost structure.

There are several conclusions regarding CDMA. As we have argued, CDMA optimizes the issues of capacity and coverage. It minimizes the costs as we shall see when looking at TDMA. CDMA is most likely the optimal solution in providing maximum net present value at minimal peak cumulative negative cash flow.

2.4.2 4.2 Several TDMA Cases

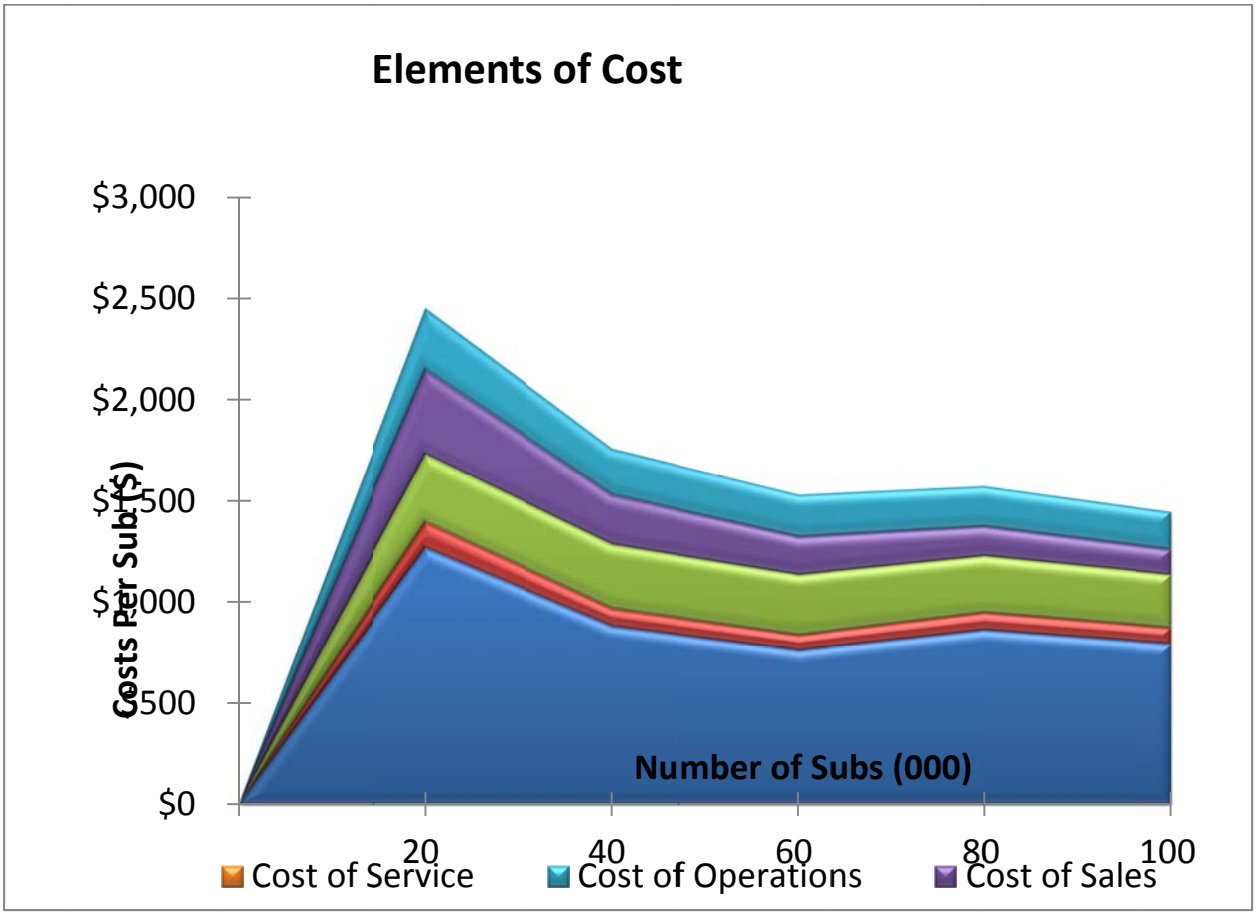
We now present several TDMA cases. Unlike CDMA, the TDMA design needs cells at all locations, and cannot function with Re Rads. This will dramatically increase the capital requirement. All other costs should be comparable, with the minor exception of Operations and Maintenance which are increased by the increased cell count. The first figure depicts the cost elements.

Figure: TDMA Cost Structure



As we can see, the TDMA cost elements reflect similar structure with the major exception of the capital base. The TDMA design needs almost $1,000 in capital per subscriber more that CDMA. This is a combination of coverage and capacity inefficiencies. This is not inconsequential. It is interesting that Bellcore has been forcefully pressing TDMA in its standards efforts. This approach will add additional burdens on any potential LEC competitor and make the capital structures of the wireline and the wireless carrier comparable. The following figure depicts the detailed costs elements.

Figure: TDMA Cost Elements



The conclusions drawn in this figure also reflect the same result as with CDMA. The only significant difference is the capital element.

2.4.3 The Existence of Scale

In this section we develop a definition of scale that attaches a more rigorous set of strictures than is normally found in the accepted definitions. This will allow us to expand further upon the issues with the systems developed above.

Definition: An **economic entity**, ℵ, has **economies of scale**, if for any ε, there exists a δ, such that, [16]

Theorem: If the Cost Function, $C_{LongRun}(q)$, is concave, namely:

[16]The use of the Long Run costs for scale is obvious and follows from the works of Kahn, Spulber and others.

where:

Proof: The proof of this follows directly from the continuity of functions.[17]

Corollary: An economic entity, ℵ, has economies of scale, if;

Proof: This follows directly from convexity arguments.

Applying this to the above discussion, demonstrates that scale is minimal in the PCS system so described.

2.4.4 4.4 The Impact of the Access Fee

We now develop the analysis that allows us to determine the impact of access fees and other similar barriers to entry in this PCS market. We do so by developing a set of examples based on the two extremes of RBOC and Non-RBOC competition.

Case 1: LEC Wire Based

The LEC currently has invested about $1,800 of capital per subscriber with 20% of that in inside plant and 80% in outside plant. The LEC currently uses cost based rate based pricing for their services. Thus, the LEC has a expense plus depreciation supply model that does not reflect any market or technology economies. More importantly, the LEC has a profit defined as:[18]

Profit = RoR (Accumulated Capital - Accumulated Depreciation)

where RoR is the PUC accepted rate of return. To maximize their profit, therefore, it is prima facie required to maximize the capital plant. Thus there are de minimis needs to reduce capital through capital innovation.

Case 2: PCS Wireless

Technology has changed dramatically in the past five years. The two current ways of providing voice service are via wireline twisted pair telephone service and through cellular voice service.[19] New technological innovations have allowed the wireless PCS services to be provided by another form of technology. This technology takes advantage

[17]Rudin, p.88.

[18]Brenner or Spulber. Both references describe the rate of return regulation.

[19]See the works by Lee. The author has provided several key bodies of analysis that provide insight into the history and current status of cellular.

of a distributed telecommunications architecture and places as much "silicon" in the field as possible. It also performs as much processing as possible so as to minimize the functions required by the LEC interconnect.

Let us now take these two models and determine what the value is for each of these business. This is at the heart of the dynamics of and allocation process based upon a bidding or auction mechanism. Let us create a NPV, net present value function that uses revenue, expenses and depreciation. [20] If m is the cost of capital or the effective discount rate at the defined risk level, than the NPV can be defined as;[21]

$$V(N) = \sum_{n=0}^{N} \frac{R(n) - E(n) - C(n)}{(1+m)^n}$$

We can define this NPV on a per customer basis. We further use a time horizon of N years for the measurement of the NPV. We shall use the life of a PCS license, assuming fifteen years.

Now we can expand this concept one step if we assume that there is some form of tax, foe example an auction fee or a franchise fee. Let us assume that there is a "tax" due to some form of U.S. Government allocation process. Call that tax, T. This then reduces the NPV as shown in the following.

$$V^*(N) = \sum_{n=0}^{N} \frac{R(n) - E(n) - C(n) - T(n)}{(1+m)^n}$$

Now we can further add to the tax, the access fee. Let A be the access fee. Then the PCS carrier faces the following NPV function;

$$V_{PCS}(N) = \sum_{n=0}^{N} \frac{R(n) - E(n) - C(n) - T(n) - A(n)}{(1+m)^n}$$

In Contrast the LEC has the value;

[20]It should be noted that this should be revenue, expenses and capital. We shall assume that we can use depreciation since there may be a leasing function available. This is truly an inaccurate method for NPV but it allows a first order comparison of LEC and PCS on a per subscriber basis. A more detailed model has been developed by the author and presented elsewhere, see McGarty, CMU, 1992.

[21]McGarty, Business Plans. See the details on the definition of NPV and its evaluation. In the proper sense it does not include depreciation but capital.

$$V_{LEC}(N) = \sum_{n=0}^{N} \frac{R(n) - E(n) - C(n)}{(1+m)^n}$$

It should be immediately clear that the LEC, even if it is more economically efficient can reduce the net present value per customer of the PCS company by four means;

(i) **Access Fees:** The LEC can burden the PCS company with and access fee, such as the $55 per month number in New York, that makes the PCS company, in any circumstance non-competitive.[22]

(ii) **Auction "Tax"**; The "Tax" can be structured in such a fashion, as is currently being lobbied by the RBOCs in Congress, as a large up front payment,, that increases the risk and further reduces the NPV for the PCS company.[23]

(iii) **Increased Risk**: The cost of capital, m, can be different for the two companies. Specifically, if m_{LEC} is the LEC cost of capital, generally a very low cost due to its existence and capital raising capacity, and if m_{PCS} is the cost of capital for the PCS entrant, then we find;[24]

$$m_{PCS} >> m_{LEC}$$

Specifically:

$$V_{PCS}(N) = \sum_{n=0}^{N} \frac{R(n) - E(n) - C(n) - T(n) - A(n)}{(1+m_{PCS})^n}$$

for the PCS entity, and;

$$V_{LEC}(N) = \sum_{n=0}^{N} \frac{R(n) - E(n) - C(n)}{(1+m_{LEC})^n}$$

[22]McGarty, Wireless (MIT, 1993). The author details the impact of access fees on PCS and details the potential for violation under Robinson Patman. It is not clear if there is any violation per se but the issue of internal transfer pricing of switch access at possible rates less than long term average costs and having the IECs and other CAPs effectively underwrite these costs are in question. Another factor that delimits access indirectly is that of number availability through the North American Numbering Plan (NAM), see Brenner, p. 19. The NANP can also be an access barrier to entry to any potential competitor. It is controlled by Bellcore, the R&D arm of the RBOCs. Bellcore is generally difficult to deal with and as has been seen in the cellular world the ability of Bellcore to manipulate the numbering plan can add additional costs and market delays. It is an issue that the Commission must address if it truly seeks competitive options.

[23]Clearly this is a Fiscal Policy element that impacts the Industrial Policy element. The author suggest a balanced of risk sharing. This approach is a modification of the policies developed by Solow in the area of Growth Theory and have been positioned in a similar fashion by Arrow.

[24]See the reference by Kolbe where he develops the details on rates of return and the cost of Capital for utilities.

for the LEC.

Thus, the LEC, can through its entrenched position, increase the risk level and, in turn, reduce the NPV, indirectly, through the cost of capital.

(iv) **Monopoly Rents**: The LEC, as a monopoly, has what is termed monopoly rents resulting from its monopolistic control over the property. This rent, as we shall discuss in the next section, acts in a bidding process, as a price escalator. Namely the LEC, if in the bidding process, can bid an amount that is consistent with its NPV, plus the amount equal to its existing monopoly rent. Namely; if MR_{LEC} is the LEC monopoly rent, as defined in the next section, then the NPV_{LEC} is;

$$V_{LEC}(N) = \sum_{n=0}^{N} \frac{R(n) - E(n) - C(n)}{(1 + m_{LEC})^n} + MR_{LEC} \quad >>$$

$$V_{PCS}(N) = \sum_{n=0}^{N} \frac{R(n) - E(n) - C(n) - T(n) - A(n)}{(1 + m_{PCS})^n}$$

Note, that the LEC now has four factors that increase its value for bidding for a wireless property. The LEC has such strong market power that it could, in a collusive fashion, between and amongst themselves, dominate the new PCS market. All one has to do is look at the current Cellular markets and see that they dominate by almost 70% all current cellular properties and if one adds AT&T, it is almost 90% of the major markets.

We provide a brief overview of the microeconomic models in order to show the impact of the results presented in the last section. The following Figure depicts the market for this type of telecommunications services. We define P(q) as the demand curve, and define MD as the marginal demand. We define MR as the marginal revenue, where MR is given by;

$$MR(q) = \frac{\partial R}{\partial q} = \frac{\partial pq}{\partial q}$$

$$= q\frac{\partial p}{\partial q} + p$$

$$= p - qP^*$$

That is the marginal revenue is always the demand curve less the factor associated with price and prices sensitivity. Therefore, the MR, marginal revenue always lies below the demand curve.. The marginal cost curve, MC, is the supply oriented curve. It is as shown. Recall from the last section, we have developed a simplistic model of the marginal cost

curve for both LEC and PCS businesses.Recall, also, that the profit maximization stable points for a competitive market and a monopolistic market are as follows:

Competitive:

MC(q)=p(q); defines the q_m point on the demand curve.

Monopoly:

MC(q)=MR(q); defines the q_m point on the demand curve.

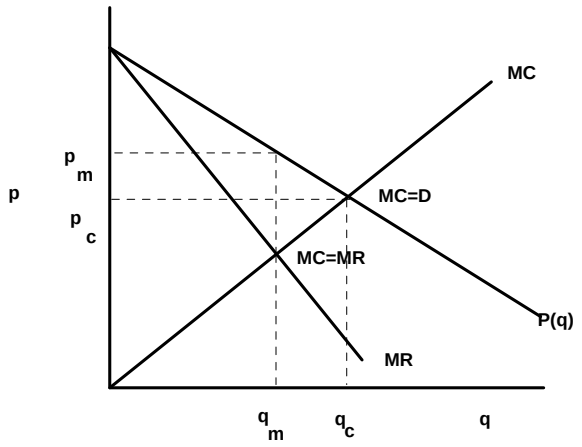
Therefore, the monopoly player can charge a higher price, p_M, as compared to a competitive play, charging, p_C. We show this in the following Figure. Note also that the monopoly player has a greater profit. Specifically, it can be shown that the price of a monopoly player is $P_{\mathbf{MONOPOLY}}$ as compared to the price of a competitive player, $P_{\mathbf{COMPETITIVE}}$, and that they are related as:[25]

$$P_{Monopoly} = \frac{P_{Competitive}}{1 + \frac{1}{\frac{\partial D}{\partial q}}}$$

Since the elasticity of demand is negative, the price of the monopolist is greater. Moreover, in the PCS and LEC environment, the LEC if it retains its monopoly position can retain the excess monopoly rates and thus retain monopoly profits, which are competitive profits plus the monopoly rent. In the following Figure, we first note that the monopoly demand point, q_m is where MC=MR. The price depends on where this demand quantity intersects with the demand curve, p(q). However, in the competitive case, the market equilibrium is where the demand curve equals the MC curve.

[25]Pindyck and Rubinfeld, p. 343. This shows the added monopoly power in pricing of the LEC in a potentially competitive market.

Figure: Microeconomic Analysis of Monopoly vs. Competitive Markets

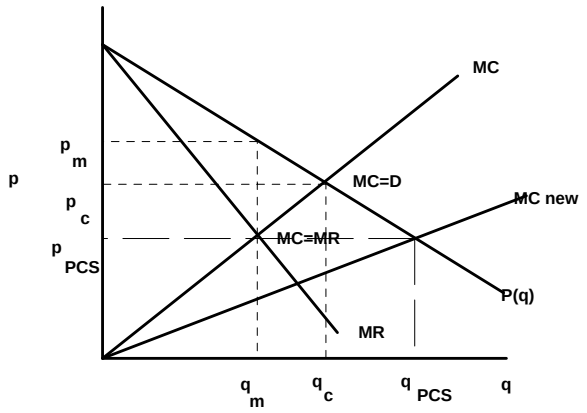


Monopoly rents are the excess profits that accrue to a monopoly player, such as an RBOC acting as a LEC, in the absence of competition. This "rent" is a premium resulting from their single market dominance, and results in an increase in the NPV of the property if this rent can be retained through continuing monopoly control. In the following Figure we depict the microeconomic situation with a monopoly and a competitive environment,. Here we show the competitive price at p_C and the monopoly price as shown before.

Moreover, in the Figure we show that the competitor now has a marginal costs curve below that of the monopolist as shown for PCS. The effect is dramatically increased demand at a dramatically lowered cost to the consumer. This is a Pareto efficient case.[26] However, this assumes that the Taxes and Access fees were not present. If these fees and taxes are added, then the new marginal costs may, as we have shown, exceed the marginal costs of the monopoly. This is and artificial cost increase, driven by Government fiat and not market forces. It is an artificial manipulation of the market mechanism that further entrenches the monopolist.

[26]Henderson and Quandt, p. 286. Also termed Pareto Optimal, this implies, "if production or distribution cannot be reorganized to increase the utility to one or more individuals without decreasing the utility to others. "

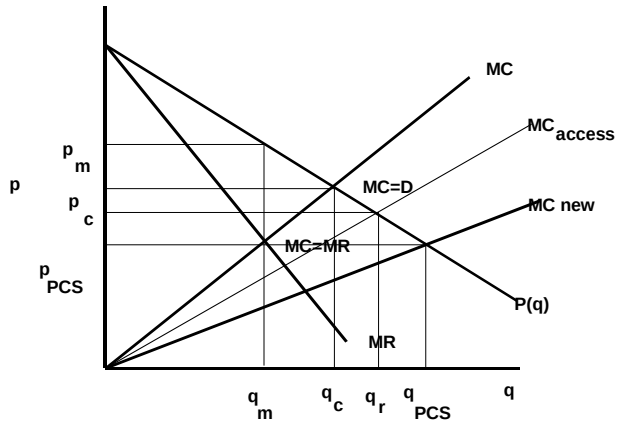
Figure: Competitive Environment with New Technology



The deadweight loss is defined as the value of the dotted triangle that appears between the p and MC curve.[27] It is in effect the monopoly rent.

We can now determine the effects on competition with the addition of access fees. The same argument will hold with regard to the addition of the "Tax" fees. The next Figure depicts the results with access added. Specifically, we show the case of the access fee added. This reduces demand, increases costs, and further puts the new entrant in a non-competitive position with respect to the entrenched monopolist.

Figure: Competitive Environment with New Technology and Access Fees



Innovation in technology can be supported or destroyed by Government actions as we have just demonstrated. It can be shown that if a new technology is introduced that will

[27] See Tirole or Pindyck and Rubinfeld.

reduce the MC, marginal cost, from c_{old} to c_{new}, where $c_{old} >> c_{new}$, then the value to the monopolist in not allowing this change to occur can be shown to be:[28]

$$v_m \frac{1}{r} \int_{c_{min}}^{c_{max}} D(p_m(c))dc$$

where D is the demand function, and r is the cost of money. The valuation is made at the price point of optimization. Thus there is a further incentive by the LECs to hinder new technologies. This has been shown to be the case in two specific recent examples. Consider first the attempt by Bellcore to position PCS as nothing more than a slight extension of the wireless phone.[29] The Bellcore position is that all wireless users should use older technology and use the existing telephone network to act as a backbone in support of the telecommunications infrastructure.[30] What this does is drive up the costs and further entrench the monopolist. It also reduces the chances for technology innovation. The second example was in the RBOC battles over a new generation access technology for cellular. This was and still is the CDMA versus the TDMA battle. It is in essence an attempt to maintain the high costs of infrastructure and in order to maintain the high barrier to entry despite the ability of technology to reduce it.

2.5 Additional Infrastructure Elements

One of the issues in building a PCS system is that of NSI costs and how they are best handled. This begs the question of scope in this business. As we define scope, it implies that a business entity that provides a portion of an infrastructure element, such as billing, and that since it may do so in another part of its business, it is a fungible assets that can be leveraged in multiple business elements. We shall argue that this reasoning has open questions that need answering, and that the scope that may exist in PCS is questionable.

2.5.1 Displaceable Costs and Economies of Scope

In the preceding section we have developed a model for the delivery of PCS services that combines capital, cost of goods, cost of service and cost of expenses (sales & service, and operations and maintenance). We can generally group these into the following form:

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[28]Tirole, p. 391. The author develops this relationship in the context of the "Social Planner" model. It also represents the bidders excess prices that an LEC may bid to keep the competition out of a market.

[29]Cox. This section summarizes the attempts by Bellcore to delimit technology innovation. There is a blatant attack on CDMA technology because it frees the wireless provider from the LEC network.

[30]In a recent FCC report, see Reed, the Commission Staff indicated that in its analysis there was limited scale economies but significant scope economies. The scope was based on cable and LECs having infrastructure. In McGarty, Wireless, the author demonstrated why the argument is specious in the context of the CATV entities. As regards to the LECs, that argument is also invalid because it assumes a technological solution consistent with the Bellcore approach of many microcells, being nothing more than extensions of wireless phones in the home, the cordless phone. This is a specious argument since it is based upon the Bellcore technology which begs the answer of continued reliance and support of the monopoly LEC.

$$C(q) = C_{Capital} + C_{CostofGoods} + C_{CostofService} + C_{Sales\&Service} + C_{O\&M}$$

Let us consider a more specific case. Let us focus on the issue of billing. A firm has several product entities that all require a billing function. The firm has the choice of building the billing function and then leveraging it across it different business units. In so doing, it arguable may have economies of scope, and thus the costs of billing in unit 1 may be lower than the costs of billing in unit 2. This arguable is a result of common software, common infrastructure, common experiences, or otherwise. This is the essence of scope. Spulber details this in a general form. The definition according to Spulber is as follows:

Definition: A firm has a technology that is described by a cost function as follows;

$C(Q;w)$ is the cost function; $Q = \left(Q_1,...,Q_n\right)$ is the vector of outputs, and;
$w = \left(w_1,...,w_k\right)$ is a vector of input prices.

The cost element is continuous, twice continuously differentiable and non-decreasing.

Definition: A firm with the above structure has a *stand alone cost* defined as;

$C(0,...,Q_I,...0) =$ stand alone cost of Good I.

Then we can define a special structure of such a good.

Definition[31]: The firms *technology is non-joint* if and only if the cost function can be written as the sum of the stand alone costs, specifically;

$C(Q;w) = \sum_{l=1}^{m} C(0,...,Q_l,...,0)$ for all Q and w.

The implication is that if technology is non-joint that production may be organized efficiently into single product firms. For multi-product firms to yield cost efficiencies, Spulber notes, there must be returns to common or joint production of outputs, as we have discussed in the billing example.

[31]Spulber, p. 114.

Definition: Let M be a product set and let S be some subset of M. Let Q_S represent the output vector Q with outputs Q_l not in the set S equal to zero. Then; the cost function,

$$C(Q_S) + C(Q_T) > C(Q_{S \cup T})$$

C(...), exhibits economies of scope if for any nonempty set S, T of M, with the intersection of S and T being non-empty,

This again goes back to the issue of billing. Scope exists in a LEC if billing for LEC wire based customers plus wireless customers is less than billing for both separately. This is not the case. There are two billing infrastructures, and those companies that have attempted this have found that there are minimal commonalties between the two.[32]

Let us consider several of the NSI functions. Specifically;

- Billing
- Customer Service
- Network Management
- Telemarketing

Each of these functions are today provided by outsourcing service bureaus. Such companies as EDS, IBM, CSC and others provide these functions. There is clearly scale in these functions, and there may be limited scope. For example, a cellular billing service bureau, such as EDS, which bought Apex, can provide many cellular companies with lower costs per bill than if the company did it itself. This is more scale than scope. Specifically, if the billing requested from the service bureau is the same for all purchasers then the cost per using per purchaser will be lower than the cost of the purchaser doing it for themselves. However, the costs for doing a different billing service will be more expensive. All one has to do is ask the vendors for quotes on such services.

The conclusion is twofold:

- ***Scope does not exits in PCS between the LEC side and the new business side. The difference is function is too dramatic to allow the capture and amortization of common costs.***

- ***Displacement of service acquisition and provision by service bureaus or outsourcing can leverage on scale and provide common services at lower unit costs. Scope is not the facto, scale, is.***

[32]The author, while an officer at NYNEX, and while responsible for billing, among other Operations items, developed a separate cellular billing system. This was necessary from an operational perspective since there was no way the existing software could accommodate the bills used in cellular. Furthermore, it would have been more efficient to buy the billing services from a cellular service bureau rather that build that system. We shall discuss this issue latter in this section.

2.5.2 Lease versus Buy: Is Financing Important?

The next issue is one of economic and practical importance. It is the issue of what are the costs that are used in determining the economic structure of a business. It has been argued that depreciation is an accounting factor and that true capital costs are required. Further, it is argued that the financial structure of a business in terms of debt structure, or otherwise must be neglected in determining the rate of return and net present value on investment cash flows.

The net present value analysis of a venture does not include the financing structure of the capital plant. This distorts the NPV of the investment. The NPV is calculated on the basis of an all equity investment. It is only after that, that the effects of financing on the venture are determined. Economic costs are those costs incurred by the firm in providing the business services. These costs are generally independent of financing also. However, there is an issue of lease versus buy.

Consider the issue of billing again. There are three ways a firm may do billing:

1. Design and build from the ground up a billing system, including developing the software and buying the hardware.

2. Lease a computer system and buy an already developed software package.

3. Buy the service from a third party service bureau at a cost per sub per month.

Now the issue of scale and scope must reflect the structure of the firm under these three scenarios. These are more than simply financing scenarios. They reflect strategic alternatives to the operations of the business. Scenario 1 will clearly show significant scale. By definition, the capital will be significant and will requires dramatic increases in the costs per sub at low sub numbers. Scenario 3 is a viable strategy if there are well defined billing constructs that have common acceptance in a large user base. The truth of the matter is that Scenario 3 is the optimal strategy for most applications, due to scale and not scope. It is the analog of lease versus buy.

2.6 Policy Implications

This section develops policy perspectives from several different angles. We look first at the issues associated with co-carriers status and then address the issues relating to auctions. We then focus on antitrust issues and the basic Constitutional concerns the build both from the issue of antitrust and the broader issues that relate to access. We conclude with a brief discussion of the current PCS contenders and their respective strategies.

2.6.1 Common Carrier and Co-Carrier Status

PCS can become a common carrier. All this implies is that PCS is open to any subscriber and that the provider cannot discriminate on the sale of the service. Common Carriage does not imply tarrifing. It is anticipated that all PCS providers will be common carriers.[33]

The evolving policy directions that handle these factors are the development of a co-carrier concept and the resulting elimination of the settlements process. Consider first the co-carrier status. A co-carrier is any local exchange service provider whose customers have common carrier access to their local exchange provider and desire access to other common carrier providers in a competitive environment. A common carrier can become a co-carrier by acclamation and by operation. The net result of co-carrier status is that the originating carrier pays the terminating carrier an access fee. The net amount paid between the carriers is termed the settlement. This process was common prior to divestiture.

The payments of settlements and the agreement between co-carriers to pay access to terminating carriers begs the question of access equality and fairness. As we have shown in an earlier section, a more efficient provider is taxed by the less inefficient, and in turn the inefficient is subsidized by the more efficient. In addition, if a carrier decides to offer service at a fixed fee, unlimited local usage, its costs of billing are de minimis. Thus its costs of settlement are significant.

Consider an example of a competitive PCS company and an existing BOC. Let us assume the following:

- *A user has 500 minute of usage per month.*
- *The PCS company has fixed fee, unlimited local usage, and the cost per customer per month per bill is zero.*
- *Assume that the BOC bills as they do currently and assume that the BOC cost per bill is $1.75.*
- *Assume that the traffic from the PCS company is 275 minutes to the BOC and 225 minutes from the BOC. Thus there are 50 minutes per month to be settled. This is a 10% difference in traffic flow.*
- *Assume that the access fee is $0.02 cents per minute, or a settlement of $1.00 per month.*

[33]The Commonwealth of Massachusetts issued the first PCS Common Carrier Certification, without restriction, to Telmarc Telecommunications on August 23, 1993. This is the first of its kind. TTI subsequently filed for co-carrier status as argued in this section.

- *Assume, further, that the PCS company must now install a billing system at the cost of $1.75 per customer per month to establish settlements.*

- *Then, the PCS customer will be further taxed by the addition of the $1.00 plus the $1.75 to measure the $1.00 settlement.*

- *Therefore, it is argued that from a pubic policy perspective, settlements should be abandoned.*

The co-carrier status can work most effectively if and only if settlements, and thus access fees are eliminated. To summarize, this is because the fees are subsidies to the inefficient, and the imposition of the fees will create additional costs that the consumer must bear to clear the fee structure. Thus it is clear that the economically most efficient method is to eliminate access fees totally.

2.6.2 Auctions and the Constitutional Implications

Auctions are processes and procedures developed and conducted by the federal Government under the premises of establishing a market value for spectrum and returning that value to the tax payer. Such a procedure has not been achieved in the spectrum area to date but has been achieved in oil and gas and in lumber and other natural resource areas. Thus the Federal Government has a set of precedents that it can legally build upon in this area. However, there is a dramatic difference in PCS and similar areas with the presence of he RBOCs and other Government "sponsored" monopolists in the market which, as we have argued have a significant advantage accruing them from this monopoly position.

Congress and the Administration have before them a set of policy and legal options which will determine the future of telecommunications in the United States for the next decades. The issue is the allocation of spectrum for the purpose of providing innovative telecommunications services, such as Personal Communications Services, PCS. The key public policy objectives are:

Service Objective: *The service should be, at a minimum, of toll grade quality, supporting both voice and data, and provided in a national seamless interoperable network, on the most cost effective basis.*

Valuation Objective: *The bandwidth should be valued on a fair market basis, assuming that all bidders can bid on a fair and equitable basis, with their reservation prices reflecting their individual abilities to meet the Service Objective through innovative technologies.*

Equity Objective: *The entitlement to participate should be based in equity and should consider the following factors: the ability to deliver the service, the early commitment to innovation, the entrepreneurial contribution to the development of*

a national service and infrastructure, and the ability of the entity to create value for the nation through jobs, technology, or infrastructure.

The service objective is a public policy objective and supports the industrial policy of creating innovative infrastructures in a highly competitive fashion. The valuation objective is a fiscal objective that attempts to validate new entrants into the market, while returning value to the public. The equity objective acknowledges the contributions made by pioneers in this new area and confers Preference as a result of their efforts to date.

The overriding concern is for the Government to be compensated for spectrum without destroying competition and innovation. The market is still uncertain and the risks are high. The major impediment to true competition is the existing player, the RBOCs, as both Local Exchange Carriers (LEC) and as cellular carriers.

The RBOCs can use their monopolistic power in four ways to drive the bid price high:. (i) ***Access fees***, having bottleneck control over access from and to the user, (ii) ***Auction "Tax"***; having a new entrant pay a cost of spectrum usage that they did not and will not have to pay, (iii) ***Cost of Capital***, paying a greater cost of capital because of the greater risk associated with a new entrant, and, (iv) ***Monopoly Rent***, having an existing monopoly rent advantage that allows them to bid excessively above free market value.

The need to value the spectrum should be based on the payout from the provision of the service rather that a single up front payment. The bid for the service then can be risk averaged over the life of the bid amount.

It is critical that provision of a seamless interoperable national service and revenue for the Federal Government be balanced in order to ensure the Global competitiveness of US. technology. There is a fundamental technological change occurring in telecommunications and this change will significantly alter the way the services are provided to the consumer. Furthermore, the benefits to the consumer of this change are directly linked to the manner in which the Government will allocate the spectrum.

There are two Amendments to the Constitution that give rise to concern; the fourteenth and the ninth. The fourteen amendment states:

"... nor deny to any person within its jurisdiction the equal protection of the laws."

The equal protection clause has two restrictions that have typically delimited its use. One is that it applies to the states, and second that it generally applies to individuals in a discriminatory setting. However, as noted by Peltason, [34]

> *"There is no equal protection clause limiting the national government; however, just as the due process clause of the Fourteenth Amendment has been used to apply the provisions of the Bill of Rights to the States, so has*

[34]Peltason, p. 167.

the due process clause of the Fifth Amendment been used to prevent national discriminator legislation."

Likewise, the ninth Amendment states;

"The enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people."

As is well known, it was through this that the right to privacy and the justification to Roe v Wade was secured. Indeed, the Ninth Amendment extends the protections under the Fourteenth.

Kahn has shown that the Fourteenth Amendment, under due process, was the original basis to sustaining the rights to regulate.[35] It will be argued that the same Amendment, under the equal protection clause, will provide a basis for protection from the predatory practices of an existing and dominant monopolist, sustained in its position by Federal regulation.[36]

In Slaughter-House v. Strauder, 1873, the Court, in that ruling, stated that the Fourteenth Amendment related to persons not companies. This was latter followed by Munn v. Illinois regulating grain elevators. [37]However, in Powell v. Pennsylvania, the Court did hear this against upholding the restrictions on oleomargarine sale, thus again opening the application of equal protection to businesses as well as individuals. It is thus argued, that as a policy issue, it is necessary to carefully understand the dynamics of auctions and allocations of resources to ensure that equal protection is afforded all of the contenders.

The policy implication here is quite clear. Can an existing competitor, whose monopolistic control over the market, which was granted explicitly by the Government, be in a position perforce of its monopolistic rents and financial structures, bid in an auction, in a full and unencumbered fashion, and deny other bidders, without advantage of such Government granted benefits, equal protection? This issue is more than an academic consideration. It is the basis of the future of the evolution of competitiveness in telecommunications in the twenty first century.

2.6.3 PCS Player Strategies

[35]Kahn, p. I, 37-40. The issue was the Smythe v. Ames case of 1898.

[36]Weinhaus and Oettinger, p. 9. This discusses the 1913 Kingsbury decision. The Department of Justice filed an antitrust suit against the AT&T companies and this was forestalled by the December 19, 1913 Kingsbury letter to Justice, proposing to dispose of the Western Union stock. Arguably, the U.S. Government thus grated AT&T and through the MFJ, the BOCs special and monopolistic consideration that allows them to continue to reap the advantages of this position as an entrenched competitor. It is therefore argued that under equal protection, that the BOCs have a disproportionate protective capacity, dating from the 1913 decisions, and supported by action thereafter. It is further argued that this could potential be the basis of an equal protection issue un this Amendment.

[37]Currie, p. 390-392.

The following table presents a list of the activities of the current players in the PCS area. Each player has developed a slightly different strategy and as a result has differing policy implications. This section has developed a framework to evaluate those implications and to demonstrate how they will effect the evolution of telecommunications. At the heart of each of these issues is the access fee. Each of these players has taken a different position on access. Each, if successful, will alter telecommunications in the next century as a result of that position.

There are several groups of PCS entrants that have been aggressively trying to enter the market. The following table presents a summary of these players and also presents a summary of their strategies. In almost all cases, with the exception of the RBOC players, the contenders for PCS license are arguing for the elimination of access.

Player	Strategy	Policy Implication
MCI	National License, single dominate control via its National Manager, and single network infrastructure. Maximize the number of participants.	The establishment of an significant AT&T and RBOC competitor in the short term.
AT&T	Single player, no other players, dominant control and full vertical integrate	Reinstitute the Bell System.
RBOCs	Protection of existing assets, Bellcore fronting, dominate the process through fragmentation of spectrum, namely 5 license at 20 MHz of occupied spectrum. Maximize the barrier to entry to any and all competitors.	Minimize competition via market and political strength. Obfuscate the obvious by reducing the value of PCS through fragmentation. Establish a maintenance policy access.
NPC	"States Rights" approach of having the power at the operator level. The Manager serves the operators, not the other way around. Democratic structure f a all general partnership, generate a national Manager on a contractual basis.	Maximizes opportunity to play in the market. Establishes a seamless interoperable nation network in the INTERNET paradigm.
Time Warner	Single dominant player, building from its base and extending into other markets by buyout.	Build from leading edge cable base. Establish a cable versus Telco compromise by US West buying to Time Warner.
TCI	Strong alliances with major competitors. Build off of key financial strengths and linkages through relationships. Be flexible without stating a specific strategy.	Co-opt the Markets with AT&T with TCI acting as a front.

2.7 Conclusions

This section has approached the issue of access from a broad perspective. The premise of the section is that access fees are constructs that are essential inherent taxes from one operation to another. Further the section argues that the taxes were instituted for a specific purpose at a specific time. That purpose and time have gone by. The issue of access, however, is still with us. Thus as the 1980s were a decade of change in the IEC business, the 1990s will be a change period for the LEC and the initial element of change will be the access issue.

We have attempted to demonstrate that the PCS business, from an economic as well as accounting perspective, have little if any scale and scope. Scale depends on the

technology used in local access. Thus the use of CDMA versus TDMA can and will have a significant impact on the evolution of the business. However, we have shown that PCS as a business is more dominated in growth potential by access fee structure more than anything else.

3 LOCAL EXCHANGE: ECONOMIC AND ANTITRUST PERSPECTIVE

3.1 Introduction

The Telecommunications Act of 1996 has provided for the open competition in the Local Exchange Carrier markets. There are several factors that make this new competitive environment dramatically different from that of the Inter Exchange Carrier markets in which AT&T and MCI and others found themselves in 1984. Specifically, there is a technological change wherein the issue of economic scale has been eliminated, namely there are de minimis entry barriers from an economic perspective. The barrier to entry is the issue of Interconnection, which simply stated is the need to connect from one new LEC entrant to the existing monopoly LEC player, specifically the RBOC. Thus there exist many new and significant legal issues relating to the implementation of such fair and equitable interconnection. The FCC in its role as Administrative Agency has taken steps effective August 8, 1996 to promulgate rules of behavior.[38] The alternatives available if such rule fail to provide for a competitive framework are the antitrust laws. This new area for antitrust law is one that rejoins many of the issues that were thought to be left behind at the time of the AT&T divestiture.

The Act as amended in 1996 has removed antitrust protection from the telecommunications industry.[39] In light of that fact, it is necessary to reexamine the implications of the many arrangements that have been customary practice, and view those arrangements in the light that all other similar arrangements can be viewed in all other industries. From an historical perspective, the Antitrust laws have been used to manage the gross misconduct of larger entities in existing competitive markets. In the case of local exchange telecommunications, however, there is a sharp distinction. Namely, the existing entities are the only player in the market and thus have essentially full monopoly control. The 1996 Act in Sections 251 and Sections 252 provide a vehicle that allows new entrants into the market so that a competitive environment may evolve. The issues however focus around the approaches taken in the new Act and how they may be interpreted.

Reed Hundt, the Chairman of the FCC and former practicing antitrust attorney, recently remarked about the relationship between interconnection and antitrust law:[40]

"When cases like Standard Oil and Alcoa were decided, our economy ran on oil and metal. Our economy now runs on impulses of digital bits transmitted via fiber, wire or the ether. It is high time that the communications industry (so vital to our country) operate

[38]See FCC First Report and Order on the Implementation of the Local Competition Provisions in the Telecommunications Act of 1996. These relate expressly to Sections 251 and 252 of the Act.

[39]See Section 601 of the Act.

[40]See Hundt, October, 1996.

under the same pro-competitive policy as every other industry in the U.S. And -- despite the intricacies of our legal culture, which has at least given an interesting and rewarding life to the lawyers in this room -- I am confident that this will happen and happen quickly."

It is clear that with the 8th Circuit Court intervening on the behalf of the monopolists and the Supreme Court has recently upheld this. Hundt's point is very significant in that the Courts have addressed monopolies I oil and transportation when they were the key elements of our society, whereas the Courts are seeming to take a strong pro-monopoly position when telecommunications is at the center of our growing economy.[41]

There seems to be no question but that Congress had the intent to create competition in the Local Exchange markets. The wording of the Act and its reflection in the Commission's attempt to clarify certain issues leads directly to that belief. However, it has been seen that the Incumbent LECs, namely the RBOCs, have a strong and vested interest in delaying or prolonging that effort. The track record of companies such as NYNEX are clear in their continued attempts to delay the entry of companies such as MFS and Teleport, especially through the process of state regulatory delay. The Commission has the set of certain authorities in the new Act to facilitate this process and create a more competitive environment but the States retain certain controls and interests.

Furthermore, telecommunications has, as a result of the Act, become potentially a more competitive environment. Despite the intention to allow competition, the industry also has certain existing structures and interlocking relationships that permit the incumbents to retain significant share by blocking the entrance of new players. This section focuses on the local exchange market in which the local exchange carrier, "LEC", is the principal player. Twelve years ago the interexchange market was opened up to full competition. The result is an network that allows for strong competition with even stronger competitors. The local exchange market is closed. This section provides an overview framework for this market, the technological change agents that make it dramatically different from other markets, and the re-application of antitrust law from the perspective of maximizing the public welfare, independent of the individual competitors.

There are several significant changes that are also occurring in the delivery of these types of products that will allow for the dramatic entry of new competitors. These will also be explored. Specifically, technology allows for disaggregation of functions in the delivery of the product. Technology also allows these functions or product elements to be delivered at marginal prices since the inherent scale in the industry is disappearing. Namely the scale economies of copper wire and large switches is now being replaced by the scale-less technology of wireless and ATM or frame relay switching.

The main objectives of this section are to discuss the following issues:

[41]Posner, see Posner references, has developed a significant theory of justice based upon the economic structure of utility and justice. I believe that one can take a Posnerian position that states that the monopoly should be totally abandoned and that there are clear economic structures in place that can handles these changes. The Courts on the other hand seem to be taking a mid-nineteenth century position which reflects pr-Sherman doctrines.

i. What is the competitive environment that a new local exchange carrier faces in the market with the structures imposed by the modifications to the Act.

ii. How can the Incumbent Local Exchange Carriers ("I-LEC"), namely the RBOCs, exercise their current monopolistic control to delimit new entrants and how can the new Local Exchange Carriers compete. Specifically, is there a viable competitive dynamic in this market under the new law.

iii. What is the role of the Commercial Mobile Radio Service ("CMRS") and Competitive Local Exchange Carriers ("C-LECs"), and how are they integrated into the telecommunications environment.

iv. What are the unbundled elements that the I-LEC and the CMRS can provided to a the C-LEC in this competitive market.

v. What is the current Administrative and Federal law as regards this competitive environment and what is the impact on antitrust law as applied to this area.

vi. How are the un-bundled elements and interconnection and access currently provided and is the means and methods of the current provision a "tying arrangement" created by the incumbents as a means to eliminate any competition and is such action an antitrust violation?

vii. How should these unbundled elements and interconnection be priced and what is the relative pricing of these elements within the I-LEC and to the C-LEC. Namely, is predatory pricing an issue of concern hereby the I-LEC against the C-LEC and the CMRS.

viii. Where is the point of regulatory control and where is the point of antitrust control in this market? Namely, does the Department of Justice Antitrust Division have any role to play or should this be disputed as civil proceeding amongst and between the competing parties. More specifically, is there an over-riding Federal concern[42].

[42]The concern is that this is almost a trillion dollar industry representing over 20% of the GDP and the DoJ has spent a great deal of focus on the Microsoft antitrust issues despite the fact that there is a clear and present danger that the incumbent carriers, namely the RBOCs, have maintained a monopoly hold on this dominant part of our economy. The DoJ under the current administration has almost a totally laissez fair approach to regulating this industry and in fact in even enforcing the law.

3.2 Regulatory Framework

The regulatory framework has changed dramatically with the passing of the 1996 Act. The Act recognizes that the I-LECs, the incumbent LEC, namely the RBOCs, have had monopoly control, and that for competition to exist, the I-LECs must unbundle, interconnect, co-locate and provide other similar services. Failure to provide such services would result in the FCC refusing to allow the I-LECs to enter certain markets, such as long distance services and manufacturing.

The 1934 Act codified a monopoly around the AT&T structure. The first major crack occurred in the Modified Final Judgment and the separation of Interexchange Services. This allowed new entrants into the IEC business and thus permitted the rapid growth of Sprint, MCI, LDDS (now WorldCom), and others. In 1996 the IEC business is approaching a competitive market with prices generally reflecting commodity pricing with the market share distribution being that of a competitive market.[43]

The view also taken by Congress and the Commission is that there are two elements that are drivers for the rapid introduction for competition; technological innovation and price reduction. The Congress in the new Act has stated in many places that there is a need for technological innovation and that this can best be achieved via a competitive environment. The case of long distance has been a clear case where this has been proven to be the case.

There were previous arguments support monopoly in the case of a telecommunications environment, especially from Alfred Kahn who noted[44]

"We have already alluded to the technological explosion in communications after World War II,...The case for a national telecommunications network monopoly has the following aspects ... Aggregate investment costs can be minimized.. if the planning for the installation and expansion is done with an eye for the total system....Since any one of the 5 million billion possible connections that the system must stand ready to make at any point in time may be performed over a variety of routes....justifies the interconnection...completely dependent on its own resources alone."

This argument for interconnection, combined with transport and control (namely horizontal integration) was valid in 1970. It however is not valid today. They are separable functions and scale economies are in the hands of the CPE manufacturers not the network providers. In effect, there exists no monopoly in interconnect as a result of these technology changes. This is a dramatic change from 1971 and Kahn's analysis.

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[43]Economists will still argue whether the IEC business is competitive or a cartel. The measure of cartel like behavior is generally driven by the distribution of market share. Porter has shown that in a purely competitive commodity market the markets shares are 40%, 30%, 20%, and 10% going to all others. This case at hand is one wherein the AT&T share is about 60%, MCI at 20% and all others at 20%. Thus the argument may not be complete for full competition but is has gone a far distance in ten years.

[44]See Kahn, (II, p 127).

Historically, a more chilling argument trying to eliminate competition on the local loop was given by an AT&T executive. Consider what was written by a Bell System polemicist in 1977 at the 100th anniversary of the Bell System at MIT. The author was John R. Pierce, Executive Director at Bell Labs, who stated:

" Why shouldn't anyone connect any old thing to the telephone network? Careless interconnection can have several bothersome consequences. Accidental connection of electric power to telephone lines can certainly startle and might conceivable injure and kill telephone maintenance men and can wreak havoc with telephone equipment. Milder problems include electrically imbalanced telephone lines and dialing wrong and false numbers, which ties up telephone equipment. An acute Soviet observer remarked: "In the United States, man is exploited by man. With us it is just the other way around." Exploitation is a universal feature of society, but universals have their particulars. The exploitation of the telephone service and companies is little different from the exploitation of the mineral resources, gullible investors, or slaves.[45]

The readers should note that this was written nine years after the Carterfone decision and five years before the announced divestiture. Pierce had a world view of an unsegmentable telephone network. This section has the view of a highly segmentable communications system. The world view of the architecture has taken us from "slavery" of Pierce to the freedom of the distributed computer networks of today. Kuhn has described technologists as Pierce as the "Old Guard", defenders of the status quo. They defend the old paradigms and are generally in controlling positions for long periods of time.

3.2.1 Legal Framework

The 1996 Act introduced the first glint of competition in the local exchange market. The Act thus amended the 1934 Act and took steps to eliminate the MFJ. The new Act allowed for entrants into the strongly monopolistic local exchange market. It must be noted that the LEC business is dramatically more complex than the IEC or long distance business. Long distance requires transport, simple switching and interconnection to a local carrier. All IECs pay the same rate to the I-LECs and thus they all have the “water” raised the same amount so that there is no inherent competitive advantage. However this is not the case in LEC competition. The new LEC must build out a plant and interconnect. It is this action of interconnection or accessing the incumbent LEC that is the issue for any antitrust concern. This is the point at which the existing monopolist can create a barrier to entry to any competitor. The new law mandates competition but the Administrative interpretation of that law can be weak and delayed. Both weakness and delay can eliminate any competitor no matter how well the words of the law are phrased.

Regulatory delay has been the strong card of any I-LEC in dealing with new entrants. The new entrant is much less capitalized than the RBOC and thus by dealing with the regulatory bodies the new entrant is weakened, has its financial resources reduced and

[45]See .de Sola Pool Ed, Pierce, Social Impact of the Telephone, 1977, pp 192-194.

ultimately is placed in a strongly disadvantageous position. We argue in this section that the vehicle for effective competition in this new market is via the antitrust laws and not only by the Administrative process.

The legal framework that we shall pose are legal requirements posed in Sherman, Clayton and the FTC Act. These laws are at the heart of the Federal jurisdiction in controlling competition and ensuring that monopoly players would not have dominant control. Unlike the breakup of long distance telephony, the LEC market is a significantly greater monopoly. This monopoly is controlled by the RBOCs predominantly and thus they have dramatic power to control the rate of introduction of new LEC competitors, called the C-LECs. Evidence over the past fifteen years has shown that the RBOCs have taken all steps possible to delay, deter, and in any other way avoid the introduction of new competitors.

Thus the analysis of this section is only that will be confined to a reading of the law and its interpretation to such factors as predatory pricing, tying arrangements, barriers to entry, and other specific actions that an I-LEC may take to ensure its survival.

3.2.2 The Opportunity and the Paradigm Change

The opportunity is that of new and significant competition in the local exchange market. The paradigm shift is one from a product which has significant scale in production to one that has de minimis scale. The author has shown elsewhere that the average capital per subscriber and the marginal capital per subscriber are equal at low percent penetrations of any market. In addition, due to the scalability of the technology, the plant can be arbitrarily expanded at capital per subscriber can be kept and the minimal scale level.[46] In addition, the author has shown, that the scale in operations costs can also be attained by outsourcing. The direct implication is that any new entrant can see costs at full scale in a short period of time. Thus if there were a fully open market, new competitors can compete as efficiently as the existing large companies, and in fact may be much more competitive in a shorter period of time.

There are two major trends in the process of allowing and enhancing disaggregation of networks. They are the development of a distributed processing environment and the loss of scale in infrastructure. We shall discuss each of these in some detail since they will be at the heart of our understanding of the new disaggregated networks.

3.2.2.1 Distributed Processing

Distributed processing is used in a most general fashion. We define Distributed Processing to mean the ability to place different processes (applications programs and other software elements) and processors (hardware computer units and the like) in different physical locations and that via the ability to intercommunication physically and via the ability of having either standard protocol interfaces or through protocol

[46]See the papers by the author as referenced.

conversion processes, we can effect and virtual single entity from this distributed and physically and logically disconnected system.

The Internet is the paradigm of the distributed system. The antithesis of this is the current voice based telephone network. We argue that having an open and distributed system, both being synonymous, that we create a Petri dish for the rapid evolution of new services and opportunities. All one has to do is to look at the evolution of the Internet over the last three years.

In terms of a distributed system, the concept of "interconnection" used in its broadest sense has significant merit. An open of fully distributed system is one that allows for ultimate flexibility. The author has also argued in early 1993 reference that the Internet would be open and distributed and that it was this characteristic that would make it a public thoroughfare.[47]

3.2.2.2 Loss of Scale

Technology has had a dramatic influence on the cost of entry into a market. More importantly, there is the concept that "silicon is almost free". Namely that we can now construct systems that have low fixed costs and that the capital per subscriber, whether is be average or marginal are almost equal. This means that technological changes have driven scale economies out of the business.

There are three examples of loss of scale. The first is the advent of the ATM (voice packet) or Frame Relay (Long Packet) switches. Unlike the old Central Office switches which are priced at a fixed entry costs of $5,000,000, one can enter a switched voice or data market with an ATM at $50,000, and reach loss of scale at 50 to 100 lines or even less. Fundamentally, ATM fabrics present a level playing field to all entrants.

The second example is wireless, namely CDMA. It has been shown by the author that unlike analog or even TDMA, CDMA cellular reached a capital per subscriber of $200 or less at 30,000 subscribers or less.[48] In the analog world scale was not lost until the subscriber base was ten times that number. Thus PCS using CDMA is almost one tenth the capital per subscriber as the current wire based telecommunications business of the RBOCs.

The third example is the concept of outsourcing. This is the "virtual" loss of scale. One can use service bureaus for billing or customer services that allow for pricing at the margin. The provider of network services no longer is required to provides for all software, computers, personnel, training and infrastructure.

[47] See McGarty, From High End User to "New User", Harvard Kennedy School, May, 1993.

[48] See McGarty, TPRC, September, 1993.

This loss of scale has several dramatic consequences to those entering and continuing to operate in the business;[49]

i. Barriers to entry are removed: This means any new entrant may get into some part of the business. Combined with the distributed element, the new entrant may do so at little costs.

ii. Economic and Regulatory Rationale for monopolies are eliminated: There is no longer the justification that one large entity, to who consumers are paying monopoly rents, is the best entity due to scale economies. One must re-look at the regulation.

iii. Change can be Effected More Swiftly: Loss of scale allow for rapid changes in service offerings by eliminating the concept of sunk costs. Albeit sunk costs are not to be considered in economic decisions they are frequently a significant factor in delaying change. The elimination of theses virtual burdens should allow for more rapid change.

We briefly show what the structure of the disaggregated network will look like and do so in the context of several specific examples.

3.2.3 Disaggregation Elements

The theory of disaggregation states that technology and industry has developed in such a fashion that it is possible to effect all elements of a business in a virtual form by obtaining all functions necessary to deliver a service by purchasing them from third parties each of whom has themselves other similar customers and thus each of whom can deliver their element of the functionality in a minimal marginal cost manner. The disaggregation theory then concludes with the result that in many technologically intense services business, a virtual company can exist wherein all the functions can be purchased from third parties or capital equipment may be purchased in a fully interconnected fashion so as to achieve near equality between average and marginal costs from the very commencement of the business. The Disaggregated Company is the embodiment of the virtual business. [50]

The existence of the disaggregated business is a challenge to the antitrust laws and especially to the implementation of the 1996 Act. What this implies is that as a disaggregated company any new entrant can achieve the same of better efficiencies of operation of its business as any incumbent, right from the start. This then states that

[49]See the McGarty papers from 1993 through 1995. In these papers the author presents detailed financial and economic models of the wireless side of the business. More importantly, see the section presented in March, 1996, at Columbia University, available on the CITI Web site, wherein the author takes this a step further and applies disaggregation theory to a broader set of telecommunications services.

[50]See the section by the author at the Columbia University presentation, March, 1996.

competition is then based solely upon the actions of the monopolistic incumbent and that these actions relate to only one area, interconnection and unbundling.[51]

Disaggregation falls into three dimensions; technical, operational, and relational. We define each as follows:[52]

Technical: Technical disaggregation the ability to overlay applications and platforms a disparate backbone of transport facilities and create a whole. An example of technical disaggregation is the client server architectures and the LAN networks in common use. This type of disaggregation is a result of the many technological advantages that have occurred in telecommunications as a direct result of the 1984 MFJ agreement.[53]Another example of technical disaggregation is the ability to use a distributed system, such as PCS, Personal Communications Services, and have the actual "switching" occur at the end users handsets rather than at the old fashioned hierarchical central office. By distributing the technology and the intelligence we marginalizes the capital deployment requirement and thus achieve technical disaggregation. One example that we discuss in this section is the concept of providing airtime. Namely the ability of a competitor to not only unbundle local loop, namely copper wire, but to unbundle frequency spectrum, namely airtime from an existing CMRS.[54]

Operational: Operational desegregation is the breaking apart of re-assembling in any fashion the operational or business elements to effect the successful provision of service. Namely we can separate billing, transport, sales, service, and network control into different pots and create a virtual corporate entity. We no longer have to do all. We only have to do that part that we do well. An example of operational disaggregation is the outsourcing business whereby a company, such as a Bell Operating Company, would use an outsourced customer service center to provide this function, or in another context of a bank who outsources all of its telecommunications network.

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[51]See Coll: William McGowan, one of the founders of MCI recognized this in the IEC business. He used a two prong approach to effecting his competitive position, first through the FCC and second via the antitrust laws.

[52]McGarty, March, 10996, section presented at Columbia University.

[53]The author had started his career at Bell Labs in 1964 as a student. It was clear then that progress in the monopoly would be slow and that no challenge to the way things would be done would be tolerated. There are two anecdotes that show that the old Bell System, rather than being a national asset as has been stated, was a national liability. The first is the attempt by Bob Kahn, the father of the Internet, to obtain a 300 bps modem from AT&T. They refused to support ARPA and Kahn and his team thus were forced to create a modem apart form AT&T. This then led to the proliferation of PC modems and the ability now with the introduction by Intel of a 56 Kbps dial up modem that supplants ISDN. The second is the demand by the Chairman of AT&T for a digital switch. The Holmdel and Naperville management refused and he had to go to Bell Northern to do the development. At that time AT&T owned a significant interest in Bell Canada. The result of that was the growth of Northern Telecom, and the displacement in New York Telephone of Northern switches. These are two seminal events that shows that Bell Labs rather than being a national resources actually in a monopoly became a national liability.

[54]It should be noted that the FCC expressly stated that the CMRS was not a LEC and thus was not required to unbundle. In addition, in the FCC First R&O on Interconnection, August 8, 1996, it stated that an RBOCs LEC was not a subsidiary even though the author argued against that based upon the theory of agency.

Relational: This will be the issue of who does what to whom in such entities as electronic marketing and distribution channels in a telecommunications cybernetwork. This is the most recent example of building cybernetworks via relationships. Unfortunately many of the current examples are examples of failure; Prodigy with IBM, CBS and Sears, or MCI and News Corp on the Internet side. In this section we attempt to focus on the latter two elements. The first has been treated elsewhere.

This Disaggregator entity is a key differentiation in the market. The Disaggregator is one who may use the existing license holders access facilities as one of several means to provide service to a fixed customer base. In FCC Docket WT 96-6 the Commission raises the issue of allowing the CMRS to provide fixed services. Namely this allows the CMRS, as defined by the Commission, to be a purveyor of what is normally termed "LEC services" and for the purpose of WT 96-6 is called wireless local loop, "WLL". It is argued that the Disaggregator is a different entity altogether and more importantly it is argued that the disaggregator is the most likely evolutionary entity to change as full competition is presented in the wireless market.

The author believes that by acting as a "Disaggregator" it can effect this competitive position. The Disaggregator works on the following principles. The provision of wireless services is based upon the integration of the service elements. This integration may be performed as an aggregation or as a desegregation approach. The Aggregation is the way most of the CMRS entities now work, having control over all of the elements of "production". The Disaggregator may have control of certain strategic elements but will "outsource" others.

3.2.4 The Product

The C-LEC or the CMRS is in the business of providing exchange access and telephone exchange services. It does so in a fashion that utilizes a variety of local transport and interconnection means and methods. The C-LEC will use a system which is a telecommunications system which utilizes fixed local telecommunications circuits and connections in combination with wireless circuits which may use radio frequencies and is made up of intersecting base stations, dedicated interconnection facilities to the public switched telephone network, separate transmission facilities, and separate switching facilities. The System consists of an integrated wire-based and wireless-based network, as required to provide the User with Telecommunications Services. The following Figure depicts the proposed network that the C-LEC may implement for the provision of its services.

In the above, the C-LEC proposes to provide its services using a variety of methods and means to connect users of its service to its switch which is located. The switch will in turn connect to the Incumbent LEC, the Inter-Exchange Carriers, and other carriers as appropriate. The user interface to the C-LEC switch may be over the C-LEC owned and operated facilities such as the Part 15 license free DS-1 interconnections to fiber that the

C-LEC may build and operate or it may be over other means using different methods and leased from third parties. Included in this third party lease is the provisions of interconnection means provided by a CMRS. The author argues that even though it may use CMRS services as one of several means that this does not make the C-LEC a CMRS. Specifically as defined below, the C-LEC is not per se a CMRS and is per se a Local Exchange Carrier.

The C-LEC intends to market and sell its services to users as if they were local exchange carrier services. It intends to compete with the Incumbent LEC and not necessarily compete with the Incumbent CMRS or the non-Incumbent CMRS. the C-LEC has selected a target market, a bundle of service offerings, and a pricing scheme that allows it to position itself as competitor to LECs. Unlike CMRS resellers who merely hold themselves out to the market as purveyors of cellular CMRS services, the C-LEC intends to hold itself out to the market as a local exchange carrier as specified by the FCC.

The C-LEC distinguishes itself from CMRS operators and CMRS reseller in two ways; means of user interconnection ("means") and offering made to the public ("offering"). The means that the CMRS uses is generally and currently exclusively the licensed based facility of its cell sites and other such facilities.[55]Thus the CMRS provider provides its service over a singularity of means. In contrast, the C-LEC plans to provide its services over a multiplicity of means. As to offering, the Incumbent CMRS offers "cellular" service only. This implies two elements. First it is an offering that is solely and completely dependent on the means available to the CMRS. Secondly, the means has the capability of crossing state boundaries and that, in addition, through roaming, the means allows interstate usage. In contrast, the offering of the C-LEC generally is one of local services and specifically the C-LEC intends to be a purveyor of services. Thus the C-LEC is different in both means and offering from a CMRS.

3.3 The Telecommunications Act

3.3.1 The Act

The 1996 Telecommunications Act, the Act, became law on February 8, 1996. The law mandated that the FCC in its role as Administrative agency establish the appropriate renderings of the law into administrative procedures in the Code of Federal Regulations, and thus amending the current CFR. The FCC took this mandate and on August 8, 1996, six months after the law was effective, issued a set of administrative rulings regarding the implementation of several key elements of the law. Specifically the FCC ruled on the issues of interconnection and unbundling of the plant. The issues still before the FCC are access and universal service.

[55]It should be noted that under Sec. 601 of the Act the CMRS of the Incumbent LEC may now "bundle" together several offerings to the public and hold itself out as a provider of services that uses a multiplicity of means. the C-LEC bases its agreement that the Incumbent CMRS is now a CMRS alone on the fact that Sec. 601 has not been implemented.

The following is a list of the key portions of the 1996 Act. Each is a Section and each will be reviewed and rendered into administrative code by the FCC. The total number of sections are significant and they cover telephony, satellites, cable and broadcast. We shall not deal with satellites, cable and broadcast in this section.

Section	***Topic***	***Issue***
SEC 251	***INTERCONNECTION***	This section deals with interconnection and unbundling of the local exchange carrier. It proposes that such a set of procedures be established and that such procedures reflect a maximally competitive environment for the local exchange business.
SEC 252	***PROCEDURES FOR NEGOTIATION, ARBITRATION, AND APPROVAL OF AGREEMENTS***	This section details processes, procedures and remedies for the failure to effectively provide for the provisions under 251.
SEC 253	***REMOVAL OF BARRIERS TO ENTRY***	This section broadly requires the removal of any and all barriers to entry in the market. This section is a classic antitrust statement of competition in the local market.
SEC 254	***UNIVERSAL SERVICE***	This section details the universal services provision.
SEC 601	***APPLICABILITY OF CONSENT DECREES AND OTHER LAW***	Eliminates Clayton exemption from Antitrust laws for all of the RBOCs.

3.3.2 The FCC First Report and Order

On August 8, 1996 the FCC issued a report and Order, the First, on 251 and 252. They detailed in almost 800 pages the interpretation of the law as a result of the Notice of Public Rulemaking process. There were approximately a dozen law suits filed, mostly by the RBOCs objecting to this R&O. The RBOCs clearly feared local competition of any form and their filings attacked the FCC and the suits are filed in every District Court available.

3.3.3 Interconnect

Section 251 is the key section in establishing competitive local exchange access. The key elements of Section 251 state the following:

"(a) ***GENERAL DUTY OF TELECOMMUNICATIONS CARRIERS****- Each telecommunications carrier has the duty (1) to interconnect directly or indirectly with the facilities and equipment of other telecommunications carriers; and (2) not to install*

network features, functions, or capabilities that do not comply with the guidelines and standards.....

(b) ***OBLIGATIONS OF ALL LOCAL EXCHANGE CARRIERS-*** *Each local exchange carrier has the following duties: (1) RESALE- The duty not to prohibit, and not to impose unreasonable or discriminatory conditions or limitations on, the resale of its telecommunications services. (2) NUMBER PORTABILITY- The duty to provide, to the extent technically feasible, number portability in accordance with requirements prescribed by the Commission. (3) DIALING PARITY- The duty to provide dialing parity to competing providers of telephone exchange service and telephone toll service, and the duty to permit all such providers to have nondiscriminatory access to telephone numbers, operator services, directory assistance, and directory listing, with no unreasonable dialing delays. (4) ACCESS TO RIGHTS-OF-WAY- The duty to afford access to the poles, ducts, conduits, and rights-of-way of such carrier to competing providers of telecommunications services on rates, terms, and conditions that are consistent with section 224. (5) RECIPROCAL COMPENSATION- The duty to establish reciprocal compensation arrangements for the transport and termination of telecommunications.*

(c) ***ADDITIONAL OBLIGATIONS OF INCUMBENT LOCAL EXCHANGE CARRIERS-*** *In addition to the duties contained in subsection (b), each incumbent local exchange carrier has the following duties: (1) DUTY TO NEGOTIATE- The duty to negotiate in good faith in accordance with section 252 the particular terms and conditions of agreements to fulfill the duties described in paragraphs (1) through (5) of subsection (b) and this subsection. The requesting telecommunications carrier also has the duty to negotiate in good faith the terms and conditions of such agreements. (2) INTERCONNECTION- The duty to provide, for the facilities and equipment of any requesting telecommunications carrier, interconnection with the local exchange carrier's network..... (3) UNBUNDLED ACCESS- The duty to provide, to any requesting telecommunications carrier for the provision of a telecommunications service, nondiscriminatory access to network elements on an unbundled basis at any technically feasible point..... (4) RESALE- The duty-- (A) to offer for resale at wholesale rates any telecommunications service that the carrier provides at retail to subscribers who are not telecommunications carriers; and (B) not to prohibit, and not to impose unreasonable or discriminatory conditions ..... (6) COLLOCATION- The duty to provide, on rates, terms, and conditions that are just, reasonable, and nondiscriminatory, ...*

(d) ***IMPLEMENTATION-****..... (3) PRESERVATION OF STATE ACCESS REGULATIONS- In prescribing and enforcing regulations to implement the requirements of this section, the Commission shall not preclude the enforcement of any regulation, order, or policy of a State commission that-- (A) establishes access and interconnection obligations of local exchange carriers; (B) is consistent with the requirements of this section; and (C) does not substantially prevent implementation of the requirements of this section and the purposes of this part."*

3.3.4 Universal Service

Universal service has been in effect de facto since the Kingsbury decision of 1913.[56]This implicitly allowed AT&T to retain its monopoly subject to the agreement to provide, ultimately, universal service. The universal service would mean that there would be access to all people to telephone services and that for poor people that service would be subsidized. The state PUCs then followed up on this and embodied this in state regulatory requirements. In effect, AT&T and the BOCs were transferring wealth fro the "rich" to those who could not pay for such services, either because of their income or because the costs to provide services to that individual would be prohibitive. This was then an enforced payment, established and managed by the BOCs, for the purpose of collecting moneys from the haves for redistribution by the BOCs to what was perceived as the have nots. Needless to say this is per se taxation. From a Constitutional perspective such rights inure solely to the states and the Federal governments and under the Commerce Clause it is highly problematic that any independent third party has any right to tax especially as regards to interstate commerce. Needless to say there has never been a challenge here.

The Universal services fund was and still is a taxation by the BOCs to redistribute income.[57] It also is a pool of funds to be used by them as a vehicle to bar competition. The universal services issue however goes to the heart of the interconnection issue. The RBOCs have used this ruse as a means to control competition in two ways. First, in interexchange access they have charged an access fee disproportionately higher than costs since it was then used as a basis for universal services. This was the taxation issue. Second, they have used a unilateral fee for any other interconnect player. Thus cellular companies, arguable providing local services, pay for initiating ad terminating calls. This has been changed by the new Act.

The Act has mandated a separate Universal Services fund to be managed by the Government, and thus the Governments powers to tax are valid and this is a legal act in contrast to the arguably illegal actions of the RBOCs in the pursuit of taxation. Second, the Act mandates balanced interconnection.

To better understand where the legal applications will be addressed we first present an overview of the major theories behind the applications of the antitrust laws. This will be important since these theoretical basis are not only applied to antitrust law but also to the enactment of the administrative regulations in the application of the Telecommunications Act. The litigation of any case in this area will require an understanding of the philosophical framework underlying its application.

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[56]See Weinhaus, p. 9.

[57]This is a Rawlsian approach to justice, ensuring that the least amongst us in the society has equal benefit to society asses. Baumol has taken this principle and applied it to monopolies supplanting the individual with the monopolist. The Baumol-Willing theorem takes the utilitarian approach and uses it as a basis for demanding the continuation of access. What Baumol does it create a Rawlsian universal service for the monopolist.

Universal Services is the mandate to provide services by any carrier to any person not individually financially able to obtain the service in the area in which the inhabit.[58] Namely the low income and rural customers. The universal services provisions are as follows:

" (b) UNIVERSAL SERVICE PRINCIPLES- The Joint Board and the Commission shall base policies for the preservation and advancement of universal service on the following principles: (1) ***QUALITY AND RATES.....****-(2)* ***ACCESS TO ADVANCED SERVICES****- ..... (3)* ***ACCESS IN RURAL AND HIGH COST AREAS****- ..... (4)* ***EQUITABLE AND NONDISCRIMINATORY CONTRIBUTIONS****.....*

(c) DEFINITION (1) IN GENERAL- Universal service is an evolving level of telecommunications services that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services..... such telecommunications services; (A) are essential to education, public health, or public safety; (B) have, through the operation of market choices by customers, been subscribed to by a substantial majority of residential customers; (C) are being deployed in public telecommunications networks by telecommunications carriers; and (D) are consistent with the public interest, convenience, and necessity....."

Universal service has been in effect de facto since the Kingsbury decision of 1913.[59]This implicitly allowed AT&T to retain its monopoly subject to the agreement to provide, ultimately, universal service. The universal service would mean that there would be access to all people to telephone services and that for poor people that service would be subsidized. The state PUCs then followed up on this and embodied this in state regulatory requirements. In effect, AT&T and the BOCs were transferring wealth fro the "rich" to those who could not pay for such services, either because of their income or because the costs to provide services to that individual would be prohibitive. This was then an enforced payment, established and managed by the BOCs, for the purpose of collecting moneys from the haves for redistribution by the BOCs to what was perceived as the have nots. Needless to say this is per se taxation. From a Constitutional perspective such rights inure solely to the states and the Federal governments and under the Commerce Clause it is highly problematic that any independent third party has any right to tax especially as regards to interstate commerce. Needless to say there has never been a challenge her.

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[58]See McGarty, October, 1996.

[59]See Weinhaus, p. 9.

Second, they have used a unilateral fee for any other interconnect player. Thus cellular companies, arguable providing local services, pay for initiating ad terminating calls. This has been changed by the new Act.

The Act has mandated a separate Universal Services fund to be managed by the Government, and thus the Governments powers to tax are valid and this is a legal act in contrast to the arguably illegal actions of the RBOCs in the pursuit of taxation. Second, the Act mandates balanced interconnection.

3.3.5 Code Changes of the First R&O

The First Report and Order ("R&O") by the FCC mandated certain changes to interconnection. These changes are as follows:[60]

"§ 51.305 Interconnection.

(a) An incumbent LEC shall provide, for the facilities and equipment of any requesting telecommunications carrier, interconnection with the incumbent LEC's network: (1) for the transmission and routing of telephone exchange traffic, exchange access traffic, or both; (2) at any technically feasible point within the incumbent LEC's network.....; and (5) on terms and conditions that are just, reasonable, and nondiscriminatory.....

(b) A carrier that requests interconnection solely for the purpose of originating or terminating its interexchange traffic on an incumbent LEC's network and not for the purpose of providing to others telephone exchange service, exchange access service, or both, is not entitled to receive interconnection.....

(c) Previous successful interconnection at a particular point in a network, using particular facilities, constitutes substantial evidence that interconnection is technically .....

(d) Previous successful interconnection at a particular point in a network at a particular level of quality constitutes substantial evidence.....

(e) An incumbent LEC that denies a request for interconnection at a particular point must prove to the state commission that interconnection at that point is not technically feasible.

(f) If technically feasible, an incumbent LEC shall provide two-way trunking upon request. "

The above mandates that the I-LEC interconnect itself to any purveyor of services that may become a competitor. This is the first time that the FCC has mandated such a requirement.

[60]The following are U.S.C. 47.

The following are the rules for interconnection pricing. There are several factors that are key. First is the reciprocal nature of the rules, second the method and means at which the prices for interconnect are to be determined, and third the bill and keep, or zero access fee, option.

"§ 51.701 Scope of transport and termination pricing rules.

(a) The provisions of this subpart apply to reciprocal compensation for transport and termination of local telecommunications traffic between LECs and other telecommunications carriers.

(b) Local telecommunications traffic. For purposes of this subpart, local telecommunications traffic means: (1) telecommunications traffic between a LEC and a telecommunications carrier other than a CMRS provider that originates and terminates within a local service area established by the state commission; or (2) telecommunications traffic between a LEC and a CMRS provider that, at the beginning of the call, originates and terminates within the same Major Trading Area.....

(c) Transport. For purposes of this subpart, transport is the transmission and any necessary tandem switching of local telecommunications traffic .... from the interconnection point between the two carriers to the terminating carrier's end office switch that directly serves the called party, or equivalent facility provided by a carrier other than an incumbent LEC.

(d) Termination. For purposes of this subpart, termination is the switching of local telecommunications traffic at the terminating carrier's end office switch, or equivalent facility, and delivery of such traffic to the called party's premises.

(e) Reciprocal compensation. For purposes of this subpart, a reciprocal compensation arrangement between two carriers is one in which each of the two carriers receives compensation from the other carrier for the transport and termination on each carrier's network facilities of local telecommunications traffic that originates on the network facilities of the other carrier.

§ 51.703 Reciprocal compensation obligation of LECs.

(a) Each LEC shall establish reciprocal compensation arrangements for transport and termination of local telecommunications traffic with any requesting telecommunications carrier.

(b) A LEC may not assess charges on any other telecommunications carrier for local telecommunications traffic that originates on the LEC's network.

§ 51.705 Incumbent LECs' rates for transport and termination.

(a) An incumbent LEC's rates for transport and termination of local telecommunications traffic shall be established, at the election of the state commission, on the basis of: (1) the forward-looking economic costs of such offerings.....; (2) default proxy.....; or (3) a bill-and-keep arrangements.....

(b) In cases where both carriers in a reciprocal compensation arrangement are incumbent LECs, state commissions shall establish the rates of the smaller carrier on the basis of the larger carrier's forward-looking costs.....

§ 51.707 Default proxies for incumbent LECs' transport and termination rates.

(a) A state commission may determine that the cost information available to it with respect to transport and termination of local telecommunications traffic does not support the adoption of a rate or rates for an incumbent LEC that are consistent with the requirements.....

(b) If a state commission establishes rates for transport and termination of local telecommunications traffic on the basis of default proxies, such rates must meet the following requirements.....

§ 51.709 Rate structure for transport and termination.

(a) In state proceedings, a state commission shall establish rates for the transport and termination of local telecommunications traffic that are structured consistently with the manner that carriers incur those costs.....

(b) The rate of a carrier providing transmission facilities dedicated to the transmission of traffic between two carriers' networks shall recover only the costs of the proportion of that trunk capacity used by an interconnecting carrier to send traffic that will terminate on the providing carrier's network. Such proportions may be measured during peak periods.

§ 51.711 Symmetrical reciprocal compensation.

(a) Rates for transport and termination of local telecommunications traffic shall be .....

(b) A state commission may establish asymmetrical rates for transport and termination of local telecommunications traffic only if the carrier other than the incumbent LEC (or the smaller of two incumbent LECs) proves to the state commission on the basis of a cost study.....

(c) Pending further proceedings before the Commission, a state commission shall establish the rates that licensees in the Paging and Radiotelephone Service .....

§ 51.713 Bill-and-keep arrangements for reciprocal compensation.

(a) For purposes of this subpart, bill-and-keep arrangements are those in which neither of the two interconnecting carriers charges the other for the termination of local telecommunications traffic that originates on the other carrier's network.

(b) A state commission may impose bill-and-keep arrangements if the state commission determines that the amount of local telecommunications traffic from one network to the other is roughly balanced with the amount of local telecommunications traffic flowing in the opposite direction, and is expected to remain so.....

(c) Nothing in this section precludes a state commission from presuming that the amount of local telecommunications traffic from one network to the other is roughly balanced with the amount of local telecommunications traffic flowing in the opposite direction and is expected to remain so, unless a party rebuts such a presumption."

The bill and keep approach is the approach that is the most economically efficient approach, is allowed by the law, and allows fore the ,most effective means to establish competition in the market. In the remainder of this section we shall focus on this issue.

3.4 The Elements of the Telecommunications Business

The telecommunications environment in the local exchange market is composed of several players. In this section we present that structure, as also determined by the Act, and demonstrate the roles played by each participant.

3.4.1 Market Players

Principally the market is composed of the following players[61]:

Incumbent Local Exchange carrier ("I-LEC"): [62]For the most part this is the Regional Bell Operating Company ("RBOC") or the equivalent. They are the existing monopoly

[61]See McGarty, Harvard, November, 1990. In that section the author developed a canonical industry structure which has survived the new telecom legislation. It demonstrates the ability of the different players to compete and also argues for certain monopoly powers for CATV companies while arguing against monopoly powers for local exchange carrier companies.

[62] The following definitions are from the Act as modified. ***Local Exchange Carrier:*** A LEC is defined as per the Act in Sec. 3(a)(2)(44).
"The term Local Exchange Carrier means any person that is engaged in the provision of telephone exchange service or exchange access. Such term ***does not include a person insofar as such person is engaged in the provision of a commercial mobile service under Section 332(c), except to the extent that the Federal Communications Commission finds that such service should be included in the definition of such term****. Specifically,*

EXCHANGE ACCESS- As per the Act, Sec.3(b)(2), the term Exchange Access means the offering of access to telephone exchange services or facilities for the purpose of the origination or termination of telephone toll services.

TELEPHONE EXCHANGE SERVICE - Telephone Exchange Service is defined in 47 U.S.C. Sec. 153 (r)means service within a telephone exchange, or within a connected system of telephone exchanges within the same exchange area operated to furnish to Subscribers intercommunicating service of the character ordinarily furnished by a single exchange, and which is covered by the exchange service charge."

player in the market and have until February 8, 1996 been protected from any and all antitrust violations by virtue of the clause in *Sec. 3* of Clayton.

Competitive Local Exchange Carrier ("C-LEC"): The C-LECs are new entrants that may provide local exchange service by means of their own transmission facilities or switches or via other similar facilities. Generally the C-LEC would have its own switch and provide other similar operational services.

Commercial Mobile Radio Service Provider ("CMRS"): [63]The CMRS is the owner of a radio license from the FCC and provide two way telecommunications services by means of that license.

Competitive Access Provider ("CAP"): A CAP is a provider of access and interconnection to a I-LEC or to a the C-LEC. The CAP generally has a fiber bypass network and may or may not have a switch.

Cable Television Provider ("CATV"): The CATV company may provide telecommunications services of its own accord but that is to be seen as a large scale opportunity. CATV companies have been allowed to act as such since 1984 with the Cox and MCI decision before the FCC.

The relationship between the C-LEC and the other players is shown in the following Figure.

The specific interconnections that we shall deal with in this section are those between the I-LEC and the CMRS. These are specifically shown in the following Figure.

Namely, in this description above, the C-LEC requires access to the facilities from the CMRS and the I-LEC. In both cases the lease of a DS-1 circuit, namely a circuit transmitting at the rate of 1.544 Mbps. On the CMRS side the DS-1 represents access to

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[63]The CMRS is defined in the Act as follows:

"(i) CMRS: *A Commercial Mobile Radio Service ("CMRS") as defined by 47 U.S.C. Section 332 and from the Code, Section 153 (n). Specifically, Commercial Mobile Radio Service means any mobile service (as defined in section 47 U.S.C Section 153(n)) that is provided for profit and makes interconnected service available (A) to the public or (B) to such classes of eligible Users as to be effectively available to a substantial portion of the public, as specified by regulation by the Federal Communications Commission."*

"(ii) MOBILE SERVICE *: As defined in section 47 U.S.C Section 153(n), Mobile Service means a radio communication service carried on between mobile stations or receivers and land stations, and by mobile stations communicating among themselves,* ***and includes*** *(1)* ***both one-way and two-way*** *radio communication services, (2) a mobile service which* ***provides a regularly interacting group of base, mobile, portable****, and associated control and relay stations (whether licensed on an individual, cooperative, or multiple basis) for private one-way or two-way land mobile radio communications by eligible Users over designated areas of operation,* ***and*** *(3) any service* ***for which a license is required*** *in a personal communications service established pursuant to the proceeding entitled "Amendment to the Commission's Rules to Establish New Personal Communications Services" (GEN Docket No. 90-314; ET Docket No. 92-100), or any successor proceeding."*

The mobile service definition requires three elements; two way communications, over a an infrastructure and that the operator is in possession of an FCC license to provide such services. The author argues that the license is a "bright line" test that makes C-LEC a LEC but not necessarily a CMRS.

24 voice channels at any one time, the risk of filling those channels is placed upon the C-LEC. On the I-LEC interconnection, the request is the interconnection of the C-LEC to the I-LEC with a DS-1 connection using a D4 channel bank or an equivalent.

3.4.2 Local Exchange Interconnection and Elements

The LEC elements are composed of two general categories of goods. They are the inside plant and the outside plant. The inside plant is the switch and all of its elements and the outside plant is composed of the wireless, fiber cables and other outside connection facilities.

In the inside plant, each call can be attributed to the use and allocation of certain determinable facilities, directly, or though a well determined allocation process. For example, if one desires a single call connection, it is know that a call uses certain line terminating equipment, certain processor capabilities and capacity, and certain trunk terminating facilities. Thus the allocations of the total good to the specific good for any single call is determinable. In effect, one who requests the use of the facilities from the I-LEC is in essence requesting the product of a combination of capital plant and ancillary support services for some time certain. It is not the provision of a service as determined by the Court.[64]

3.4.3 Interconnection and Elements

The C-LEC and the CMRS provider provide certain access facilities to connect between the use and a switch by means of a set of radio stations and a concentrator switch which may or may not provide for the ability to hand-off from one cell to another. Interconnection establishes the ability of one provider of services to establish a connection with the other provider of services.

3.4.4 Unbundling

The unbundling of the system elements of the I-LEC has been mandated by the 1996 Act. Specifically, the Act mandates unbundling, interconnection, co-locations and other similar facilities provisioning. Unbundling is the key issue. Unbundling has two parts; first, how does one take an I-LEC and break it into useful parts that are unbundleable, and second, what are the costs of those parts and how do common facilities get allocated across parts, if at all. In reality all of the facilities are capital plant facilities that have been commonly placed in the rate base of the former regulated I-LEC. The allocation of parts to rate base is not necessarily the way to allocate parts for unbundling.

[64]Note that we have phrased this as a purchase of two or more elements. This is consistent with the Court ruling in *Students Books v. Washington Law Book*, 232 F. 2nd 49 (DC Cir. 1955) and the sales of these are contemporaneous as in *Atlanta Trading Corp. v. FTC*, 258 F. 2nd 365 (2nd Cir. 1958).

We consider the unbundling of a CMRS first and then of the I-LEC. For the CMRS, the system is composed of the following four elements: capital, operations, sales, and overhead.

Capital: This includes the capital plant and equipment and such equipment may be provided in whole or in part. The capital costs include both hard ad soft costs. The hard costs are the costs paid to vendors and the soft costs are the costs provided to the engineering and construction contractors. The three main components of the capital equipment for a CMRS, for example, are: (i)Cell Sites, (ii) switches, (iii) Interconnection Network

Operations: These costs elements relates to the providing of the service and relate to the operations and maintenance of the system and not related to the costs of supporting customers. These costs are: (i) Operations and maintenance, (ii) Network Management, (iii) Spares and repairs.

Sales: Theses are all of the costs related to the acquisition, implementation, integration, and support of customers. They are typically: (i)Billing, (ii) Customer Service, (iii) Provisioning, (iv) Sales.

Overhead: The overhead costs are such elements as administration, planning, research and development, lobbying, regulatory, and other such areas.

We have presented detailed models of these costs elsewhere. In this case, if we decide to provide cellular services, then we can use the capital per subscriber numbers that have been presented elsewhere.

Example 1:

For example, in analog cellular, the capital per subscriber at 50% penetration is about $500. This includes all capital element as described above. This amounts to $12,000 per 24 subscribers equivalent, at 50% loading. If the single user uses the system at 0.01 Erlang per user, then the capital per DS-1 trunks is $600,000. At higher Erlang loads the capital per DS-1 actually decreases.

Example 2:

Calculated in a different fashion, we note that a DS-1 is 24 voice channels, a fully loaded cell is 72 voice trunks or 3 DS-1s. A fully loaded cell is $750,000 or $250,000 per DS-1. As per the previous calculations, we can see that calculated on a per subscriber basis the capital is higher. Much of this is dominated by the issue of coverage versus capacity. If the $500 numbers at 25% loading then the number goes to $300,000 per DS-1. Typically the cell is at 25%.

Principle of Cost Based Pricing

The above examples present the key issues of interconnect and unbundling. We conclude this with the Principle of Cost based Pricing. The principle can be explained via the following example. Consider the interconnection shown in the following Figure. Here we have a CMRS, an I-LEC, a C-LEC, sever IECs, and their interconnection. The CMRS will be the focal point. The CMRS connects to the IECs and to the I-LEC and C-LEC as well as to other similar players on the other side of the IECs.

Consider two calls. Call 1 goes from the CMRS to the local I-LEC. Call 2 goes from the CMRS, over an IEC to a customer at a distant I-LEC. Both calls are originated by a CMRS customer and terminate on an I-LEC customer.

Today, any IEC call must pay an interconnection access fee to the I-LEC to terminate on their network. As we indicated this is a wealth transfer policy and does not reflect any true cost. The CMRS before the Act paid the I-LEC a termination or origination fee and there was no compensation from the I-LEC to the CMRS. As we have demonstrated that is no longer the case.

The Principle of Cost base Pricing states the following: The consumer should pay for each link separately and they should pay only for those links for which they are customers of that link provider. The payment the customer makes should reflect a price that is in turn based on the costs of that link.[65]

[65]The issue here is a quid pro quo issue of parity in providing interconnection in a commodicizable market. For example, if two or more LEC or LEC like carriers enter a market, then there should be not interconnection fee and each carrier should price their services at the price based upon their costs and have no third party intervenor establish a de facto subsidization. If however, one carrier provides a service such ad aggregation to more efficiently interconnect, then this added non pari passu facility should be compensated at an equal, comparable, and costs based level, shared amongst all players.

Thus, in the Case 1 example, the Principle of Cost Based Pricing states that a CMRS customer pays for the costs of accessing the CMRS system up to the demarcation point between the CMRS and the I-LEC. The I-LEC customer should pay all costs for the access to the I-LEC facilities. Thus the Principle states that there should be not access fees. The classic economist states that the I-LEC has externalities that the other providers should pay for. The theory of competitive markets states that such externalities are inefficiencies in clearing of the markets since they burden all other players with the costs of the inefficient provider.

In Case 2 the Principle applies as follows. The Customer should pay for the CMRS costs at a cost based pricing method and the Customer should pay their IEC a price on a similar cost based principle. The termination is on a customer of the I-LEC who pays for their access and thus does not burden the call initiating party.

Let us examine why this is a fair principle. Simply, the consumer will have multiple providers of local access and long distance access. The consumer will then be able to select a provider whose prices reflect their costs and no other costs. Thus the price of the most efficient provider will be the lowest price and the consumer will spend the least amount. This allow for clearing of the market in the most efficient manner. If the I-LEC has inefficient plant it has several alternatives. One is to write off the plant more rapidly and to effect greater efficiencies in services provisioning. This is what AT&T was forced to do in the IEC competitive markets and it successfully did so. MCI and Sprint did not pay for the AT&T externalities, whatever they may have been.

The Principle the we propose is also one that is consonant with the antitrust laws since it ensures without and government intervention fair and equitable pricing and it eliminates predatory pricing and barriers to entry. It also applies equally to both the LEC type companies and to the IEC companies. The Universal Service option is now taken care of separately via the service fund that is established under the law. Finally, this Principle also is supported by the Bill and Keep provision of the law.

3.5 The Elements of Competition

The key argument in this section is that there has been a technological and industrial change that has led to the elimination of scale in the local exchange technologies as well as the elimination of scale by the availability of outsourced services in the delivery of everything from sales channels to billing systems. Namely, the new entrant can obtain process that are at the margin and thus the new entrant does not necessarily face high initial costs and can achieve industry scale levels almost instantaneously.

3.5.1 Loss of Scale

Technology has had a dramatic influence on the cost of entry into a market. More importantly, there is the concept that “silicon is almost free”. Namely that we can now construct systems that have low fixed costs and that the capital per subscriber, whether is

be average or marginal are almost equal. This means that technological changes have driven scale economies out of the business.

There are three examples of loss of scale. The first is the advent of the ATM (voice packet) or Frame Relay (Long Packet) switches. Unlike the old Central Office switches which are priced at a fixed entry costs of $5,000,000, one can enter a switched voice or data market with an ATM at $50,000, and reach loss of scale at 50 to 100 lines or even less. Fundamentally, ATM fabrics present a level playing field to all entrants.

The second example is wireless, namely CDMA. It is shown below that unlike analog or even TDMA, CDMA cellular reached a capital per subscriber of $300 or less at 50,000 subscribers or less.[66] In the wire based world or the wireless analog world, scale was not lost until the subscriber base was ten to one hundred times that number. Thus, PCS, using CDMA is almost one tenth the capital per subscriber as the current wire based telecommunications business of the RBOCs. The following Figure depicts this analysis. This is for a 10 MHz CDMA system, where we have plotted the capital per subscriber versus the number of subscribers. The curves have been parameterized on total coverage area. The observation to note is that by the time the penetration is 50,000 subscribers, no matter how large the area of coverage the average and marginal capital per subscriber is almost the same, about $300. Although at low penetrations there may be high fixed costs, scale is lost in this technology at very low penetrations. Recall that the typical cellular system sells more than 5,000 subscribers per month, thus scale is eliminated in less than the first year of operation.

The third example is the concept of outsourcing. This is the “virtual” loss of scale. One can use service bureaus for billing or customer services that allow for pricing at the margin. The provider of network services no longer is required to provides for all software, computers, personnel, training and infrastructure. The following Figure depicts the costs per subscriber per month for all operations costs of the telephone operations. This is derived on the basis of actual operational numbers from current cellular systems and from the outsourcing that can be obtained from such companies as AMS, NPC, IBM, EDS and others. We have plotted the cellular costs plus their access fees. We then plot the costs less access. The observation is that a cellular company does not eliminate scale until they reach over 2 million subscribers. However, by least cost outsourcing this can be achieved at lower levels as shown. This chart shows that scale can be eliminated and the costs for all operations can be lower than $8 per subscriber per month.

[66]See McGarty, TPRC, September, 1993. McGarty, T.P., Access Policy and the Changing Telecommunications Infrastructures, Telecommunications Policy Research Conference, Solomon's Island, MD, September, 1993. Also, McGarty, T.P., Spectrum Allocation Alternatives; Industrial; Policy versus Fiscal Policy, MIT Universal Personal Communications Symposium, March, 1993. McGarty, T.P., Wireless Access to the Local Loop, MIT Universal Personal Communications Symposium, March, 1993. McGarty, T.P., Access to the Local Loop; Options, Evolution and Policy Implications, Kennedy School of Government, Harvard University, Infrastructures in Massachusetts, March, 1993.

This loss of scale has several dramatic consequences to those entering and continuing to operate in the business;[67]

i. *Barriers to entry are removed: This means any new entrant may get into some part of the business. Combined with the distributed element, the new entrant may do so at little costs.*

ii. *Economic and Regulatory Rationale for monopolies are eliminated: There is no longer the justification that one large entity, to who consumers are paying monopoly rents, is the best entity due to scale economies. One must re-look at the regulation.*

iii. *Change can be Effected More Swiftly: Loss of scale allow for rapid changes in service offerings by eliminating the concept of sunk costs. Albeit sunk costs are not to be considered in economic decisions they are frequently a significant factor in delaying change. The elimination of theses virtual burdens should allow for more rapid change.*

We briefly show what the structure of the disaggregated network will look like and do so in the context of several specific examples.

3.5.2 Disaggregation Elements

The theory of disaggregation states that technology and industry has developed in such a fashion that it is possible to effect all elements of a business in a virtual form by obtaining all functions necessary to deliver a service by purchasing them from third parties each of whom has themselves other similar customers and thus each of whom can deliver their element of the functionality in a minimal marginal cost manner. The disaggregation theory then concludes with the result that in many technologically intense services business, a virtual company can exist wherein all the functions can be purchased from third parties or capital equipment may be purchased in a fully interconnected fashion so as to achieve near equality between average and marginal costs from the very commencement of the business. The Disaggregated Company is the embodiment of the virtual business. [68]

The existence of the disaggregated business is a challenge to the antitrust laws and especially to the implementation of the 1996 Act. What this implies is that as a

[67]See the McGarty papers from 1993 through 1995. In these papers the author presents detailed financial and economic models of the wireless side of the business. More importantly, see the section presented in March, 1996, at Columbia University, available on the CITI Web site, wherein the author takes this a step further and applies disaggregation theory to a broader set of telecommunications services.

[68]See the section by the author at the Columbia University presentation, March, 1996. McGarty, T.P. , "Disaggregation of Telecommunications", Presented at Columbia University CITI Conference on The Impact of Cybercommunications on Telecommunications, March 8, 1996. McGarty, T.P., The Economic Viability of Wireless Local Loop and its Impact on Universal Service, Presented at Columbia University CITI Conference on Universal Service, October, 1996.

disaggregated company any new entrant can achieve the same of better efficiencies of operation of its business as any incumbent, right from the start. This then states that competition is then based solely upon the actions of the monopolistic incumbent and that these actions relate to only one area, interconnection and unbundling.[69]

Disaggregation falls into three dimensions; technical, operational, and relational. We define each as follows:[70]

Technical: Technical disaggregation the ability to overlay applications and platforms a disparate backbone of transport facilities and create a whole. An example of technical disaggregation is the client server architectures and the LAN networks in common use. This type of disaggregation is a result of the many technological advantages that have occurred in telecommunications as a direct result of the 1984 MFJ agreement.[71]Another example of technical disaggregation is the ability to use a distributed system, such as PCS, Personal Communications Services, and have the actual "switching" occur at the end users handsets rather than at the old fashioned hierarchical central office. By distributing the technology and the intelligence we marginalizes the capital deployment requirement and thus achieve technical disaggregation. One example that we discuss in this section is the concept of providing airtime. Namely the ability of a competitor to not only unbundle local loop, namely copper wire, but to unbundle frequency spectrum, namely airtime from an existing CMRS.[72]

Operational: Operational desegregation is the breaking apart of re-assembling in any fashion the operational or business elements to effect the successful provision of service. Namely we can separate billing, transport, sales, service, and network control into different pots and create a virtual corporate entity. We no longer have to do all. We only have to do that part that we do well. An example of operational disaggregation is the outsourcing business whereby a company, such as a Bell Operating Company, would use an outsourced customer service center to provide this function, or in another context of a bank who outsources all of its telecommunications network.

Relational: This will be the issue of who does what to whom in such entities as electronic marketing and distribution channels in a telecommunications cybernetwork. This is the most recent example of building cybernetworks via relationships. Unfortunately many of

[69]See Coll: William McGowan, one of the founders of MCI recognized this in the IEC business. He used a two prong approach to effecting his competitive position, first through the FCC and second via the antitrust laws. Coll, S. The Deal of the Century, Atheneum (New York), 1986.

[70]McGarty, March, 1996, section presented at Columbia University.

[71] The first is the attempt to open the data monopoly of the AT&T was by Bob Kahn, the father of the Internet, to obtain a 300 bps modem from AT&T. AT&T refused to support ARPA and Kahn and his team thus were forced to create a modem apart form AT&T. This then led to the proliferation of PC modems and the ability now with the introduction by Intel of a 56 Kbps dial up modem that supplants ISDN.

[72]It should be noted that the FCC expressly stated that the CMRS was not a LEC and thus was not required to unbundle. In addition, in the FCC First R&O on Interconnection, August 8, 1996, it stated that an RBOCs LEC was not a subsidiary even though the author argued against that based upon the theory of agency.

the current examples are examples of failure; Prodigy with IBM, CBS and Sears, or MCI and News Corp. on the Internet side. In this section we attempt to focus on the latter two elements. The first has been treated elsewhere.

This Disaggregator entity is a key differentiation in the market. The Disaggregator is one who may use the existing license holders access facilities as one of several means to provide service to a fixed customer base. It is argued that the Disaggregator is a different entity altogether and more importantly it is argued that the disaggregator is the most likely evolutionary entity to change as full competition is presented in the wireless market.

The author believes that by acting as a "Disaggregator" it can effect this competitive position. The Disaggregator works on the following principles. The provision of wireless services is based upon the integration of the service elements. This integration may be performed as an aggregation or as a desegregation approach. The Aggregation is the way most of the CMRS entities now work, having control over all of the elements of "production". The Disaggregator may have control of certain strategic elements but will "outsource" others.

3.5.3 Local Exchange Interconnection and Elements

The LEC elements are composed of two general categories of goods. They are the inside plant and the outside plant. The inside plant is the switch and all of its elements and the outside plant is composed of the wireless, fiber cables and other outside connection facilities. In the inside plant, each call can be attributed to the use and allocation of certain determinable facilities, directly, or though a well determined allocation process. For example, if one desires a single call connection, it is know that a call uses certain line terminating equipment, certain processor capabilities and capacity, and certain trunk terminating facilities. Thus the allocations of the total good to the specific good for any single call is determinable. In effect, one who requests the use of the facilities from the I-LEC is in essence requesting the product of a combination of capital plant and ancillary support services for some time certain. It is not the provision of a service as determined by the Court.[73]

3.6 Principle of Cost Based Pricing

The above examples present the key issues of interconnect and unbundling. We conclude this with the Principle of Cost based Pricing. The principle can be explained via the following example. Consider the interconnection shown in the following Figure. Here we have a CMRS, an I-LEC, a C-LEC, sever IECs, and their interconnection. The CMRS will be the focal point. The CMRS connects to the IECs and to the I-LEC and C-LEC as well as to other similar players on the other side of the IECs.

[73]Note that we have phrased this as a purchase of two or more elements. This is consistent with the Court ruling in *Students Books v. Washington Law Book*, 232 F. 2nd 49 (DC Cir. 1955) and the sales of these are contemporaneous as in *Atlanta Trading Corp. v. FTC*, 258 F. 2nd 365 (2nd Cir. 1958).

Consider two calls. Call 1 goes from the CMRS to the local I-LEC. Call 2 goes from the CMRS, over an IEC to a customer at a distant I-LEC. Both calls are originated by a CMRS customer and terminate on an I-LEC customer.

Today, any IEC call must pay an interconnection access fee to the I-LEC to terminate on their network. As we indicated this is a wealth transfer policy and does not reflect any true cost. The CMRS before the Act paid the I-LEC a termination or origination fee and there was no compensation from the I-LEC to the CMRS. As we have demonstrated that is no longer the case.

The Principle of Cost Based Pricing states the following: The consumer should pay for each link separately and they should pay only for those links for which they are customers of that link provider. The payment the customer makes should reflect a price that is in turn based on the costs of that link.[74]

The basis for the Principle is the same basis for the Baumol Willig theorem, namely maximizing consumer welfare. The argument is based upon the theory of Ramsey pricing. The classic approach taken by Baumol and Willig is as follows:

maximize $^{\{P1, \ldots, Pm\}}$ [CS + PS]; subject to PS = F

where CS is the consumer welfare and PS is the production surplus or the profit of the monopolist provider.[75] If however, we eliminate the monopolist totally, that is maximize it on the basis of consumer welfare alone, and if we assume a fully displaceable and commodicizable service, and if we further assume the change in technology that eliminate scale in toto, then the resultant position is the Principle of Cost Based Pricing. Namely, each separate provider sells their service on the basis on their own costs and the interconnection is free and reflects not costs to the consumer.

We now can apply the principle of cost based pricing to the case on I-LEC interconnection.

[74]The issue here is a quid pro quo issue of parity in providing interconnection in a commodicizable market. For example, if two or more LEC or LEC like carriers enter a market, then there should be not interconnection fee and each carrier should price their services at the price based upon their costs and have no third party intervenor establish a de facto subsidization. If however, one carrier provides a service such ad aggregation to more efficiently interconnect, then this added non pari passu facility should be compensated at an equal, comparable, and costs based level, shared amongst all players. The Baumol-Willig approach can apply here if we merely eliminate the artifact of ensuring a profit to the monopolist as Baumol has consistently done. By maximizing consumer welfare at the expense of the suppliers, namely by creating a competitive market, one arrives at the principle of cost based pricing.

[75] See Brown and Sibley, The Theory of Utility Pricing, Cambridge University Press, 1986, p. 39.

3.7 The Goods and Services Offered to the Market

The delivery of telecommunications services, be they by wire or by wireless, are in effect the same services. They are the same as viewed by the consumer of these services even if they are implemented in a fashion that is different from the perspective of the provider. Standard wire based telephony is the same as cellular and is the same as any wireless based telephony.

3.7.1 Telephone Service

Standard telephone service is the provision of voice and/or data communications in a fashion so that it may be delivered in a national network. The delivery of switched telecommunications can now be achieved via the existing telephone network, which is a monopoly, protected by the 1934 Federal Communications Act. There are new and innovative forms of technology that can and do deliver the same service. Cellular is one that has been in operations for over ten years and is a service and market controlled by eleven dominant players; the seven, now potentially six, RBOCs (excluding Air Touch), GTE, McCaw (AT&T), Sprint, and Air Touch. A third alternative will be available in the next year or two, as approved by the FCC in its Fifth Report and Order dated July 15, 1994, namely, PCS, or Personal Communications Services.[76]

PCS provides, at a minimum, the ability of any new entrant to deliver toll grade quality voice services in a seamless interoperable nation network. This service or product offering is the provision, at a minimum, of voice grade service. It is the same as the service offered by the current Local Exchange Carriers, LEC, and is the same that could be potentially offered by the existing cellular carrier.[77]Arguably, there is nothing preventing the Cellular provides from doing the same.

This states that PCS, and other wireless means for telephony, are nothing more than "plain old telephone service". It clearly has the potential of providing telephone service at a more competitive price than a wire based service. It is totally cross elastic with a wire based service. Namely, the consumer cannot differentiate with either offering other than possibly through the extra mobility afforded by PCS. In essence, PCS makes wire and wireless telephone service a simple commodity, indistinguishable to the consumer solely on the basis of the technology. The distinguishing feature will most likely be the price and only the price, as it is with all commodities. PCS allows for the commoditization of local exchange service.[78]

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[76]It should be noted that AT&T has recently announced that their TDMA IS-54 services, which have been operational in New York and other cities for four years are now called PCS. AT&T did nothing more than recognize that PCS is merely the provision of cost accessible wireless services and have nothing to do with spectrum allocation. The author had indicated as such in FCC filings in 1992. Moreover, the consumer cannot recognize the difference, namely the service is commodicizable.

[77]In McGarty, 1990 [1], the references being detailed at the end of this filing, the demonstration is made that the networks as evolved with wireless can be constructed in a fully open and distributed fashion. It was in this section that the concept of commoditization was first presented.

[78]Telmarc Telecommunications, Inc., NPRM Comments to the FCC, November 9, 1992.

PCS, cellular, and wire based local exchange services are indistinguishable from the perspective of the buyer. Therefore, PCS can and should compete with the LEC and the wire based service.

If the intent is to create a competitive alternative to the local loop, and, simultaneously, to expand the telecommunications services offered, then PCS offers a significant alternative means to do so. Experimental efforts to date have indicated that the consumer does not necessarily view PCS as a separate service offering. If priced competitively, and positioned competitively, the consumer views PCS as a displaceable alternate to the wire based telephone.[79]

3.7.2 The Market

The "Market" for PCS is the same as the "Market" for the LEC based services of today. The "Market" for cellular is the same as the PCS "Market". Namely the Market is the local exchange telephone service business. There is no material or other observable or measurable difference in the offering of PCS and wire based service and the markets for both are the same. The consumer may choose between the two.[80]

PCS enables the commoditization of voice services and establish the possibility for any new entrant to sell the same service to the consumer, with the consumer purchasing the commodicized service solely on the basis of price. PCS allows for the total cross elasticity of supply to the consumer of telephone service. It is argued that the service offered by the dominant entity or the RBOC LEC is fully displaceable by PCS and that as such competes with the LEC in its primary market.[81]

New entrants into the PCS business do not face economies of scale in capital plant that have been faced by prior entrants, thus justifying the prior monopoly position of the LEC. PCS entrants, by means of outsourcing, can also obtain all support and sales services at marginal prices and thus each Local Service Operator, CMRS, does not have a scale economy in the operations and sales sides of the business. Thus there are no economies of scale in the PCS business and the justification for any monopoly player is no longer valid on economic principles.

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[79]Telmarc Quarterly Report, July 1, 1993, which details extensive market research in this area.

[80]The Court, in *United States v. E.I. duPont de Nemours & Co.* (Cellophane), 351 U.S. 377 (1956), introduced the concept of cross elasticity to determine the market. Although there is no true market measure at this time, extensive market research indicates that there is anticipated to be great cross elasticity as defined by the Court in the aforementioned.

[81]In the decision of *Telex Corp. v. IBM Corp.,* 367 F. Supp. 258, 355-356 (N.D. Okla. 1973), the Tenth Circuit Court ruled that IBM had monopolized the market on the basis of the sale of peripheral products that were commodicizable in the terms in which we use herein.

It has been shown that new entrants have the ability to establish capital plant in such a way as to have marginal capital and average capital be almost the same at very small market penetrations, less than 0.5%. Thus there are de minimis scale economies in capital plant. In addition there may be scale in support and operating services, but by outsourcing, and using the economy scope of a third party, such as an ISSC or EDS or CSC (as did NEXTEL), an entrant may purchase such service at the margin. Thus any new entrant may see entry costs all at the margin.[82] This implies that there is no natural monopoly. In fact this implies that competition may be quite significant.

3.8 Competition

The Incumbent LECs have control of almost 100% of the market in wire based distribution of the telephone service, with some diminution due to local bypass entities. The existing entities have control over almost 75% of the current wireless market as a means of distribution of telephone services.[83]

3.8.1 Cellular and PCS

There is some mis-perception that the cellular carriers differ in some way with PCS. The cellular carriers, having 25 MHz of spectrum each, half of which was given to the RBOCs free of any cost, and half won in lotteries, and subsequently purchase, half of that being by RBOCs, is just bandwidth. The RBOCs can and are doing with 800 MHz bandwidth what can and may be done with the 1.8 GHz bandwidth. Bandwidth is fungible. Pac Tel had stated in 1990 that they could provide service to all of Los Angeles using CDMA and the existing 25 MHz 800 MHz spectrum.[84]

Telephone services, as a commodicized entity, do not differ in any way if delivered by a wire or wireless means. The consumer perceives the service as the same in either case. Thus there is complete cross elasticity in a commodicized market.

The delivery of telephone service, when differentiated by wire based or wireless, is the same service but sold through a different sales and marketing channel. There is no basic product differentiation between a wire based service and a properly delivered wireless service. The only difference is price as reflected throughout the distribution channel.

The essence of what makes wireless and wire based services different is merely the sales or distribution channel. The sales channel is a different company, although owned by the same holding company. Pac Tel was the only RBOC to publicly recognize this and separate the two entities. The current differential between the two services is price, and

[82]McGarty, 1994 [1], and Telmarc Quarterly Report to the FCC, April 1, 1994.

[83]Wireless Communications; Donaldson, Lufkin & Jenrette, Report, Summary, 1994.

[84]Statement of Craig Farrill, Vice President of Pac Tel, at CTIA in January 1991, talking on their choice of CDMA.

this is driven by capital and operation inefficiencies in the analog technology. These will disappear in the digital technologies.

The current wireless market is controlled by Duopoly Players, one being an existing entity, called the B side wireline carrier, who was granted at no cost the 25 MHz of spectrum, and another A side player, called the non-wireline player. More that 50% of the current wireline players are existing entities, namely RBOCs or GTE. All of these entities may deliver a telephone service comparable to that on the wire based side. Some of them currently do.

The current cellular market is at best a duopoly and in some sense a monopolistic market. With few exceptions, the market shares are the same. The exceptions are most pronounced in the markets of Bell Atlantic NYNEX Mobile ("BANM"). Notwithstanding the differences, the control of the telecommunications market, be it wire or wireless based, is under the control of the RBOCs or other Existing Entity.

3.8.2 Local Competition

The value of a telecommunications property is dependent on the net present value of the property. That value is a function of the revenue, expenses, capital, auction fee, access fee, and cost of capital as perceived by the bidder. If all operators face the same revenue stream, capital requirement, and expense stream, the property values will reflect access fee, auction fee, and cost of capital differences. This will advantage those with low costs of capital and control over access.[85]

The existing entity may have the ability to use their existing monopoly powers to ensure preservation of their monopolies in the upcoming bidding for wireless licenses. This would create a new barrier to entry to any new entrants, and continue the existing barriers to entry. The existing entities face the lowest cost of capital of any provider and in addition have a monopoly rent value that increases their valuation per PoP. In addition these existing entity bidders, as a group, have control over some of the means of production, including but not limited to access fees. Thus these players, per force of their existing monopoly franchise, have a higher value per PoP, assured by the government franchises, and thus can outbid any player in a free and open auction.

Access Fees are a key means of production. They are currently viewed as a means of compensating the RBOC for use of its facilities and payment for certain yet to be defined network externalities. Access fees include the costs of interconnect plus other costs and services that go beyond interconnect. Access fees are not unbundled costs for interconnect.[86]

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[85]Such an action, if actually exercised, is predation.

[86]As shown in McGarty, 1993 [1] through [4], and 1994 [1], access fees tie together elements such as interconnect, R&D, sales and services, and other elements of the telephone companies services, and have been indicated as such by the LECs in filing to various Public Service Commissions. Interconnect is what is sought, and unbundled from any and all other elements. It can be argued that this "tied" offering, which provides ability for interstate traffic and commerce, which is not expressly conveyed to the access buyer, which can be separated into a multiplicity of products as

The RBOCs have bundled many costs into access. For example, the IEC may face a $0.05 per minute access whereas the cellular carrier may face a $0.11 per minute for comparable service. Recently, NYNEX proposed changing access in New England from $0.07 to $0.035 per minute. These fees load such items as Bellcore and internal Science and Technology costs, which may for the most part have nor relation to access. In fact, these R&D costs relate to new products and services and not to unbundled access.[87]

Competition from other entities, specifically the Incumbent LECs, who may perforce of their lower operating costs and lower cost for infrastructure capital, may be able to offer a more competitive service than any other entity if they were to obtain a license.

The Incumbent LECs have entrepreneurial capabilities that will permit lower costs and a competitive market. It has been argued by many such groups that represent these entities that a set aside is the only way for them to compete. Notwithstanding this, a set aside may be appropriate for the Incumbent LECs but a set aside for the RBOCs only, delimited to at most one band, is essential for there to be any long term competition.

It is clearly to the RBOCs advantage to merge, to integrate, to improve the position of their existing channels, and to perform other acts that ensures them greater share of the market prior to the entry of any competition.[88] This is the same set of issues that were prevalent in the 1970s during the early stages of the AT&T breakup.[89]

3.9 Tying Arrangements

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evidenced by the actions of Ameritech, and over which the LEC has significant economic power to control both availability and price, and which ostensibly has not clear business justification, implies that access fees are potentially tying claim, as per *Jefferson Parish Hospital No. 2 v. Hyde*, 466 U.S. 2 (1984).

[87]Companies such as NYNEX have over 500 staff in their internal R&D facilities as well as sharing a significant portion of the of Bellcore which has been over $200 million per year for Bellcore and almost $100 million per year for the NYNEX S&T operation. In particular, NYNEX S&T significantly burdened the cellular entity for developments that were marginally related to the business. The author has personal knowledge as formed Head of R&D for NYNEX and as COO of NYNEX Mobile. It also should be noted that Bellcore is now allegedly for sale and that as of this writing a possible buyer has surfaced. This is a clear reflection that Bellcore no longer has a strategic interest to companies who may in many cases be competitors.

[88]Recent pricing of cellular at such rates as $19.95 per month for unlimited local service in Boston by Southwestern Bell is an example of pricing to obtain market share. Recent estimates put Southwest Bell's subsidiary in Boston at over 400,000 subscribers of a market of 4.5 million, almost 10% market share. It will be very difficult for any new entrant to get that share away from them. In addition, although Telmarc has been arguing for access fee elimination in Massachusetts, neither the Bell Atlantic NYNEX Mobile ("BANM") nor Southwest have raised that issue, as a means to provide a more competitive service. In a duopoly market, such a fee is common to both players and is not a barrier. In a fully competitive market, this would change. The Parties argue that the fact that BANM in the Massachusetts market has not attempted to act as a LEC implies that BANM cannot and does not act independently of the LEC portion of NYNEX and that in what can be observed externally, the LEC interests dominate even over the unregulated and non-LEC operations.

[89]Temin, P., Fall of the Bell System, Cambridge, 1987, p. 129. Here the author recounts Van Deerling suggestions of abandoning FCC control and oversight and reintroducing the antitrust laws which control competitive markets. It can be argued that the same effect is taking place here.

The ability to offer a local exchange service in a competitive manner depends upon any new entrant being able to collect together five elements; user connection, switch interconnection, billing, customer care, and sales. How these are obtained are dependent upon each user. The user connection may be obtained via the unbundled connection capability purchase from the I-LEC, from the deployment of the purveyor's own fiber network, from air time purchased from a third party, or from a wide variety of means. Namely, as we have already argued, there is a multiplicity of means available for the purveyor and these means may be owned and constructed by the purveyor or they may be provided as products from some other third party. The switch interconnection is the ability to have access to any and all other purveyors to assure universal interconnectivity. We shall focus on this latter element, interconnection, in a later section. In this section we focus on the unbundling of the elements, specifically airtime. This analysis applies to the unbundling of any of the elements as specified in Section 251.

We can now proceed with a detailed analysis of the product offered and how they may be purchased from other players, especially dominant market player, or the monopoly player in the market. At the hear of this analysis is the argument that there are clear and evident tying arrangement present. As we have argued, the following facts are self evident:

i. *Local Exchange services is the product being provide to the customer.*

ii. *Local Exchange Service can be provided by the agglomeration of such "operational components" or "products" as air time, I-LEC/CMRS interconnection (namely the interconnection between the CMRS switch and the I-LEC switch), I-LEC interconnection which is the direct interconnection to the I-LEC switch no matter what the source of the interconnection, billing, customer service, network management, sales, switching, local interconnection, and other elements as may be required.*

iii. *The competing player in this market may provide the product by delivering several of the "operational components" directly themselves and by obtaining some of the missing operational components from the monopoly Incumbent LEC.*

iv. *The 1996 Act mandates that the I-LEC unbundle amongst other requirements.*

v. *The 1996 Act removes the Antitrust protection from the I-LEC.*

vi. *The Incumbent LECs have monopoly control of the Local Exchange market.*

vii. *The Incumbent LEC has, through its holding company, directly or through interlocking agreements, overt control over the CMRS which is related to it.*

3.9.1 Tying Arrangements Defined

To quote from the Court in *Kodak*:[90]

"A tying arrangement is "an agreement by a party to sell one product but only on the condition that the buyer also purchases a different (or tied) product, or at least agrees that he will not purchase that product from any other supplier." Northern Pacific R. Co. v. United States, 356 U.S. 1, 5-6 (1958). Such an arrangement violates 1 of the Sherman Act if the seller has "appreciable economic power"' in the tying product market and if the arrangement affects a substantial volume of commerce in the tied market. Fortner Enterprises, Inc. v. United States Steel Corp., 394 U.S. 495, 503 (1969)."

A tying arrangement exists only when a producer of a desired product sells it only t those who also buy a second product from it.[91] Consider the arrangement made by the CMRS. If a local exchange carrier who is not the I-LEC desires to enter the local exchange market by purchasing air time from the CMRS, then the CMRS may tie with the air time such services as network management, customer service, engineering services and other such services. In addition the CMRS generally ties together the interconnection between the switch of the CMRS and the switch of the I-LEC. The latter is a separable set of product offerings and the forced tying arrangement we argue is a per se violation. The Court has ruled in *Jefferson Parish Hospital v. Hyde* that when "forcing" occurs with a company that has "market power" that such is unlawful.

The elements of an illegal tying arrangement have been articulated by the Court in *Jefferson Parish Hospital v. Hyde*. Specifically the elements for a successful claim are:[92]

i. the tie must affect more than a de minimis amount of interstate traffic;

ii. where the tying arrangement is not express, buyers must in fact have been coerced into buying the tied product as a condition of buying the tying product;

iii. the two products must be separate;

iv. the defendant must have economic power in the tying market;

v. there must not be any valid business justification for the tied sale.

We shall now go through each of these elements in turn for the case of the I-LEC and CMRS relationship.

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[90]See *Eastman Kodak Company v. Image Technical Services, Inc. et al.* (June 8, 1992).

[91]Areeda & Kaplow, p. 704.

[92]Ross, p. 285.

3.9.2 Interstate Traffic

The issue of interstate traffic is a forgone conclusion in the case of telecommunications. The overall product that is to be sold is local exchange service combined with inter-exchange carrier service. Since the I-LEC is by definition a monopoly player in all markets in which it acts it has the market power and in view of the CMRS it is a duopoly player in an interstate market. The specificity of the interstate issue has been joined and resolved by the Congress and is stated in U.S.C. 47 Section 332.

3.9.3 Coercion

The contracts with the CMRS explicitly require the purchase of the tied elements. Namely, if one were to go to any existing CMRS provider the service offered is that of the air time plus the I-LEC interconnection. As we shall argue, these are clearly two separate products and in fact there should be no reason that the CMRS should in any way refuse to connect to the competitive the C-LEC. The refusal is a barrier to entry to the C-LEC. It is argued that that refusal is a *per se* violation.

3.9.4 Separate Products

In *Kodak* the Court ruled that products or services are separate when there is sufficient consumer demand to justify firms providing one item without the other.[93] Let us consider the products being offered. For the CMRS they are:

Air Time: This is the provision of access to the cell transport facility allocated on a block of trunk voice channels which can be readily allocatable by the switch software. This allocations is common practice in all MTSO or MSC trunk routing software. The air time is the provision of end to end trunk circuits.

Field Service: These are the costs allocated to the servicing of cells and the switch of the I-CMRS provider.

Network Management: This is the management associated with the provision of the CMRS services.

The CMRS will bundle the interconnection, as follows into this product.

I-LEC Interconnection: This is the connection from the CMRS switch trunk side to the I-LEC line side. There is no functional reason why this cannot be terminated on the C-LEC switch. The reason provided by the I-LEC is that it would allow for IEC access to the C-LEC and thus avoid the payment of access fees.

[93]Ross, p. 289.

We bundle these three elements into an airtime fee for service. In addition to these the CMRS provides the following products. It should be noted that the CMRS also provides line item costing and pricing for these demonstrating that they exist and are separable.

Billing: This is the full bill service from tape collection at the switch, issuance of the bill, provisioning of the switch, and collections process.

Customer Service: This is the provision of all incoming customer service calls.

Sales: This is the sales, set, provisioning, collections and other functions.

Administration: This is the overhead management of the system in addition to the normal operations of the business. It may not generally have any relation to the delivery of any products provided.

Planning, R&D, Overhead: These are general overheads related to the service that may be related to new services and products that the CMRS may offer but would have no relation to general air time.

3.9.5 Economic Power of Incumbent

It is beyond a doubt that the incumbent has economic power. As a duopoly player aligned with the monopolist player this is without a doubt. The cartel formed by the A and B band cellular providers who are for the most part the I-LEC affiliates or agents is prima facie proof of this power.

3.9.6 Business Justifications

There are no viable business justifications for the bundling of such services. It can be argued that the 1996 Act recognized that unbundling and other similar requirements are a necessary step for the I-LECs to be allowed entry to the IEC market.

3.10 Pricing Arrangements

Prices charged can be used as a barrier to entry and a per se violation of the antitrust laws. The issue of separate products and the prices applied thereto is key to the understanding of the pricing mechanism in the antitrust sense.

3.10.1 The Products and The Prices

We have introduced the following set of distinct products that can be provided; Wireless Connection, I-LEC Interconnection, Billing, Customer Service, Sales, and Overhead. The costs are generally presented as fixed costs plus variable costs. We have shown elsewhere that the Wireless Connection, the I-LEC connection, billing, customer service and sales can all be obtained on a marginal basis and that there are thus de minimis fixed costs and thus de minimis scale. Therefore, we have in the case of the CMRS business an

Average Total Cost equal to the Average Variable Cost, which is approximately equal to the Marginal Cost.[94]

Specifically, in the referenced papers by the author, values of these costs have been presented. In addition, the author has demonstrated, herein and elsewhere, that the AVC for the Wireless Connection, which we shall call air time although it includes some other variable costs, is less than 20% of the sum of all AVC elements. Sales is over 20% of the sum of all AVC, billing and customer service is about 20% and the remaining costs are overhead and access fees for interconnection.

The questions that we ask are two:

i. Does the CMRS sell itself air time at a price that is below the AVC?

ii. Does the CMRS sell airtime at a price that is dramatically above AVC?

The counter to these questions are also asked concerning the cost of interconnection to the I-LEC regarding access fees. Specifically:

i. Does the I-LEC sell itself interconnection at a price that is below the AVC?

ii. Does the I-LEC sell interconnect at a price that is dramatically above AVC?

3.10.2 Price Discrimination

Price discrimination exists when a seller provides its product to two buyers in such a fashion that one sale has a different rate of return than the other. Namely, one buyer is discriminated against by being forced to sustain a higher rate of return to the seller than another. As has frequently been noted, in a purely competitive business wherein the good being market is a commodity there should be no price discrimination. Let us consider the issue of air time.

In the ideal world after the PCS licenses, there will be two 800 MHz cellular carriers, six PCS carriers, namely three at 30 MHz bandwidth and three at 10 MHz bandwidth, and an SMR carrier. This is a collection of at least nine providers of air time. We have also argued that air time is a separable product, that it is in essence a commodity, namely there is generally no discernible difference in the market other than price, and thus one would anticipate the evolving of a commodity market that is competitive for airtime.[95]

Let us consider a simple market case. Let us assume that there are two sellers of local exchange service and let us further assume that the service is composed of agglomerating

[94]McGarty, 1993-1994 papers on access. The author derives the detailed costing model for all of these elements.

[95]It should be noted that NextWave, the dominant winner in the C Band PCS auctions proposes to be solely a purveyor of airtime on a wholesale basis.

the products of: airtime, interconnect, billing, customer service, and sales. This is a simple case of five products being blended together to deliver the overall product to the customer.

Let us further assume that there are costs related to these products for each provider. Namely:

- A_k = *Airtime for supplier k.*
- I_k = *interconnect for supplier k.*
- B_k = *billing for supplier k.*
- C_k = *customer care for supplier k.*
- S_k = *sales for supplier k.*

Then the supplier have an assumed rate of return of $R_{k.}$ The price to the consumer, P_k is given by:

$$P_k = (A_k + I_k + B_k + C_k + S_k)\ (1 + R_k)$$

Thus is Supplier 2 is the most efficient supplier and is airtime is priced at commodity rates, then all things being equal the price of Supplier 2 should be lower than the price of supplier 1.

If however, Supplier 1 controls the airtime, and if Supplier one sells itself airtime at a rate that is equal to or above the AVC, but sells Supplier 2 airtime at a rate that is dramatically higher than it sells it to itself, then, although there is no per se violation, there is price discrimination. Namely, the Supplier 1, who perforce of market power due to its duopoly presence, is allowed for the interim to sell airtime at disproportionately higher rates, does so with the intent of controlling the market.

It should also be made clear that Supplier 1 may, if it so chooses, to be a purveyor of air time only and thus reap adequate returns on its investment. It, however, wants to reap larger returns by selling the consumer the bundled product at higher prices even though a competitor Supplier 2 could deliver lower costs on all other elements, except airtime, since Supplier 2 does not have an FCC license.

We can define the situation better as follows. If P is the price, we define E as the excess costs. Then:

$$P_k = (A_k + E_k)\ (1 + R_k)$$

If Supplier 2 is much more efficient than Supplier 1 in providing all but the air time element, then:

$$E_2 << E_1$$

But the Supplier 1 charges airtime to itself at a dramatically lower rate than it charges Supplier 2. Specifically:

$A_1 << A_2$

Then clearly the consumer will be forced to pay the excess charge for airtime, which would accrue to Supplier 1 as excess oligopoly rents.

Recall that Section 2 of *Clayton*, namely the *Robinson Patman Act*, states:

"It shall be unlawful for any person engaged in commerce, in the course of such commerce, either directly or indirectly, to discriminate in price between different purchasers of commodities of like grade and quality, where either or any of the purchases involved in such discrimination are in commerce, where such commodities are sold for use, consumption, or resale within the United States or any Territory thereof or the District of Columbia or any insular possession or other place under the jurisdiction of the United States, and where the effect of such discrimination may be substantially to lessen competition or tend to create a monopoly in any line of commerce, or to injure, destroy, or prevent competition with any person who either grants or knowingly receives the benefit of such discrimination, or with customers of either of them..."

Recall also that this regulates consistency of prices and not consumer welfare. In this above example, however, consistency of prices, through the aggregation effect, also maximizes consumer welfare. In fact it does not material disadvantage the supplier of airtime who may still reap an adequate return on their air time investment. It does, however, drive from the market the producers of "excess" product elements that can more efficiently be provided by alternative suppliers. It allows for the ultimate commoditization of airtime. We shall return to this later.

3.10.3 Predatory Pricing

Predatory pricing generally means that the competitor sells its product at artificially low prices. Generally it is illegal for a firm to sell below cost where the intent its to drive competitors out of the market or to ensure that competitors do not enter the market. Competition should drive prices to the margin and this is what one would expect in a market wherein true competition exists. In the local exchange market we are starting with a monopoly situation and we are seeking to allow new entrants.

We shall focus on two elements in this business from two competitor. The two competitors are the I-LEC and the CMRS. In all markets the CMRS is affiliated with the I-LEC and that affiliation has been allowed to be more closely affirmed under Section 601 of the 1996 Act. In effect, the author has argued elsewhere that the relationship can be viewed within the context of the law of Agency and it can be seen that the Incumbent's CMRS is acting as one and the same with the I-LEC. Thus they are indistinguishable in the market and have pari passu equal power.

From the I-LEC the product that we will concern ourselves with is the switch interconnection product. For the CMRS perspective, the product is airtime.

Predatory pricing has been analyzed by the use of the Areeda-Turner test. Specifically the test states:

i. *If the Price offered by the competitor to the market is greater than the Average Total Cost then there is no issue of predatory pricing.*

ii. *If the Price offered by the competitor to the market is greater than the Average Variable Costs then there is no predation.*

iii. *If the Price offered by the competitor to the market is less than the AVC then the price is predatory and it is unlawful.*

We now want to consider the two cases. However we must remember that the price of the bundled product, namely LEC service, is the sum of the prices of the separate products that are combined to offer that end product.

3.10.3.1 I-LEC and Access

As we shall demonstrate latter in this section, the I-LEC sells itself interconnection. It also sells interconnection to other parties. First it sells interconnection to the inter-exchange carriers, “IEC's. They pay a significantly higher price than all other entities.

Let us assume that the price that the I-LEC charges the customer is the sum of the price for the interconnection plus all other prices. Namely, the price to the customer is the sum of the two product prices:

$P_C = P_I + P_O$

where P_I is interconnection price and P_O is all other prices. Let us assume that C_I is the cost of interconnection and C_O is the cost of all other elements. We shall assume that these costs are the AVC costs. The question is, can the I-LEC charge the customer for the LEC service a price that reflects a predatory rate, whereby we define a predatory rate as one where:

$P_I << C_I$

How can this be achieved. Quite simply. If the I-LEC charges the IEC a Price for Interconnect as follows:

$P_{I,IEC} >> C_I$

Thus the I-LEC makes up for losses in the local exchange area to ensure a sustainable monopoly position, by charging much higher interconnection prices in the interexchange area. This is a cross-subsidy scheme that ensures that the interexchange market subsidizes the monopoly position of the local exchange market. We have argued elsewhere that the I-LEC charges should reflect the totality of the I-LEC and should not select subsidies, costs from other competitors or any other market pricing distortion. We shall return to this latter.[96] We argue, however, that interconnection is predatory and falls in the collection of Class 3 Areeda-Turner violations.

3.10.3.2 CMRS and Airtime

The argument on predatory pricing for an I-LEC does not apply to the CMRS. We cannot argue that the bundled offering is priced at below costs. Unlike the I-LEC case where there is a "back-door" subsidy to allow below AVC and allegedly Marginal costs pricing, there is no similar argument here for the CMRS. Notwithstanding that observation, we do argue that the tying arrangements are themselves per se violations.

3.11 Unbundling of CMRS

The unbundling has been applied to the I-LEC via the Act. We now want to consider another issue of unbundling, namely the unbundling of the CMRS carriers.

The CMRS carriers fall into several categories. The oldest is the A and B Band cellular providers who have had their license since 1984. They are dominated by the RBOCs, who receive the B Band elements free and purchased over 50% of the A Band players. The other elements are the A-F Band PCS players, operating at 1.9 GHz and not 800 MHz as does cellular. They are also dominated by the RBOCs through PRIMECO and other directly controlled entities. If as we have argued, via disaggregation a new entrant can compete, then we extend the unbundling a step further. Namely, we seek to unbundle the CMRS carrier, especially the one controlled by an RBOC. We propose that this can be accomplished via an unbundling of what has been termed airtime.[97]This section presents the argument for this type of unbundling.

The CMRS provider however is currently deferred from the unbundling requirement. As we have just shown, the CMRS provider can be one of several elements in the facilitating of the competitive environment in the LEC market. The distinction here is that the FCC has issued a finite number of CMRS licenses and thus there is an inherent barrier to entry to any new player who desires to enter the LEC market by utilizing the CMRS air time facility amongst others.

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[96]See McGarty, "Access...", 1994. That section demonstrates the LEC's access AVC and shows that there is Areeda-Turner problems.

[97]There is an existence proof of this with the C Band winner called NextWave. They are selling airtime and MCI has used that company as its means to enter wireless.

3.11.1 Unbundling Alternatives

The unbundled elements for the CMRS fall into the following categories; air time and interconnection. Interconnection is a well defined product that connects the CMRS to any LEC. Currently the CMRS connects only to the I-LEC thus preventing by means of an artificial barrier to entry the new LEC entrant, entering the market by a multiplicity of means, to have direct access and thus increasing the costs of service assuring that the new entrant cannot effectively compete.

There are at least four ways in which air time may be provided. The following subsections discusses each of these requests in some detail.

3.11.1.1 Type 1: Current Airtime Offerings

This is what is available to the current resellers. The CMRS, generally the duopolistic cellular company, sells minutes of connect time from the customer to the RBOC LEC line side of the switch. This approach or proposal is to purchase or buy straight Airtime at the standard reseller rates. These are generally at the range of $0.20 per minute. This has already been provided by the major cellular companies.

3.11.1.2 Type 2: Airtime Connection at Trunk Termination

This is the sale of cellular minutes from the customer to the trunk side of the CMRS switch. In this proposal the company is to terminate on the MSC with a DS-1 circuit and to have the connection from the CMRS carrier to the LEC be a competitor connection. It allows the competing LEC to sell service from that point on and allows the competing carrier to become a Local Exchange Carrier in its own right and seek appropriate interconnect and access pricing agreement from the monopoly local exchange carrier, the RBOC. This has been proposed to the cellular companies and has yet to be accepted. It would reduce the rates to approximately $0.18 to $0.15 per minute.

3.11.1.3 Type 3: Bulk Voice Channel Buys with Trunk Termination

This is the purchase of DS-1 or 24 voice channels from the CMRS cellular purveyor, from the users to the trunk side of the CMRS switch. This is the critical step that allows for success in local market competition and has been proposed under several other state dockets. What is being requested in this Phase is the purchase of a DS-1 bank of voice channels. This is not a per minute rate, rather it is a buy of air time at risk.

The new carrier takes the risk of loading these circuits up and then sell them. This is what is done today in the LEC market. It is mandated to LECs that are not CMRS by the 1996 Act but is not done so yet in this area of the CMRS. The new entity is a desegregated entity and this entity can only be developed if the Commission utilizes its powers under the 1996 Act to treat the CMRS as any LEC and to apply the un-bundling requirements thereto.

The question then posed is the one that asks if this new disaggregated entity is itself a CMRS. The author has argued that the law is clear in that a CMRS must hold a license from the Commission and that this "bright line" test is all that suffices. Further, what is asked and addressed to and by the Commission is the issue of whether this new disaggregated entity can effectively compete with the Incumbent LEC and its agents, affiliates, and associated entities on the basis of a "Bill and Keep" or more preferably a "Zero Access" interconnect interface. Is there an "equal protection" issue here that states that the Disaggregator has rights that are pari passu with those of the CMRS or are that separate. We argue that the rights to access on a free and open basis convey without the position as LEC competitor and not merely as a CMRS. The Commission in CC 95-185 and in WT 96-6 has joined these questions.

3.11.1.4 Type 4: "Dark Hertz" Access; "IF" Access with Trunk Termination[98]

This form of air time disaggregation is the most extreme. It allows, depending upon availability of spectrum, the purchaser to buy from the license holder, IF Bandwidth. The term IF means "intermediate frequency" and is used as a term of art since this is where one technically wants to gain unbundled. The following depicts the fourth option, type or proposal. This is the proposal that requests that the CMRS provide only IF interfaces at intermediate frequencies, "IF", to a disaggregator. Namely, the license holder will provide the transmitters and receivers at the sites but the buyer will provide all signaling behind this. This form has been advocated by several people in various forms before. The author has commented on the Gilder Conjectures and this type of Airtime is a way, under the 1996 Act, to begin implementation of this approach.[99] This will especially be important in the context of the proliferation of spectrum with the completion of the PCS auctions.

3.11.2 Unbundled Pricing

The issue of what are the true costs or in turn the fair prices for these types of airtime can be answered by understanding that if there were a truly competitive market the market mechanisms would clear the market and allow a truly competitive price to be reflected. Unfortunately this is not the case. As such we calculate a price using the classic rate base approach and providing a more than adequate rate of return on that investment.

The following simple calculation how such an approach could be priced:

- *Cell Capital at about $750,00 fully loaded per cell.*

[98]See McGarty, TPRC, September, 1994. The author argues that there should be a possible way to have a dark hertz provider and that such an approach has certain economic and technological advantages. The author presents a detailed explanation of what was called the Gilder conjectures.

[99]See McGarty, TPRC September, 1994.

- *In an analog system, 30 KHz per voice channel, 15 MHz per band, reuse of 7, yields (15000/(30*7)) or 72 instantaneous trunks per cell, or three DS-1.*

- *The capital per DS-1 is $250,000.*

- *The lease rate for seven years at 18% annual interest is 2% per month or $5,000 per DS-1 per month.*

- *A uses is busy 1% of the time at 100 minutes per month. Thus a DS-1 can handle 2,400 users. That is $2 per user per month.*

- *At 100 minutes per user this is $0.02 per minute, a factor of 10 less than the Phase 1 Rates!*

If we further assume that there is a less than 100% loading and that the usage is less than 100%, and we use 50% in both cases, the effective rate per minute is $0.08. It is this strategy that shows how one can achieve the result of expanding competition and in un-bundling.

The author further notes the following facts:

- Under the most conservative calculations, the above pricing scheme for analog voice provides Air Time at almost one-third of what the current providers are selling it at. This is comparable to building a DS-1 from 24 DS0 circuits because the LEC refuses to sell a DS-1.

- The above calculation assumes a very costly cell capital structure. Most analog cells may be half to one third of this, even with full capital allocation and cost allocation.

- Digital cells have five to twenty times the capacity as analog and thus for the same of similar capital the capacity is five to twenty times as much per unit capital. Thus digital introduction should drive down the costs by a similar amount.

- Other overhead factors can and should be appropriately allocated but the disaggregation approach requires appropriate location of costs. The CMRS should not allocate costs on a basis that disadvantages the new entrant. Specifically, the author will use its rights under Section 252 of the 1996 Act hereto.

- The competing carrier would take the risk of filing the channels with traffic.

The conclusion reached in this section is that such unbundling is feasible, that it is an extension of the powers given the FCC via the Act and that the same antitrust argument convey to the RBOCs via their control of this means of transport.

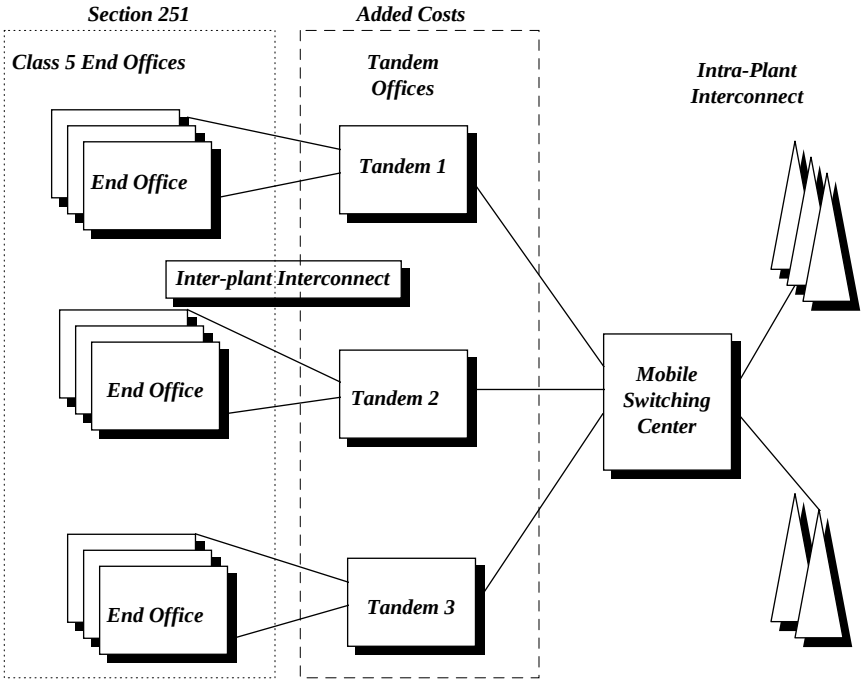
4 ACCESS AND INTERCONNECTION

In this section we also develop the concept of access because it is through access that competing carriers meet and it is through access that the dominant carrier may have the power to control the nondominant. We have discussed in the past few sections the issue of unbundling. We have viewed that from the perspective of the CMRS, which is an innovative way to do so since the FCC had not done this in their order. However the principles developed follow over directly to those elements that the FCC mandated as unbundled. In this section we develop the analysis for interconnection. This assumes that the provider, say a CMRS, has obtained all of the elements and has assembled them into a complete services offering. Now we ask the question, can we apply the Principle of Cost Based Pricing and if so what is the implications of that application. We have argued before that the direct consequence if Bill and Keep.

Interconnection is the process whereby the competent LEC connects with its competitor to allow traffic to flow from one direction to another. The operative issue associated with interconnection is access.

4.1 Interconnection Defined

The interconnection issue is a major factor in the deployment of wireless systems. This report provides an analysis of the interconnect problem from the Commercial Mobile Radio Services, CMRS's, facilities to the Incumbent Local Exchange Carrier, I-LEC. As has been discussed in previous reports, the interconnect issue for a wireless carrier falls into two categories; intra-plant and inter-plant. The intra-plant issue is that between cell sites and the carriers own switch and the inter-plant facility is between the carrier's switching facilities and the I-LEC's facilities. The overview of these interconnections is shown below.



This Figure depicts three issues: first, the intra-plant facilities are generally under the total control of the carrier. Second, the end office I-LEC interconnect is clearly under the control of the Section 251 reciprocal compensation rule. Namely, such agreements as those between WinStar and NYNEX allow for termination of traffic on a mutual compensation basis. Third, the real problem is how does one get from a single MSC, to several access tandems and then ultimately to dozens of end offices. This report addresses those issues.

The overall goal of this report is twofold. First to address the technical issues related to the interconnection, especially what options are available to tandem interconnection. Second, what are the resultant regulatory options that may be available to the carrier.

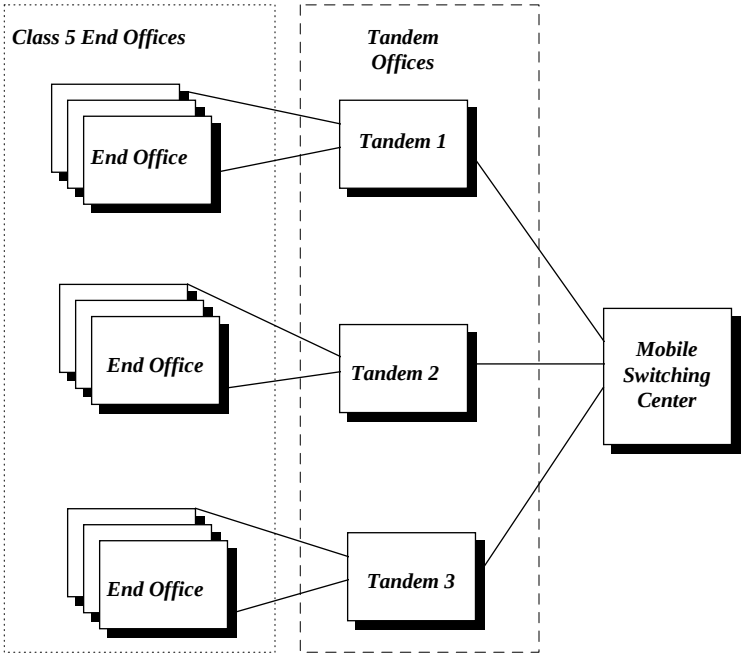
Any new carrier must be aware of these options before they interconnect since these interconnection options present significant fixed costs to the carrier and there may be ways to move these monthly fixed costs into some variable form or to move them into a form of carrier owned facilities.

4.1.1 Interconnectivity Options

There are several interconnectivity options for the inter carrier case. This section depicts them. The issue is clearly, how does the competitive non-ILEC carrier enter the ILEC domain and what are the ways in which end office Interconection, namely class 5 switch access, be achieved. Some alternatives are shown herein.

4.1.1.1 Option 1: Classic Approach

The following is an example of the classic approach. It uses the MSC access to a set of access tandems. Each access tandem must be interconnected with in a region. The costs of this are the costs of the access tandem connections plus the costs of the terminations on the end office switches. If the question is posed to the ILEC that there may be a more efficient mode of interconnection than the one so described, the response is that this is the only design that the I-LEC will provide.



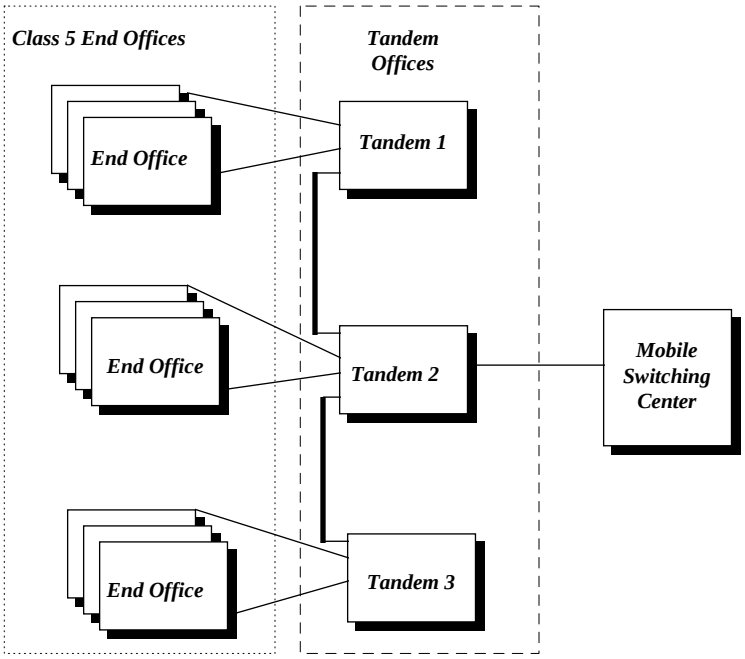
The CFR stipulates MTA coverage of this interconnection.[100] However with the Eighth Circuit Court of Appeals stay on the FCC rulings this may still be an issue. The issue above is that the MSC must connect to the Tandems but there is also the connection via an IEC and then to Tandems.[101]

4.1.1.2 Option 2: ILEC Tandem Connection

The ILEC may also interconnect via their Tandems. This is shown in the following Figure, in this case the ILEC has one single Tandem interconnect with the MSC and then they in turn connect via their own tandem trunks to the other access tandems.

[100]The issue of MTA coverage is a significant issue for the CMRS. This means that, if Section 251 stands the test of the Courts then, a CMRS can connect to the closest access tandem and get MTA coverage. It should be remembered that an MTA, Metropolitan Trading Area, covers several LATAs. This makes the I-LEC provide inter-LATA service, a possible conflict.

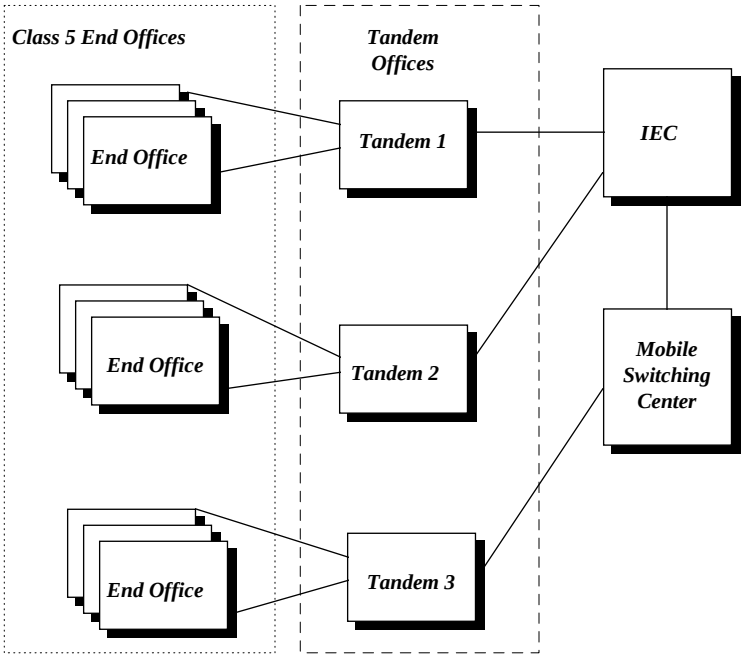
[101]The author has been negotiating with several of the I-LECs to obtain interconnection. They have generally delayed on several fronts in order to secure strong barriers to entry. First, they require inefficient multiple tandem access connections. Second, they charge $0.027 per minute, as compared to the FCC rates of $0.0015, almost a factor of twenty more. The I-LEC clearly is making confiscatory profits on this rate and they have moved the barrier to entry pricing from the local access to the tandem access. The author anticipates significant antitrust litigation to be a result of this action.



The issue here is this the concern of the CMRS or of the ILEC. We have argued elsewhere that this is the ILEC concern. In our current negotiations this has been agreed to by several ILECs.

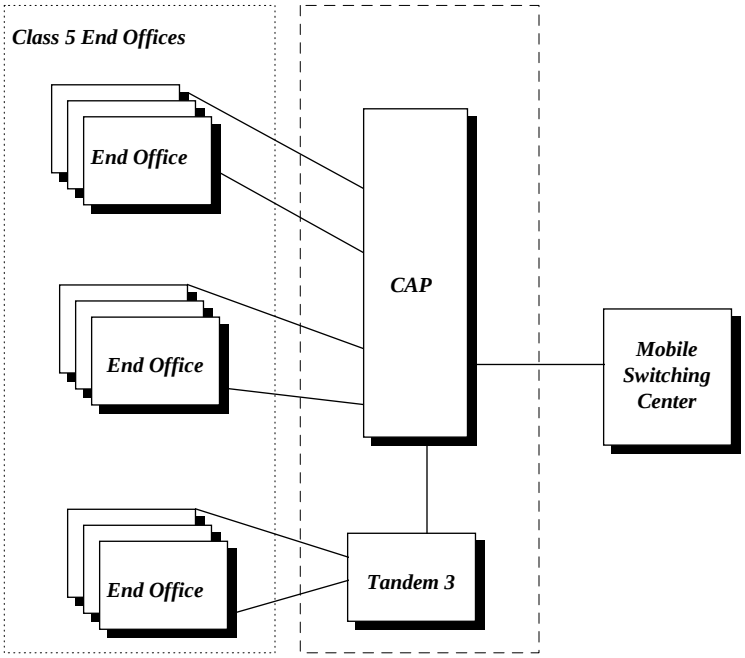
4.1.1.3 Option 3: ILEC and IEC Option

The next option shows the connection between the MSC and using the Inter Exchange Carrier, IEC, as the intermediary to the ILEC. The IEC generally has connections between the ILEC access tandems and this allows for the most effective use of a national backbone. This connection may even be an intra-LATA connection as well as inter LATA connections.



4.1.1.4 Option 4: CAP, ILEC and IEC Options

The CAPs, competitive access providers or C-LECs, may provide another alternative. The figure below shows the possibility to connect with the CAP and then in turn with the end offices directly of via the access tandems. There are several concerns with this approach. First there are may CAPs and they are not necessarily the same in quality. Second, ultimately the CAPs may be competing with the CMRS carriers as a purveyor of local service.



4.1.2 Views of Access

There are three views of access that are currently in use. These are:

1. ***Access as Externality***: This is the long standing concept of access that is the basis of the current access fee structures. The RBOC contends that it has certain economic externalities of value that it provides any new entrant and that the new entrant brings nothing of value to the table in the process of interconnecting. The RBOC has the responsibility of universal service and furthermore permits the new entrant access to the RBOCs customers, which brings significant value to the new entrant. In fact, RBOCs argue that a new entrant would have no business if the RBOC did not allow it access to "its" customer base. This school of access is the Unilateral school. Commissioner Barrett has stated publicly on several occasions that any new entrant should reimburse the RBOC for the value the RBOC brings to the table. The RBOCs, especially Bell South, are strong supporters of this view.

2. ***Access as Bilateralism***: This is the view currently espoused by the Commission in some of its more recent filings. It is also the view of the New York Public Service Commission in the tariff allowing Rochester Telephone and Time Warner Communications to interoperate. It also is the view of Ameritech in its proposed disaggregation approach. Simply stated, Bilateralism says that there are two or more LECs in a market. LEC A will pay LEC B for access or interconnect and LEC B will pay LEC A. It begs the question of what basis the reimbursement will be made, what rate base concept, if any, will be used, and what process will be applied to ensure

equity.[102] This is akin to reinventing the settlements process of pre-divestiture days. Bilateralism is rant with delays, with expensive legal reviews and administrative delays. It clearly plays to the hand of the established monopolist. Suffice it to say that U.S, West owns a significant share of Time Warner and one would suspect that there presence in this Bilateralism approach is seen.

3. ***Access as Competitive Leverage***: This concept of access assumes that there is a public policy of free and open competition and that the goal is providing the consumer with the best service at the lowest possible price. It argues that no matter how one attempts to deal with access in the Bilateral approach, abuses are rampant. Thus the only solution in order to achieve some modicum of Pareto optimality from the consumer welfare perspective is to totally eliminate access fees. The Competitive access school say that the price that the consumer pays for the service should totally reflect the costs associated with its providers and not with the provider of the service to the person that the individual wants to talk to. For example, my local telephone rate does no change if I desire to talk to someone in Mongolia, even if their rates are much higher due to local inefficiencies. In addition, if I mail a letter to Poland then I only attach a U.S. stamp and am not required to also pay a Polish fee by buying a Polish stamp. The Competitive Access school says that externalities are public goods, created perforce of the publicly granted monopoly status of the past one hundred years. It states further that Bilateralism is nothing more that an encumbrance that allows the entrenched monopolist to control the growth of new entrants, and is quite simply an artifact of pre-divestiture AT&T operations. The only choice for the Competitive Access school is no access at all and price at cost.

4.1.3 Access as a barrier to Entry

The cost model for the effects of the proposed tariff structures on the development of the technological infrastructure has been developed below. Specifically, recognizing the proposed bilateral access structure, the model that depicts the results. This section summarizes those results. The model for the pricing is shown below. Here we assume that "P" is the price and that "C" are costs. "A" is the local allocation of costs to price and "T" is the transfer allocation. This model of access is what has been proposed by the FCC. We shall show that this form leads to the strong possibility of predatory pricing on the part of the existing monopolist and thus is a per se violation of the antitrust laws.[103]

[102]See Baumol and Sidak. The authors assume Bilateralism and then work from there. They do not event broach the question of what is best for the industry. Their approach is an academic treatise on what are optimal reimbursement mechanisms, rather that what allows competition. Also see Brown and Sibley who show that the use of the Baumol-Wilig theorem dictates payment to the incumbent. This is however an ad hoc propiter hoc argument in the extreme. The theorem maximizes welfare subject to a constraint on the monopolists profit being above a rate of return. The counter to this theorem is to eliminate any subsidy to the monopolist and thus the Baumol Willig theorem in a competitive market mandates zero access fees.

[103]See Addendum 1 at the end of the Ex Parte filing by Telmarc on August 17, 1994 in the matter of FCC 90-314. The issue was to show the significant Antitrust Issues that arise as a result of the access fees being based on any means other than those of Zero Access.

Let the prices charged to the customer be given by:

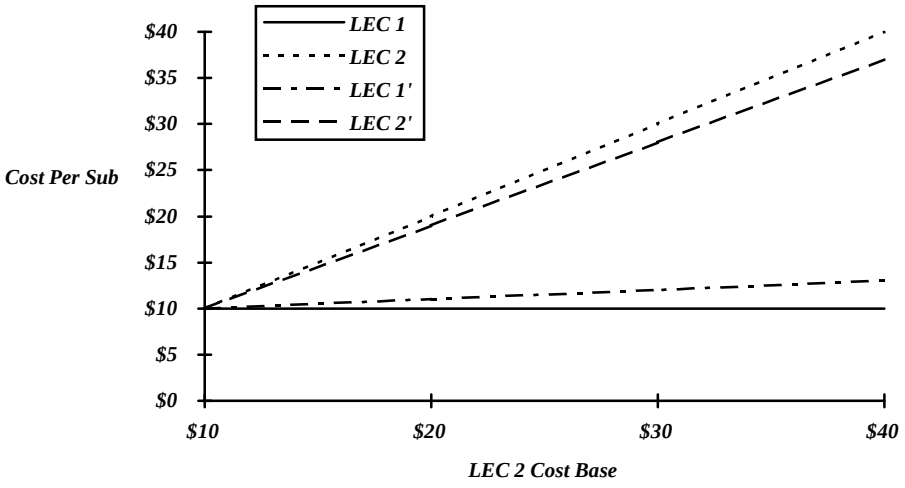
$$P_1 = A_1 C_1 + T_{1,2} C_2$$

$$P_2 = A_2 C_2 + T_{2,1} C_1$$

$$T_{1,2} = 1 - A_2, T_{2,1} = 1 - A_1$$

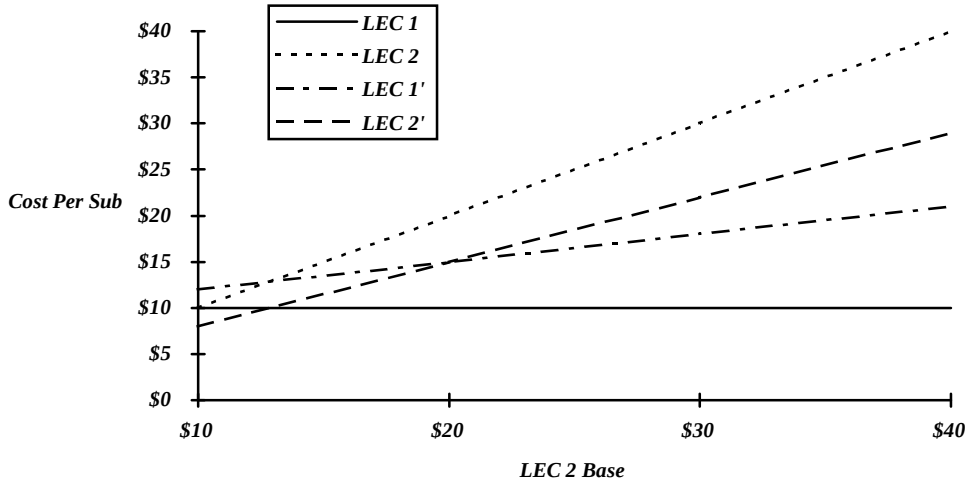
We now consider two cases. In Case 1 we depict an example of where access costs are prorationed on and equal basis, namely 10% of the base each. In this case it is clearly shown that the efficient carriers is taxed by the inefficient and furthermore the inefficient is subsidized by the efficient. Thus in the case of equal proration of transfer rates, the less efficient carrier dominates the efficient through a subsidy.

Case 1; A=0.9, T=0.1 for Both LECs



In the Case 2 example, we assume that the efficient carrier is allowed to place only 10% of its base in an access charge, and the inefficient carrier places 30% of its base in access charge. The Figure depicts a very important finding. Namely, if the inefficient carrier is allowed to place an excess amount in the base assigned to access, then it is possible for the inefficient carrier to have a lower price to the consume, and in turn drive the price of the efficient carrier above theirs by means of the cross linking of access. The following Figure depicts the fact that until the inefficient carrier is almost twice the efficient t that the inefficient is less than the efficient. This market distortion goes to the heart of where technology and rate base allocations are for access. If the fees are kept, even as reciprocal, but based on underlying technology, the inefficient technology may drive out the efficient, a form of Gresham's Law of technology.

Case 2; A_1=0.9, T_{12}=0.3, A_2=0.7, T_{21}=0.1



The conclusion of this is obvious;

- *Under equal allocations of base and percentage, the inefficient carrier is penalized by the inefficiencies of the inefficient carrier.*

- *Under the case of misallocated costs, the inefficient carrier may actual use the efficient carriers costs to price below the efficient, thus driving the efficient out of the market.*

- *The driving of the efficient from the market by the inefficient, occurs only in those market situations wherein an imbalance via government regulations occur. These markets are not cleared and reflect dramatic distortions.*

4.1.4 Access Implications

The provision of wireless telecommunications services is essential the provision of local exchange service. The service offering is that of a wireless toll grade voice or data service provided through a seamless interoperable national network service. Simply stated, this is the commoditization of local exchange service. Namely, the wireless operator is offering, from the consumers perspective, the same product as the existing monopoly local exchange carrier.

There are several implications from this analysis. First let us review the conclusion made.

- Scale does not exist in capital plant if the plant is allowed to cover the area where the majority of customers are. Scale is significant in capital if there is a demand to cover all customers, no matter how economically efficient. Scale in capital plant is an artifact of social policy mandated by Universal Service.

- Scale exists in the operations support services perforce of common shared processing equipment and common use of software and human resources. There is a natural need for agglomerated back office or operations support Outsourcers to service the C-LEC. The "Market" will allow such entities to be developed and serve the C-LECs as is done with current outsourcing.

- Scale is not a problem for the C-LEC. The C-LEC has de minimis scale from local capital and has access to the Operating Support Services on a marginal price basis from a NSE. The CMRS can compete with the entrenched carrier since the CMRS faces no scale and can price the service to market in a short period of time. The C-LEC does not need large capital resources to do this.

- Commoditization of the product offering, namely voice, allows for competition on the basis of price only. The C-LEC competitor can compete against the LEC RBOC if there is no access fees. Access fees are diseconomies of scale to the new entrant. They act as a financial barrier to entry to any new competitor.

- An new entrant, in an access free environment can compete against the entrenched monopolist with orders of magnitude less investment by leveraging off of an outsourced Operations Support Provider structure and using the new wireless technology. Quality is maintained by the outsourcing of the back office operations. There is no qualification for entry to new competitors other than local operations expertise. The scale and scope in the existing monopolists can be nothing more than an added capital burden on the new entrant.

- Bilateral access fees are determined on two key factors: the providers cost base and the providers allocation of assets to access. The analysis of access clearing or settlements using this algorithm leads in all cases to a control of the price and the existence of a monopolists controlled barrier to entry through a manipulation of access fees. Only through the elimination of access fees can any new entrant hope to compete on price and thus benefit the buyer.

There is a premise that new entrants must have significant capital. The analysis shows this not to be the case. In fact the capital required may be quite low. Thus the FCC's analysis is based on old paradigms of operations resident in RBOC and CATV monopoly operations and do not reflect the cost of competitive service provision.

The current wireless market is dominated by the RBOCs with 75% or more of the spectrum under their control. Using their control of the wire market, this leaves less than 5% currently available to competitors. The FCC is establishing an auction process which may allow the RBOCs in all bidding groups. Their capital power will drive out any new competitor and thus ensure the continuation of a de facto monopoly. The only way to avoid this is to mandate that any RBOC be prohibited from bidding for any new spectrum. This is the only way to establish local loop competition.

The RBOCs through control of spectrum, control of access, and control of switching, present a barrier to entry to any new entrant. If the objective is to establish competition, then it is necessary to prevent the continued dominance and to allow for ease of access. The only way to do this is total elimination of any and all access fees between competing LECs.

4.2 Conclusions

This section has argued that effective competition in the local exchange market can only be achieved by the timely unbundling of the I-LEC as well as the existing CMRS as well as of the new CMRS. In addition the unbundling should be done at fair and equitable prices. Furthermore we have argued that zero cost access was also an essential element in this overall process. We have developed these arguments based upon three elements; fundamental changes in the technological and operational environment, the application of the new Telecommunications Act, and the direct application of the existing antitrust laws.

In many ways this is no longer an FCC or State PSC issue but has been risen to the civil and possibly criminal level of Clayton and Sherman respectively. The latter issue is one of blatant sustained anti-competitive behavior in the local exchange market. Recent evidence brought before the FCC and the State Commissions clearly indicate that there is more than just grounds for investigation.

This section argues further, that the regulatory and administrative law process is rant with delays and inefficiencies. Further, we argue that although the antitrust laws are vehicles for appropriate remedies we should not expect the Federal Government to act on these issues. Thus, it is argued that the civil application of these laws may be the most used and most efficient vehicle for the true development of a truly competitive local, exchange market. Many authors have argued against the antitrust laws but these arguments have been based on much less market power and control that is evident in this case.[104]

The essence of antitrust law is promote competition and not competitors. To do so in telecommunications one must recognize several significant principles. Firs, the loss of scale. Namely as we have argued, technology is driving scale out of telecommunications. All costs are marginal costs and all average costs approach margin in a precipitous fashion. Second, disaggregation allow for marginal pricing in all elements of the business. Capital plant has been marginalized as a result of technology and operations costs are marginalized as a result of the restructuring of industry. Third, commoditization is the driving factor in telecommunications. A connection is just a connection and differentiation is driven to the periphery of the network. Fourth, prices is cost based, and this means that such artifacts of Rawlsian economics as the Baumol-Willig theorem have no place in a competitive environment, and the only maximization allowed is consumer welfare.

[104]See the works by Bork and Posner. We generally agree with Posner that economic analysis is the key to determining how to best apply the law in these cases. In fact, we argue that the Posner approach is most likely to be the basis for many of the briefs developed in subsequent litigation.

These four conclusions drive our analysis along antitrust grounds. Telecommunications, especially at the local exchange level has and still is a monopoly. The 1996 Act took away any last vestige of antitrust protection from the I-LECs, namely the RBOCs. The main issue is interconnection and the secondary issue is unbundling. Interconnection is dominated by tying arrangements which are directed at the elimination or thwarting of any competition as well as the competitors. Thus, the conclusion is quite clear. Implementation of the 1996 Act will require aggressive prosecution of the antitrust laws. This prosecution will most likely be done by the new incumbents and not by the Government since such acts on the Governments side have become a conflict between all three branches of the Government. Chairman Hundt has courageously taken the lead in this area and it is hopeful that fate has placed an antitrust attorney in such a position at such a time.

SUPREME COURT DECISIONS

Case	*Cite*	*Decision*	*Relationship*
United States v. Loew's, Inc.	466 U.S. at 13-14 citing 371 U.S. 38 (1962)	Court held that Loew's violated § 1 Sherman because of block booking despite having only 8% or market share but Court ruled that "requisite economic power is presumed when tying product is patented or copyrighted".	Any patent protection by the RBOC is putatively proof. The extension to this is the RBOCs ability via the standards setting body or even via the regulatory bodies to establish de factor "patent" rights by their presences in the market as the participant controlling the definition of interfaces.
United States v. Jerrold Electronics Corp.	466 U.S. at 23, aff'd per curiam, 365 U.S. 567 (1961)	Issue of two separate products. Court focused on three elements: 1. Firms other than Jerrold sold the products separately. 2. Jerrold priced the product separately. 3. Jerrold's packages were customized suggesting separate products.	The issue is the separability of such products as I-LEC interconnection and airtime. Also airtime as merely the provision of connections and not bundled with other separable products.
United States v. Fortner Enterprises (Fortner I)	394 U.S. 495 (1969)	Reiterated Northern Pacific. Namely; ...a total monopoly is not essential, rather the key is whether some buyers can be forced to "accept a tying arrangement that would prevent free competition for their patronage in the market for the tied product"	This is the case with I-LEC and the airtime issue. The tying applies to the bundled CMRS opportunity as well as the bundling into the pricing algorithms used by the PUCs. The clear way to eliminate this ruling is to go to Bill and Keep.
United States Steel Corp. v. Fortner Enterprises (Fortner II)	429 U.S. 610 (1977)	US Steel credit company had insufficient market power. The Court concluded that a tying arrangement existence is insufficient unless the entire deal makes consumer worse off than they would be in a competitive market.	The issue is the consumer welfare and this is driven by clearing the market with the most efficient use of capital by the most efficient producer of the overall product. Clearly, in the case of interconnection, be it for local service or interconnect, the consumer is better off with a lower price, which has been shown via the IEC competition to be a direct result of competition.
United States Shoe Corp. v. United States	258 U.S. 451 (1922)	The Court ruled that "while the clauses enjoined do not contain specific agreements not to use the machinery of a competitor of the lessor the practical effect of these drastic provisions is to prevent such use."	Clearly the specific enjoining of usage is not required only the effect thereto. The application herein relates to the specific use of tandem offices that may be a back door into increasing access fees.
Unger v. Dunkin' Donuts of America, Inc.	531 F.2d 211) 3d Cir. 1971)	Court held that the seller's power could be inferred from: 1. coercion. 2. resolute enforcement of a policy to "influence" buyers to take both products. 3. widespread purchase of both products by buyers.	Clearly there is a form of coercion as argued supra and there is significant influence. There is no widespread purchase of both other than is the small segment of competitors. We have demonstrated these elements in this section.
Times Picayune Publishing Co.	345 U.S. 594	Clayton was only to commodities.	The issue is whether the products are

Case	*Cite*	*Decision*	*Relationship*
v. United States	(1953)	Government evoked § 1 of Sherman. However although in § 3 of Clayton either "monopolistic position" or restraint of significant volume of trade was required, in Sherman both were required.	products or services. If ruled services still have protection but a sharper issue to prove. Clearly the issue here is services.
Siegal v. Chicken Delight, Inc.	448 F.2d 43 (9th Cir. 1971), cert. denied, 405 U.S. 955 (1972)	Court found against Chicken by stating that if it had been secret recipe than it would have been acceptable but that defendant could have provided specifications for materials and the Plaintiff could have achieved the same results. Court ruled that three elements must be shown: 1. the scheme in question has two distinct items and provides that one may not be obtained without the other. 2. the tying product posses sufficient economic power to appreciably restrain competition in the tied product area. 3. a "not insubstantial" amount of commerce is affected.	Two distinct have been proven supra, economic power id evident via the monopoly control, and commerce is telecommunications which is per se "not insubstantial".
Northern Pacific Railway Co. v. United States	356 U.S. 1 (1958)	Court condemned the freedom of choice for consumers. Court held could show monopolistic control by simply showing "sufficient economic power to impose an appreciable restraint on free competition of the tied product". Court held the per se rule by stating: "tying arrangements serve hardly any purpose beyond the suppression of competition..."	Argue that "per se" rule can be applied directly. This is applicable to all elements of these arguments.
Kentucky Fried Chicken Corp. v. Diversified Packaging Corp.	549 F.2d 368 (5th Cir. 1977)	Court upheld Kentucky because there was no real coercion. Kentucky had approved other suppliers.	Not allowed to choose other suppliers thus a violation and Kentucky does not apply. This also applies since the monopolist controls the market.
Jefferson Parish Hospital District No. 2 v. Hyde	466 U.S. 2 (1984)	Set out five elements for successful tying: 1. must effect more than de minimis amount of interstate traffic. 2. tie is not express and coercion to buy the tyed product is evident. 3. two products must be separate. 4. defendant must have economic power. 5. no valid business reason for tying. Court in Jefferson ruled that	Have proved all elements supra. Also this extends the per se rule to this violation. This case has been discussed extensively in the body of the section.

Case	*Cite*	*Decision*	*Relationship*
		Jefferson had only 30% of market power and thus did not force "customer" to buy product. Court stated, dicta, that: "to force a purchaser to do something that he would not do in a competitive market" was condemned.	
International Sale Co. v. United States	332 U.S. 392 (1947)	Defendant may insist upon a tied sale when the quality of the tied product affects the operation of the tying product. Tying arrangement is not justified when the defendant can set quality standards for the tied product.	No issue of quality changes can be made in the issue of interconnection. Specifically, with the establishment of standards there is now a set of open and definable interfaces and performances and certifications that these interfaces must comply with. Thus any grounds from this case do not apply.
International Business Machines v. United States	298 U.S. 131 (1936)	When the tied sale is not accompanied by escape clause for the buyer who finds a better price then the tying arrangement can be used to price discriminate.	No escape clause allowed is one option to consider an antitrust case. We extend this to cover the inability to interconnect as a per se barrier to entry since it automatically precludes any competitor to enter the market in any efficient manner.
Henry v. A.B. Dick	224 U.S. 1 (1912)	Allowed defendant to force users of patented duplicating to use its section.	This cases may have some benefit t o the I-LEC but we believe that it is irrelevant since the defendant in this case had no monopoly position and it could be shown that there was some justification for the tying. Again, in the interconnection world there is a clear precedent for separation and the elimination of the tying arrangement.
Eastman Kodak Co. v. Image Technical Services, Inc.	112 S.Ct. 2072 (1992)	Court reaffirmed the view that products are separate when there is sufficient consumer demand to justify firms providing one without the other.	This extends the per se rule and reads onto the cases presented in this section Moreover, the issue of bundling is at the heart of the current debate regarding interconnection. The I-LEC is forcing companies to interconnect at the access tandem levels and will not allow them to select their own interconnect. They are bundling transport and switching and pricing it a factor of ten to twenty times their Long Run Average Costs. .

4.3 The Economic Viability of Wireless Local Loop and its Impact on Universal Service

This section presents an overview of the economics of wireless transport focusing on PCS and LMDS as compared to the existing incumbent local exchange carriers, namely the I-LECs. The section also addresses the issues of universal service and presents an analysis of how wireless may be a viable player in that environment. The section combines the approaches from several different fields and demonstrates that wireless has applications as a provider of universal services in certain niche areas but it is not a clear universal applications. The section also develops several policy issues as to how best to deal with the issue of universal services and also addresses the issue of how far that social demand should be extended.

4.4 Introduction

Wireless local loop is a vision of how wireless technology may be deployed in the provisioning of local telephone service. Both the large existing entities such as AT&T and the entrepreneurial entrants such as NextWave and others have look at taking the PCS spectrum and using the new technologies to allow for the provision of full local loop capabilities in a wireless fashion. This section discusses the economic viability of such a plan.

There currently are several different strategies aimed at the presentation of local telecommunications. One is the strategy of attempting to go head to head with the existing LEC on a local loop only basis. The other is the bundling of this with other services, such as long distance and television delivery to attempt to obtain scale economies in the delivery of the services. The latter approach is clearly expressed by both AT&T and MCI.

The key issue is initially one of cost. Can wireless be delivered at a lowered costs per unit service than can the existing wire based local loop. Previous analyses have shown that wire base systems have capital per subscriber as high as $1,800. Wireless is at about $250 which does not include the handset. However the incumbent has these as sunk costs whereas the new entrant has these as entry costs. This is a significant difference. Add to this the license costs which in many cases equals the cost of capital plant.

There is also the issue of bundling. PCS generally is a voice only system, although some data is available. LMDS is a voice, video and data system at 28 GHz. The question is, does the ability to bundle significantly increase the entry opportunity.

Finally, all of these wireless financial numbers are exclusive of any Universal Service coverage commitment. If one adds a surcharge on all players then the approach is simple and each customer is taxed for the Universal Service Fund. If however there is a requirement to physically cover, then this is generally uneconomic. We shall show the value per PoP versus population density. It is clear that in most wireless systems at

densities at less than 100 PoPs per square mile there is no economic value to the business. The policy issue is related to providing Universal Service but not forcing Universal Coverage by all participants.

4.5 Universal Service

Universal Services is the mandate to provide services by any carrier to any person not individually financially able to obtain the service in the area in which the inhabit. Namely the low income and rural customers. The universal services provisions are as follows:

" (b) UNIVERSAL SERVICE PRINCIPLES- The Joint Board and the Commission shall base policies for the preservation and advancement of universal service on the following principles: (1) ***QUALITY AND RATES.....****-(2)* ***ACCESS TO ADVANCED SERVICES****- ..... (3)* ***ACCESS IN RURAL AND HIGH COST AREAS****- ..... (4)* ***EQUITABLE AND NONDISCRIMINATORY CONTRIBUTIONS****.....*

(c) DEFINITION (1) IN GENERAL- Universal service is an evolving level of telecommunications services that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services..... such telecommunications services; (A) are essential to education, public health, or public safety; (B) have, through the operation of market choices by customers, been subscribed to by a substantial majority of residential customers; (C) are being deployed in public telecommunications networks by telecommunications carriers; and (D) are consistent with the public interest, convenience, and necessity....."

Universal service has been in effect de facto since the Kingsbury decision of 1913.[105]This implicitly allowed AT&T to retain its monopoly subject to the agreement to provide, ultimately, universal service. The universal service would mean that there would be access to all people to telephone services and that for poor people that service would be subsidized. The state PUCs then followed up on this and embodied this in state regulatory requirements. In effect, AT&T and the BOCs were transferring wealth fro the "rich" to those who could not pay for such services, either because of their income or because the costs to provide services to that individual would be prohibitive. This was then an enforced payment, established and managed by the BOCs, for the purpose of collecting moneys from the haves for redistribution by the BOCs to what was perceived as the have nots. Needless to say this is per se taxation. From a Constitutional perspective such rights inure solely to the states and the Federal governments and under the Commerce Clause it is highly problematic that any independent third party has any right to tax especially as regards to interstate commerce. Needless to say there has never been a challenge her.

The Universal services fund was and still is a taxation by the BOCs to redistribute income. It also is a pool of funds to be used by them as a vehicle to bar competition. The

[105]See Weinhaus, p. 9.

universal services issue however goes to the heart of the interconnection issue. The RBOCs have used this ruse as a means to control competition in two ways. First, in interexchange access they have charged an access fee disproportionately higher than costs since it was then used as a basis for universal services. This was the taxation issue. Second, they have used a unilateral fee for any other interconnect player. Thus cellular companies, arguable providing local services, pay for initiating ad terminating calls. This has been changed by the new Act.

The Act has mandated a separate Universal Services fund to be managed by the Government, and thus the Governments powers to tax are valid and this is a legal act in contrast to the arguably illegal actions of the RBOCs in the pursuit of taxation. Second, the Act mandates balanced interconnection.

To better understand where the legal applications will be addressed we first present an overview of the major theories behind the applications of the antitrust laws. This will be important since these theoretical basis are not only applied to antitrust law but also to the enactment of the administrative regulations in the application of the Telecommunications Act. The litigation of any case in this area will require an understanding of the philosophical framework underlying its application.

4.5.1 Philosophical Underpinnings

The issues of political philosophy may seem a far cry from wireless communications but it is clearly in the middle of it. Any process which provides a service which the government is in the middle of will perforce have a political element and in turn an overriding political philosophy. We consider two philosophies and their implications.

The first is the Rawls philosophy of John Rawls. His philosophy has three elements. The first is his concept of an Original Position. The Original Position is that all governments are based on a "contract" between its citizens and that the ideal contract is one developed in a consensus between all its citizens that allow it and them to agreement on principles of government. This is like Rousseau and the Social Contract. It is a contract amongst and between the citizens and the government, one and indistinguishable. From this follows the two Rawls principles of justice; First Principle, each persons shall have equal rights to the most extensive total system of equal basic liberties with a similar system of liberty for all, and Second Principle, social and economic inequalities are to be arranged so that they both, (I) provide the greatest benefit to the least advantaged, and (ii) attached to offices and positions open to all under conditions of fair equality of opportunity.[106]

One may say what does this have to do with the Internet. Simply stated this philosophy controls access prices and who "must have" access. As to access prices, this is reflected in the Baumol Willig theorem of access pricing. They have used the concept of Ramsey pricing, also know as second best pricing. This is a sub-optimal version of Pareto pricing. Pareto pricing is a pricing mechanism in the market whereby any change in one person to

[106]See Kukathas, Rawls, Stanford University Press.

increase their welfare will not diminish the welfare of any other person. Thus something is Pareto optimal if I give you one more candy bar, that increase your welfare or happiness, and that their result of doing so does not upset anyone else. Hardly a reasonable assumption but a key basis of economic. The Ramsey scheme tries to balance welfare and profit.

The Baumol Willig theorem states that we want to maximize the welfare of the populace while keeping the profits of the monopolies high. This is a classical example of an ad hoc propiter hoc theorem. Clearly the result is that we tax the people and subsidize the monopoly.

The other issue is how do we measure welfare. If we are a Rawlsian then we measure welfare as the welfare of the least of us and not the average welfare. Rawls states that if we maximize average welfare then we disadvantage the least of us and this is not just. Thus as a Rawlsian we demand Universal Service. We must insist that all people have access to all service elements, whether it makes economic senses or not, we do so via wealth transfer.

Hopefully, this political theory should now not seem too foreign. Ralwsians favor the implementation of access fees and the implementation of Universal Service. Indeed, the true Rawlsian would impute Universal Service to even computer terminals as has been stated by Vice President Gore.

In contrast is the classic liberal, now called libertarian view. It is more a combination of minimal government involvement and maximizing utility to the consumer. This is the philosophy of the utilitarian. Here we assume that government has a de minimis role and that the market follows of its own accord and that the market, in an Adam Smith fashion, will clear any inefficiencies of distribution and pricing mechanisms. It assumes that each business should stand on its own stead and that utility is maximized on average. The result from the libertarian school, as opposed to the contractarians or Rawlsians, is the elimination of access fees and the elimination of universal Service.

It will be important to recognize that these political philosophies dominate the overall play of regulation is all markets. These two schools of thoughts, the libertarians versus the contractarians, whether they know they are one or not, will have a great deal to do with our development as an industry.

4.5.2 Rawlsian Approach

Rawls has proposed a theory of justice that is a statement of what many proponents of antitrust theory ion the mid-fifties and sixties promulgated. The essence of Rawls' theory has three elements;[107]

[107]See Kukathas and Pettit for an excellent expository of the Rawlsian theory.

Original Proposition: There exists a means and method for a society to establish a Contract amongst and between themselves. This Contract thus created in this society of the just is one that maximizes the return on every transaction to the least of the individuals in the society.[108]This approach to contractarianism is one related to individuals in a non-bargaining environment establishing between and amongst themselves a "contract" to govern their society.[109] There are two elements contained herein. The first is the essence of a contract, and in fact a form of social contract between the members of society and amongst them as a whole. The second element is that of a view towards man as a constrained and unconstrained view of human nature. [110] The unconstrained view states that man, individually and in concert, has the capabilities of feeling other people's needs as more important than his own, and therefore we all act impartially, even when the individuals own interest are at stake. The constrained view is to make the best of the possibilities which exist within the constraint.

For example, the constrained view of universal service is one which would state that if it costs a certain amount to provide the service, an there is a portion of the society not able to purchase the service, then there is no overriding need to provide it if such a provision is uneconomical and places a significant burden on the other member of society. The unconstrained view, as a form of socialism, states that if there is the least of us in want for whatever the telecommunications revolution has in store, then they should have access to it at whatever cost.[111] One can see that the current trend in Universal Service is such an unconstrained view, especially as viewed by the current Vice President in his actions over the past four years.

Rawls approach to this contract is one wherein the individuals in the society collect themselves as individuals, and agree to a plan for the operations of that society.

First Principle of Justice: each person shall have equal rights and access to the greatest set of equal fundamental personal liberties.

Second Principle of Justice: social and economic inequalities are to be arranged so that they both, (i) provide the greatest benefit to the least advantaged., and (ii) attached to positions available to each individual under conditions of fair equality of opportunity.

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[108]Indeed in the Rawlsian world the individual posits their position and does so without any negotiation and thus posits a position assuming that that individual will be the least amongst players in that society. Such a position, to create justice in that society, is a ***maxi-min*** position.

[109]This is the same in many ways of the Social Contract envisioned by Rousseau.

[110]See Sowell, pp. 18-24.

[111]See Schumpeter, pp. 167-186. Specifically, he defines socialism as; "*an institutional pattern in which the control over the means of production and over production itself is vested in a central authority- or, as we may say, in which, as a matter of principle, the economic affairs of society belong to the public and not the private sector*." Indeed in the case of Universal Service, the FCC and other elements of the Executive Branch have taken the property and means of production from the carriers and mandate how they are to be deployed, irrespective of an economic justification.

This latter elements is the means to establish a Schupeterian form of socialistic control. If we were to define the public welfare by a function W, and each individual listed as a variable I_n, then the policy choice, P_k, is chosen such that the welfare is maximized for the least advantaged. Specifically, if the utility of policy P_k to I_n is a function U, then we defined a Rawlsian system as one which performs the following mathematical function:[112]

$$\max W(u_1,.....u_N: P_0,P_M) + \lambda \quad \Sigma [U(I_n : P_M) - U(I_n : P_0)]$$

where P_0 is the initial state and P_M is the application of the new policy. What this states is that we want to maximize the society welfare subject to the constraint that no individual suffers due to the change.

We can compare this to the utilitarian school which states that we seek the maximization of:

$$\max \text{ average } W(u_1,.....u_N: P_0,P_M)$$

which is not constrained on what happens to any one individual but to society as a whole. This approach is also one applied by Baumol and Willig in the establishment of interconnections and access rates and is the basis of the Ramsey tax policy. The Ramsey approach is Rawlsian whereas the approach of an Adam Smith or other utilitarians is the average approach.[113]

The application of the Rawlsian theory of justice is a key factor in the current telecommunications act. Specifically it is an element of the universal service portion in that the Act requires that the least of us receive the same as the greatest of us.[114]

4.5.3 Habermas Theory

A slight distinction to Rawls is the theory of Habermas. In the Rawlsian case the contract is generated in a mass meeting of all people. Rawls assume that such a meeting would engender the development of a justice system that would provide for the equal justice for all and ensure the result that the least of all would be protected. Habermas, and as recently stated in his most current publications, takes a similar but drastically different tract. He assume some form of representative government which comes up with a more

[112]This is a modification of the Ramsey pricing scheme of constrained maximization. Also there are variations as discussed by Baumol are: the classic Pareto, the Kaldor, the Scitovsky, and the Bergson. The problem with these approaches is that they are all ad hoc propiter hoc approaches.

[113]See Brown and Sibley, p. 39. This is the Baumol Willig theorem which uses the first Rawlsian approach to maximizing the return subject to a single constraint; namely that the monopolist suffers no harm. This has been the basis of non-mutual interconnection fees and has been corrected by the new Act but is currently stayed by the Sixth District Court after an avalanche of suits by the RBOCs. This is of course a different twice to Schumpeterian socialism, wherein a monopolist like the RBOC usurps the power of the state for its own benefit.

[114]See SEC. 254. UNIVERSAL SERVICE.

average form of justice. One could state that this is what we see in many republican democracies. In contrast to least getting the same, in the Habermas system one would expect a more averaging of the welfare function over the population.

The Habermas distinction is that the contract is created by a different and representative group which takes into account certain economic realities. In some sense this is a representative democracy. The Habermas approach is in many ways intermediate to Rawls and Bentham.

4.5.4 Utilitarian School

The utilitarian school has as one of its key developer Jeremy Bentham. Bentham, to paraphrase Posner, states that people are rational maximizes of their own utility or satisfactions in all areas of life and that economic efficiency is an ethical and scientific concept.[115] The utilitarian approach does not generally focus on the individual, and thus that constraint of Rawls is absent. It assumes that the individual can make an economic choice. For example, as regards Universal Service, if I decide to live in Montana in the mountains, I have made a utilitarian choice of maximizing my satisfaction.

In that choice, independent of government intervention, I have chose to forgo the advantages of a broad based telecommunications access. I will not have a Mbps link to my cottage, I will not have video on demand, and I may not have access to the Internet. I have no social contract with others and deal solely with myself. That choice is then my choice. If however, the Government is a Rawlsian approach, mandates that I have the telecommunications access, then this may of may not be reflected in my choice of where to live but it clearly costs the other members of society who are now taxed to pay for this added satisfaction, albeit questionable, which I am now the recipient of.

As a utilitarian policy analyst, I would not require any form of Universal Service, and in particular I would argue for free and competitive open markets. These two extremes will be at the hear of the battle over Universal Service.

4.6 LMDS

LMDS, Local Multipoint Distribution Services, is a generic terms for the deployment of integrated two way voice, video and data services using the generic 28 GHz band.[116] The LMDS systems are to deployed after the FCC auctions the spectrum in this band. This is expected in late 1996 or early 1997. LMDS is an immediate extension to MMDS, microwave multipoint distribution services. LMDS may very well supplant MMDS.

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[115]See Posner, Economics of Justice, p. 13. In addition, Posner in his other referenced works develops a [powerful theory of justice and the law and his economic analyses are powerful tools in the overall economic and policy analysis of this area.

[116]This is from the FCC R&O on LMDS, FCC Fourth Report and Order, CC- Docket No. 92-297, July 17, 1996. This may be amended from time to time and the compliance with the FCC rules and regulations is incumbent upon the vendor.

MMDS in many ways is merely microwave to buildings and is in reality a real estate business since the target market is multiple dwelling units. However, LMDS it has been argued is focused on all forms of residential and commercial applications.

The service provided are a mix of video, voice and data. The system must have the capability to reallocate the amount of capacity between all three general areas. This allocation must be both on a quasi-static basis as well as adjustments on a real time basis. The system thus has a dynamic management capability that it must provide.

4.6.1 Services

The system may provide, at a minimum, the following general services:

***Voice*:** The system may provide full switched toll grade quality voice service. The voice quality may be telephone toll grade or better and there may be no delays in speech that are perceptible to the user. The user may interface with the system by a standard method or means typically being an RJ-11 standard telephone jack employing their own standard telephone in the case of a residential user. The voice user is not expected to change any of their infrastructure interfaces. The "normal" telephone connection may be provided by means of the LMDS local interface unit, the LIU. The LIU may be compatible with any and all normal accepted telephone interfaces. The system must also provide all typical custom calling and CLAS features as expected in normal deliver of a competitive wire based telecommunications service.

***Low Speed Data*:** The system may be able to provide data at the rates of 1.2 to 9.6 Kbps on a transparent basis and have this data stream integrated into the overall network fabric. The system may handle all data protocols necessary in a transparent fashion. The network may allow local access to value added networks from the local access point. The low speed data may be provided for over a standard voice circuit from the users premises as if there were no special requirement. There may be toll grade or better quality. The system may also be capable of support all Group 3 fax services.

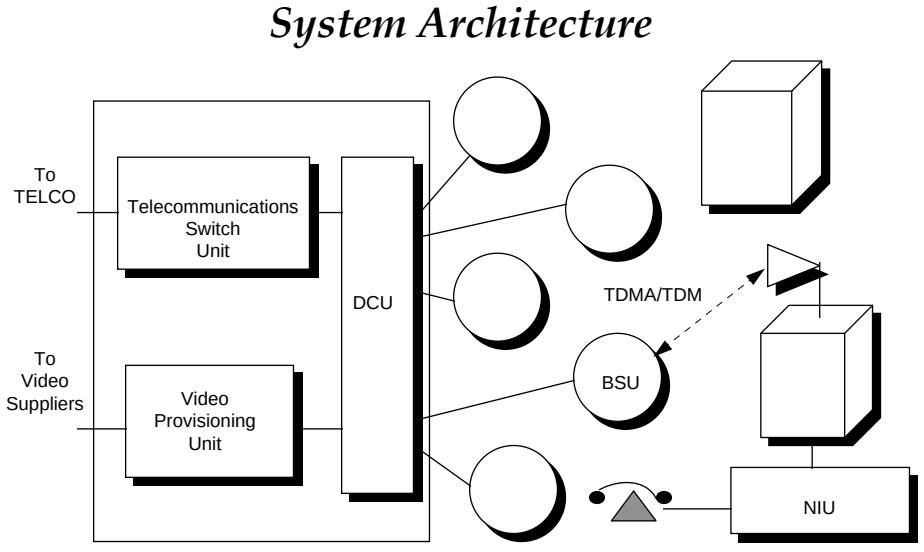
***Medium Speed Data*:** The network may be able to handle medium speed data ranging from 19.2 to 64 Kbps. The interfaces for such data may be value added network local nodes. The medium speed data may be provided for over a standard voice circuit from the users premises as if there were no special requirement. There may be toll grade or better quality. The interconnection for 64 Kbps may also be ISDN compatible.

High Speed Data: Data rates at and in excess of 1.544 Mbps may also be provided on an as needed basis and a dedicated basis. The data rates may be between 1.544 Mbps and a maximum of 155 Mbps. The BER may be less than 10^{-9}. Also it may be required to provide access to such high speed data services as Fast Ethernet and FDDI at 100 Mbps. This may require both physical layer interfaces and the datalink and network layers as specified in the particular protocol. The system must also support multiple layer protocols including TCP/IP. Also the data must be point to point, point to multipoint, and multi point to multi point.

Video: The network may be able to provide the user with access to analog and digitized video services. This may also enable the provisioning of interactive video services. The video services may enable a system with a minimum number of channels of 150 video channels of remote programming, ten of local off-air programming, and 20 locally generated programming. The interactive video may allow for ten channels of pay per view at a minimum, and interactive channels for local information selection. Video must also support such tiered services as basic, premium, pay per view, and interactive. The inputs to the system are from such sources as off-air, local generated, satellite, and other sources. Sources may be analog or digital, encrypted or not.

4.6.2 LMDS Architecture

This section presents an overview of a possible LMDS architecture. The overall design is shown in the following Figure. Here is shown a connection to the Telcos and to external video sources. There is a connection to a Telecommunications Switching Unit, TSU, and to a Video Provisioning Unit, VPU. The connections between these and the DCU, the Digital Connection Unit, is a digital signal. The DCU takes the digital signals from the TSU and VPU and combines them in a common broadband digital signal, assigns it is a TDM form for transmission and then places it in the appropriate RF format for transmission to the BSU, the Base Station Units or nodes. The input from the BSU is also passed throughout he DCU and is fed to the TSU if it is data or voice, and to the VPU if it is a video control signal.

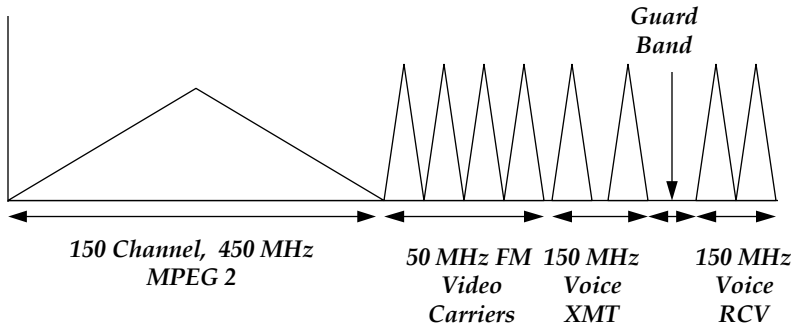


The actual embodiment of these units will be left to the system integrator to complete. However, it will be essential that these be separate embodiments and separately controllable and upgradeable.

The BSU transmits in the LMDS band to the NIU in the end users premises. The signal from the BSU is TDM and the NIU return is TDMA.

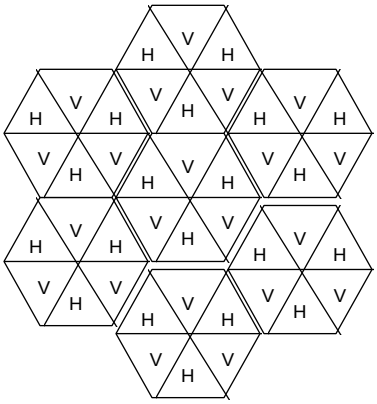
The proposed carrier plan is shown in the following Figure. It shows a broadband video carrier which is TDM and a set of narrowband local video digitized inserts. It also shows a transmit voice band comprised of sets of carriers and a guard band separating the receive TDMA carriers. The receive carriers may also be 40 MHz or some other bandwidth occupancy. The detailed carrier plan in the following Figure shows a low band of 850 MHz and a high band of 150 MHz. The low band is further split into a video sub-band and a voice sub band. The low band may be used for transmission from the node to the end user and the high band for transmission from the end user to the node. Allocations other than what has been proposed may be deployed depending on the ability to achieve overall system performance and services acceptability.

Carrier Plan



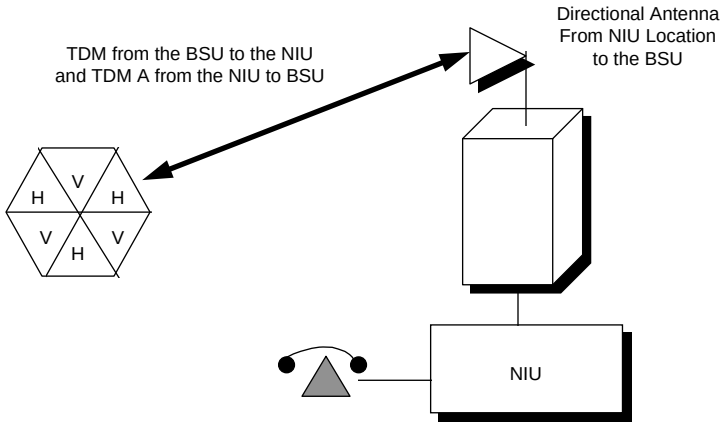
The BSU can use multiple frequencies by segmenting the sectors. The following Figure depicts a sectoring of 60^{o} sectors with hexagonal patterns. The sectors are separated by vertical and horizontal polarization as allowed expressly by the FCC. The sectors, here six, can each have higher gain antennas and can each be driven by separate systems. The added gain allows for wider coverage. There is a balance between sectoring and increased antenna gain and the number of sectors and their cost. The larger the number of sectors the smaller the beamwidth and the greater the gain and the longer the effective range. It is anticipated that there is an optimum sectorization depending on the terrain. In hilly areas the line of sight, LOS, is limited by obstructions so that no matter how great the gain on the antenna, and effectively how many sectors, there is a diminishing return in the design. Many designs will employ a single beam or sector.

6-Way BSU Frequency Architecture



The BSU to NIU connection is from the sector antenna at the BSU to the NIU antenna which is a narrow beam and high gain antenna. The antenna beam from the NIU assures that frequency interference is kept at a minimum. This is the standard approach as was used in such systems as the Interdigital system.[117]

Node to NIU



[117]See Patent No. 4,675,863, June 23, 1987.

4.7 PCS Systems

PCS, Personal Communications Services, is nothing more than the expansion of bandwidth and the introduction of competition in wireless. It is not a specific frequency band, a new technology, nor added features and services. It is the introduction of competition in the new markets. This is a definition that is economically driven and not technologically. One should avoid the battles between TDMA and CDMA, between 800 MHz and 1.9 GHz, between voice, and two way paging. PCS I the commoditization of air time. It will allow entrepreneurs to take unbundled air time and create highly competitive new services and systems.

When viewed in this sense, PCS is comprised of two 800 MHz providers of 30 MHz each, three 1.9 GHz providers of 30 MHz apiece, three 1.9 GHz providers at 10 MHz apiece, and a SMR set of providers in 900 MHz at about 5-10 MHz apiece. Thus there are nine wireless providers of a commodicizable product, namely airtime.[118]

The current wireless technology as embodied in the cellular communications systems is composed of several key technological elements. Specifically they are the Cell Sites, the MTSO (Mobile Telephone Switching Office) or Mobile Switching Center ("MSC"), and whatever connections or management systems are in place. The connections between the cell sites and the MTSOs are digital circuits carrying the voice signals.

Unlike LMDS, PCS is mobile. PCS has less bandwidth and is generally focused on large regions of coverage. LMDS is fixed as a service, it may be delimited as a LEC to a single state, whereas PCS, as is all of cellular, able to cross state boundaries. This is a dramatically different regulatory constraint. PCS providers are Commercial Mobile Radio Service, CMRS, providers. LMDS providers are LECs.

4.7.1 System Elements

The design strategy in this section proposed uses a CDMA approach which has been selected since it provides the lowest cost per subscriber. The design of the system using CDMA demonstrated the ability of that technology to balance coverage and capacity. However, it can be shown that with the cost reductions in GSM TDMA technology the differences are getting smaller over time. We can characterize these two domains as follows:

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[118]See McGarty, Columbia Section, March, 1996, Disaggregation. In that section the author develops the theory of disaggregation. Also see McGarty, Federal Communications Law Journal, in which this theory is extended. *"What the theory states is simply: The theory of disaggregation states that technology and industry has developed in such a fashion that it is possible to effect all elements of a business in a virtual form by obtaining all functions necessary to deliver a service by purchasing them from third parties each of whom has themselves other similar customers and thus each of whom can deliver their element of the functionality in a minimal marginal cost manner. The disaggregation theory then concludes with the result that in many technologically intense services business, a virtual company can exist wherein all the functions can be purchased from third parties or capital equipment may be purchased in a fully interconnected fashion so as to achieve near equality between average and marginal costs from the very commencement of the business. The Disaggregated Company is the embodiment of the virtual business."*

Capacity Domain: In this case there are enough cell sites and they are deployed so that at no time is a unit too far from a cell. For high powered units this may be a great distance. For lower power units this may be quite a small distance. However, there are so many users per cell area that the load exceeds the capacity of a cell. To meet the demand, cells must be split and the frequency reused. This installation of new cells for the reason of reaching a capacity limit is called the Capacity Domain.

Coverage Domain*:* As with the capacity domain, the coverage domain is that situation when new cells are added because users are too far away from any cell. The coverage domain of PCS is that time where there are less than the saturation number of subscribers per cell in all of the cells. It generally is that period where the system has just been deployed and the customer base is growing.

The current analog systems were in the Capacity domain several years ago and they were predicting dire results. With the sale of portables this has shifted to the coverage domain. TDMA was a response to the capacity driver only. CDMA is a response to the coverage driver as well as the capacity driver. To balance the fluctuation between the two domains in a cost effective fashion, it is necessary to have a technological infrastructure that meets the two needs, this is provided by CDMA.

In the analog world, cell capital costs are typically $1 million per site and a typical site may cover a radius of 10 miles for a 3 watt mobile or 2 miles for a 0.6 watt portable, and a cell has a capacity of 40-50 instantaneous calls at any one time. The adjacent cells must use separate frequencies and thus there is a proliferation of cells and a significant amount of capital in cell sites. For example, New York has over $350 million in cell sites per carrier and Boston has over $150 million. This number is for each carrier, A and B side. Thus in New York, at $250 million and for 125,000 subscribers, this is $2,000 of cell capital per subscriber.

Capital in the system will be divided into two major categories; local service infrastructure (LSI) and national service infrastructure (NSI). The LSI portion consists of all elements of the system up to and including the switch. The NSI portion is all elements from the switch on back. The NSI will also include elements that comprise the databases and computer support.

Six independent elements have been identified in the overall PCS architecture. They are as follows;

- ***Portable****:* Provides the end user access to the network for voice and or data services.

- ***Local Service Infrastructure (LSI)****:* The LSI provides three elements. The first is the establishment of a virtual circuit between the portable and the LSI. The second is the interconnection within the LSI covered areas between portables. The third is access to the other network interfaces to allow off net connections to LECs and IECs. It is

important to note that the LSI has a sense of switching but that the implementation of the LSI switching can be implemented in many ways.

- ***Operations Support Systems (OSS):*** The OSS provides for the overall national amendment functions of the PCS network, including network management, customer service, billing, operator services and other elements.

- ***Service Provider Infrastructure (SPI)****:* The SPI is a third party service node that can provide such services to the PCS users as may be found in Intelligent Network Services. These may be the services such as messaging, voice mail etc.

- ***Local Exchange Carriers (LEC)****:* This is the access to the LEC and the LECs customer base. It allows LEC customer access to the LSI and the PCS customer access to the LEC customer.

- ***Interexchange Carriers (IEC)****:* The IEC provides access to other inter LATA LEC customers and other PCS customers in different regions.

4.7.2 LSI Elements

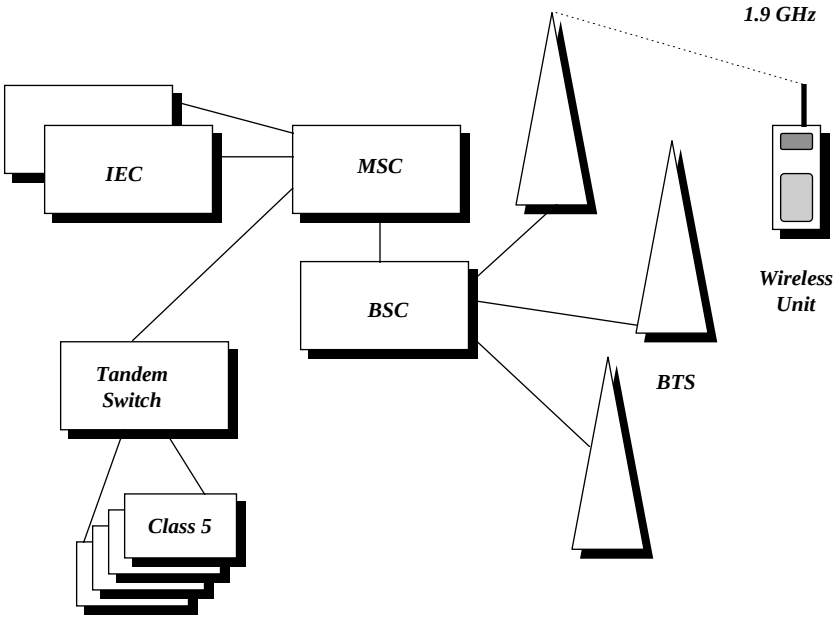
CDMA dramatically changes the cost equation. First, CDMA will allow 10 to 20 times the capacity per unit bandwidth as analog. Second, CDMA allows for use of the same frequencies by keeping separations through the direct sequence codes in the technology. Simply put, a CDMA cell site may cover a 3 mile radius, yet have the capacity of 75 channels per 1.25 MHz of Bandwidth. Using a CDMA system, one may cover a greater area and thus be run at maximum utilization of close to 90% or more per site.

The costs associated with this configuration are those capital and operating costs of the cell and the MTSO as well as the carriers charges for the PSTN. For a cell there are specific life cycle factors that control its overall costs are: Cell Site Location and Planning, Cell Construction, Cell Capital, Cell Installation, Cell Operations, Cell Maintenance, and Cell Repairs.

The first four items are part of the initial capitalization and may take anywhere from six months to two years, depending on how quickly access is allowed to the site. The last three elements are ongoing. In some systems, the sum of all these costs for the full life of a cell, seven to ten years, may be two to three times the cell installation capital. Thus cell site life cycle costs are a critical factor to manage in a system.

The following Figure depicts the PCS architecture used for pricing.

4.7.2.1.1 Architecture of PCS



To effectively compare technological alternatives we must have models for the effective utilization of capital in the two cases. In this section we shall develop these models in summary form. We assume that the system is composed of the following three generic elements;

Base Terminal Stations (BTS): These devices are placed in the field and there are as many BTSs as are need for either coverage or capacity. The first demand is coverage. A BTS may cover 20-30 square miles, depending on the power, the modulation, the multiple access, and the capabilities of the wireless end user terminal. For example, in CDMA with PCS, a BTS has three sectors, and covers three mile radius or about 33 sq. mi. per BTS. If there are no customers, then for 1,000 sq. mi., one need approximately 30 BTSs. A BTS also serves one or more CDMA channels. In narrow Block CDMA (namely 1.25 MHz per channel), the CDMA channels must be added each time the system load goes beyond the capacity of one link. Namely, a CDMA channel at 1.25 MHz and with three sectors services 75 instantaneous channels or "trunks", whereas analog services 7.[119] If a user is busy only 100 minutes per month, then this is an activity ration of 1%, thus 75 trunks handle 7,500 subscribers in this 30 sq mile area. If there is a 10% penetration, then the population is 75,000 people, or PoPs, in 30 square miles, or

[119]The calculation for analog goes as follows. each analog signal occupies 30 KHz of Bandwidth. There are 42 such channels in 1,250 KHz. Yet there is a reuse factor of 7 for analog. This means that for every cell, the surrounding 6 cells cannot use the same frequency amongst them, thus the 42 number must be divided by 6, yielding 7 channels. The CDMA system thus has a 10:1 ratio over analog.

about 2,700 PoPs per square mile. This is a high population density. As the traffic increase, more CDMA channels must be added. Also in any system, trunk interfaces are added as the trunks are added, perforce of traffic growth.

Base Station Controllers (BSC): The BSC provides for the overall coordination and processing of the switched signals. It typically can handle a multiple set of BTSs and a multiple set of trunks. In the current CDMA narrowband system, a BSC handles up to 50 BTSs.

Switches (SW): The switch for Mobile Switching Center ("MSC"), interfaces with the LECs and the IECs. It is sized based on a fixed component and a component dependent upon the number of trunks. Newer systems use ATM switching which has proven to be more efficient for the packet type voice signals integrated with data in a wireless environment.

The financial models for a narrowband CDMA system is presented below. It assumes that there are 1.25 MHz channels along with a total available spectrum as discussed above, and it assumes that the area covered is 1,000 sq. mi. The results show Capital per subscriber as a function of the total subscriber base. It should be noted that there is significant scale in the lower end.

The following set of sizing are based upon vendor supplied financial numbers but are retail and do not include any volume discounts or other factors. Note that the system capital for the 10 MHz system is about $366 per sub and reaches that at almost 50,000 subs as we have specified. From that point on Capital per sub is all marginal, namely it lacks scale.[120]

Note in the second case, whether we have 30 MHz, we have reduced Capital per subscriber from $366 to $336. This is a $30 per subscriber penalty for only 10 MHz but may be more than set aside by the lower cost of the spectrum.

4.7.2.1.2 CDMA (1.25 MHz Channels, 10 MHz Spectrum)

[120]It should be noted that in the C Band auctions the bidders bid an average of $50 per PoP. The F Band is less than one tenth that number. However, from the above analysis, there is less than an 15% capital penalty for the use of 10 MHz CDMA. Thus the lower bid price must reflect the dilution of the market from the larger number.

Number of Subscribers	*10,000*	*25,000*	*50,000*	*100,000*	*150,000*	*200,000*	*300,000*
Total Area (sq mi)	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*
No Sectors/BTS	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Total Bandwidth (MHz)	*5*	*5*	*5*	*5*	*5*	*5*	*5*
Bandwidth/CDMA Channel	*1.25*	*1.25*	*1.25*	*1.25*	*1.25*	*1.25*	*1.25*
No CDMA Channels (Max/BTS)	*4*	*4*	*4*	*4*	*4*	*4*	*4*
Capacity/BTS (per CDMA Channel)	*75*	*75*	*75*	*75*	*75*	*75*	*75*
No BTS/BSC	*50*	*50*	*50*	*50*	*50*	*50*	*50*
Erlang Load/Customer	*0.08*	*0.08*	*0.08*	*0.08*	*0.08*	*0.08*	*0.08*
Number of Trunks	*800*	*2,000*	*4,000*	*8,000*	*12,000*	*16,000*	*24,000*
Radius/Cell Cluster	*3*	*3*	*3*	*3*	*3*	*3*	*3*
No Sectors	*36*	*36*	*36*	*36*	*36*	*36*	*36*
No BTS	*13*	*13*	*14*	*27*	*41*	*54*	*81*
No BSC	*1*	*1*	*1*	*1*	*1*	*2*	*2*
No CDMA Channels	*13*	*13*	*14*	*27*	*41*	*54*	*81*
No Trunks	*800*	*2,000*	*4,000*	*8,000*	*12,000*	*16,000*	*24,000*
No CDMA Channels/BTS	*1*	*1*	*1*	*1*	*1*	*1*	*1*
No Trunks/BTS	*61*	*153*	*285*	*296*	*292*	*296*	*296*
No Trunks/BSC	*800*	*2,000*	*4,000*	*8,000*	*12,000*	*8,000*	*12,000*
Maximum Subscribers (000)	*146,250*	*146,250*	*157,500*	*303,750*	*461,250*	*607,500*	*911,250*
Fixed Capital/BTS	*$8*	*$8*	*$8*	*$8*	*$8*	*$8*	*$8*
Capital/Sector/BTS	*$18*	*$18*	*$18*	*$18*	*$18*	*$18*	*$18*
Capital/CDMA Channel/BTS	*$85*	*$85*	*$85*	*$85*	*$85*	*$85*	*$85*
Capital/Trunk/BTS	*$3*	*$3*	*$3*	*$3*	*$3*	*$3*	*$3*
Fixed Capital/BSC	*$700*	*$700*	*$700*	*$700*	*$700*	*$700*	*$700*
Capital/BTS/BSC	*$6*	*$6*	*$6*	*$6*	*$6*	*$6*	*$6*
Capital/Trunk/BSC	*$1*	*$1*	*$1*	*$1*	*$1*	*$1*	*$1*
BTS Capital	*$4,290*	*$7,878*	*$14,028*	*$27,945*	*$41,943*	*$55,890*	*$83,835*
BSC Capital	*$1,578*	*$2,778*	*$4,784*	*$8,862*	*$12,946*	*$17,724*	*$25,886*
Total Capital	*$5,868*	*$10,656*	*$18,812*	*$36,807*	*$54,889*	*$73,614*	*$109,721*
Capital/Sub	*$587*	*$426*	*$376*	*$368*	*$366*	*$368*	*$366*
Efficiency	*7%*	*17%*	*32%*	*33%*	*33%*	*33%*	*33%*

4.7.2.1.3 CDMA (1.25 MHz Channels, 30 MHz Spectrum)

Number of Subscribers	*10,000*	*25,000*	*50,000*	*100,000*	*150,000*	*200,000*	*300,000*
Total Area (sq mi)	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*
No Sectors/BTS	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Total Bandwidth (MHz)	*15*	*15*	*15*	*15*	*15*	*15*	*15*
Bandwidth/CDMA Channel	*1.25*	*1.25*	*1.25*	*1.25*	*1.25*	*1.25*	*1.25*
No CDMA Channels (Max/BTS)	*12*	*12*	*12*	*12*	*12*	*12*	*12*
Capacity/BTS (per CDMA Channel)	*75*	*75*	*75*	*75*	*75*	*75*	*75*
No BTS/BSC	*50*	*50*	*50*	*50*	*50*	*50*	*50*
Erlang Load/Customer	*0.08*	*0.08*	*0.08*	*0.08*	*0.08*	*0.08*	*0.08*
Number of Trunks	*800*	*2,000*	*4,000*	*8,000*	*12,000*	*16,000*	*24,000*
Radius/Cell Cluster	*3*	*3*	*3*	*3*	*3*	*3*	*3*
No Sectors	*36*	*36*	*36*	*36*	*36*	*36*	*36*
No BTS	*13*	*13*	*13*	*13*	*14*	*18*	*27*
No BSC	*1*	*1*	*1*	*1*	*1*	*1*	*1*
No CDMA Channels	*13*	*13*	*13*	*13*	*14*	*18*	*27*
No Trunks	*800*	*2,000*	*4,000*	*8,000*	*12,000*	*16,000*	*24,000*
No CDMA Channels/BTS	*1*	*1*	*1*	*1*	*1*	*1*	*1*
No Trunks/BTS	*61*	*153*	*307*	*615*	*857*	*888*	*888*
No Trunks/BSC	*800*	*2,000*	*4,000*	*8,000*	*12,000*	*16,000*	*24,000*
Maximum Subscribers (000)	*438,750*	*438,750*	*438,750*	*438,750*	*472,500*	*607,500*	*911,250*
Fixed Capital/BTS	*$8*	*$8*	*$8*	*$8*	*$8*	*$8*	*$8*
Capital/Sector/BTS	*$18*	*$18*	*$18*	*$18*	*$18*	*$18*	*$18*
Capital/CDMA Channel/BTS	*$85*	*$85*	*$85*	*$85*	*$85*	*$85*	*$85*
Capital/Trunk/BTS	*$3*	*$3*	*$3*	*$3*	*$3*	*$3*	*$3*
Fixed Capital/BSC	*$700*	*$700*	*$700*	*$700*	*$700*	*$700*	*$700*
Capital/BTS/BSC	*$6*	*$6*	*$6*	*$6*	*$6*	*$6*	*$6*
Capital/Trunk/BSC	*$1*	*$1*	*$1*	*$1*	*$1*	*$1*	*$1*
BTS Capital	*$4,290*	*$7,878*	*$13,884*	*$25,896*	*$38,052*	*$50,598*	*$75,897*
BSC Capital	*$1,578*	*$2,778*	*$4,778*	*$8,778*	*$12,784*	*$16,808*	*$24,862*
Total Capital	*$5,868*	*$10,656*	*$18,662*	*$34,674*	*$50,836*	*$67,406*	*$100,759*
Capital/Sub	*$587*	*$426*	*$373*	*$347*	*$339*	*$337*	*$336*
Efficiency	*2%*	*6%*	*11%*	*23%*	*32%*	*33%*	*33%*

CDMA has a larger single cell radius at 0.6 W than does all of the other systems. This is due to the lower E_b/N_o needed for the link. This will have a dramatic effect in achieving the targeted cost per customer number. We shall use the example of CDMA technology to demonstrate how this new technological infrastructure can enable the new market. We shall briefly describe the CDMA system and then proceed to the financial implications of using this new technology.

4.7.3 Operations Support Systems

The OSS elements are generally computers, workstations, memory units and other MIS type systems. Capital is composed of initial fixed capital and then incremental growth capital. These have been sized and are part of the overall model. We will show their impact when we develop the design of the system.

The provision of OSS will entail several dimensions of service capabilities. These may or may not be from a single service providers but must be able to be integrated into a

single service provisioning element. The following are the sets of functions to be provided :

Network Management

The local and national backbone network must be managed and controlled in a real time fashion. Operating entities, at all levels of operation, must have the capability of being monitored as to operational effectiveness, network performance, and impact on their interconnecting network elements. The Network Manager must be able to determine the locations of any and all outages or system degradation points in the network, or in any other network that a customer may have access to.

IEC Interface Management

IEC Management must be performed to ensure the establishment and proper maintenance of any and all IEC interfaces and connections to the local PCS network. The overall management service will include such items as circuit ordering and scheduling, circuit interface negotiations, optimization of network design, and the physical management of the integration of the networks. It has been assumed that the IEC interfaces will be consistent with all other equal access provisions and that no IEC will receive any preferential treatment.

Customer Service

The Customer Service function will provide customer service capabilities supporting such areas as billing, service quality, inquiries, service features, service upgrades, and complaints. Customer Service is the most important part of the provision of service. The customer only needs Customer Service when the service is not totally transparent and thus when the service is not meeting the customers needs. Therefore, Customer Service is the MOST critical function that can be provided and must be provided with utmost care and effectiveness.

Billing

The Billing Function must be responsible for the full life cycle factors associate with billing. This includes the capture of billing data, both local and IEC, the processing of the data, the preparation of the bill, the issuance of the bill, and the collection, reporting of and corrections to the bill. The billing function in essence consists of all functions necessary to collect the bill for services rendered, commencing from the time the service is requested, through the necessary intermediates steps and through all intermediaries.

Roaming Implementation

The Roaming functions are required to provide a national and seamless service. The roaming functions require the establishment of a national database and a national identifier system. All portables must have an identifier and self registration facility to

identify themselves as they enter a new system. This must then be integrated into the active roaming database and all calls must be routed accordingly.

Repair Dispatching and Maintenance

The RD&M function is required when a fault is detected. The function prepares the trouble ticket and the dispatch ticket and the inventory dispatch ticket. It closes out all repairs and reports on the results.

Inventory Management (MRO/MRP)

The Inventory Management function, also providing Materials Resource Planning (MRP) and Material Resource Ordering (MRO) functions, will be responsible for the ordering and inventorying of all system and network elements needed for growth, spares, and maintenance. The function must be fully integrated and electronically supported ensuring the minimum response time and cost for inventory carrying. As a goal, the Manager seeks to have a "Just in Time" system that ensures the availability of the parts needed without the need for any stockpiling of equipment. This not only applies to the network elements but to the portables sent to the customers as well.

Operator Services and Directory Assistance

The Operator Services and Directory System intended to support access to all PCS customers. This system must allow any individual in any location to obtain ready access to any PCS subscriber. The objective is to ensure that all calls are equally inbound and outbound.

4.7.4 Operations Expenses

The operations of a PCS system, or any telecommunications system, for that matter, has intrinsically several costs to be included. We divide these costs into the following categories;

Cost of Goods: The costs associated with the provision of materials that may be held in inventory. We shall consider in this case that provision of the terminal, namely the portable, as a cost of goods. We have assumed a terminal cost of $200.

Cost of Service: This will be the costs associated with the access fees. We have assumed zero access fees throughout. It should also be noted that we have assumed that we are not charging AT&T or the other IECs with an access fee. This will be $0.05 per minute. This will be used to compete against the LEC.

Cost of Sales: This is the cost of all of the elements of acquiring and maintaining the customer. We have assumed that all costs are about $200 per new customer or 15% of the gross revenue.

Cost of Operations: This includes the LSI Operations as well as the OSS and are estimated at about $8 per month per subscriber.

The following three Table depicts the capital models for this type of PCS operations.

4.7.4.1.1 PCS Capital Plant

Year	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*
Switch Capital	*$40,000*	*$100,000*	*$100,000*	*$100,000*	*$130,000*	*$245,000*	*$315,000*	*$375,000*	*$430,000*	*$515,000*
BTS Capital	*$27,803*	*$112,811*	*$175,981*	*$245,896*	*$456,200*	*$685,097*	*$817,893*	*$947,176*	*$1,067,454*	*$1,311,769*
BSC Capital	*$6,273*	*$36,906*	*$48,514*	*$70,985*	*$152,819*	*$222,148*	*$263,401*	*$303,563*	*$340,928*	*$416,825*
CPU Capital	*$1,000*	*$1,000*	*$1,000*	*$1,000*	*$1,000*	*$1,000*	*$1,000*	*$1,000*	*$1,000*	*$1,000*
Cell Interconnect	*$5,370*	*$20,400*	*$28,620*	*$32,700*	*$36,810*	*$40,890*	*$40,890*	*$40,890*	*$40,890*	*$40,890*
Switch Interconnect	*$1,600*	*$4,000*	*$4,000*	*$4,000*	*$5,200*	*$9,800*	*$12,600*	*$15,000*	*$17,200*	*$20,600*
Total New Capital	*$82,046*	*$193,071*	*$82,997*	*$96,466*	*$327,448*	*$421,907*	*$246,849*	*$231,846*	*$214,843*	*$408,612*
Accum Capital	*$82,046*	*$275,117*	*$358,115*	*$454,581*	*$782,028*	*$1,203,935*	*$1,450,784*	*$1,682,630*	*$1,897,473*	*$2,306,084*
Deprecation	*$8,205*	*$27,512*	*$35,811*	*$45,458*	*$78,203*	*$120,393*	*$145,078*	*$168,263*	*$189,747*	*$230,608*
Accum Cap-Accum Dep	*$73,842*	*$239,401*	*$286,587*	*$337,595*	*$586,839*	*$888,352*	*$990,123*	*$1,053,706*	*$1,078,802*	*$1,256,805*
Accum Dep	*$73,842*	*$313,243*	*$599,829*	*$937,424*	*$1,524,263*	*$2,412,616*	*$3,402,739*	*$4,456,445*	*$5,535,247*	*$6,792,052*
Capital per Sub (Eff)	*$2,532.85*	*$1,263.07*	*$668.54*	*$491.76*	*$427.84*	*$400.86*	*$373.38*	*$362.05*	*$353.14*	*$358.47*
Depreciation Per Sub (Eff)	*$253.29*	*$126.31*	*$66.85*	*$49.18*	*$42.78*	*$40.09*	*$37.34*	*$36.20*	*$35.31*	*$35.85*

4.8 Economic Comparisons

This section presents several of the general economic factors that give the value per PoP to a PCS property and an LMDS property. The assumptions on both cases are similar:

i. Revenue is based on a competitive pricing against existing services. The pricing is generally 20% lower than the existing service.

ii. Penetration is based in discount and a five year penetration curve to the full discount potential. For example, at a 20% price discount, the five year penetration is 10% of the market, at 30% discount it is 15% and at 50% discount it is a 25% penetration.

iii. Operations costs are fixed and outsourced and are priced at $8.00 per month per subscriber. These are based on analyses performed by the author in other papers.

iv. Sales costs is 15% of the gross revenue assuming the use off network marketing forces.

v. Infrastructure capital is based on coverage requirements and penetration and the resulting capacity requirement. We assume an effective area per unit cell and we assume a fixed amount of allocated common capital.

vi. End user capital is assumed to be financed by the system operator at a 100% financing schedule.

The following reflects the results of these assumptions.

4.8.1 PCS Valuations

The issues of PCS valuations is based on several factors:

- ***Market Penetration and Size****:* The greater the market penetration the greater the share. The greater the share the more effect the competitor can then be. Share is dependent upon brand recognition. Thus a large entrant with a brand will tend to have a better share.

- ***Capital Efficiency***: The efficiency of capital use in the local plant by the bidder. This is technology dependent and size of purchase dependent.

- ***Operating Efficiency:*** The ability to provide a national infrastructure of such services as network management, billing, roaming and customer service will allow for a lower set of operating costs per customer, and possibly even operating costs on a marginal rather than average basis. This will dramatically change cash flow.

- ***Cost to Acquire Customers*****:** The issue of brand reflects not only the revenue element but also the costs element of acquiring a new customer.

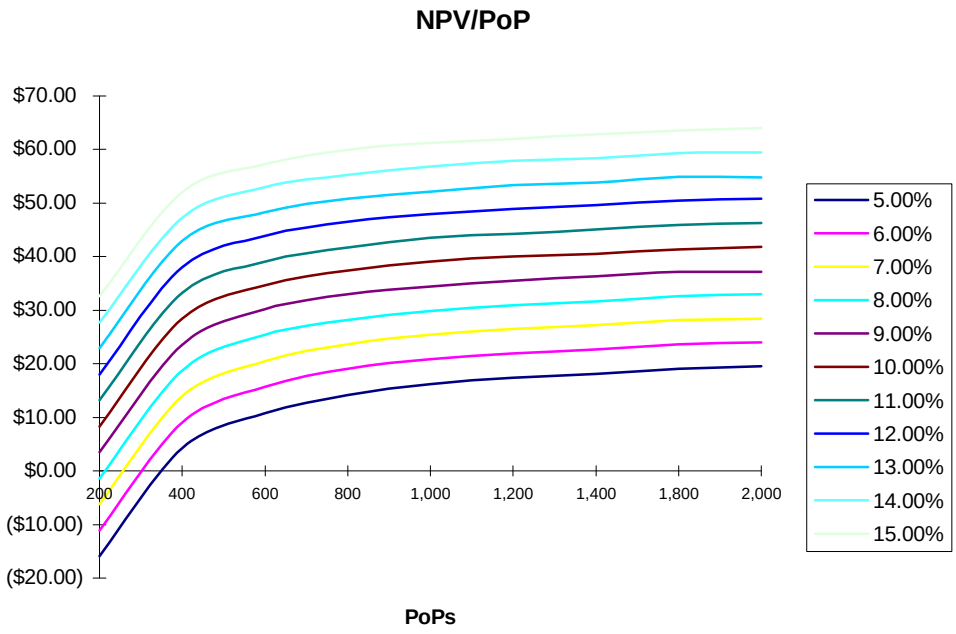
- ***Access Fees****:* Access fees will make or break this business.

- ***Cost of Capital:*** The cost of capital will dramatically effect the price of a bid. This is dramatically different for a PCS provider and an RBOC.

The analysis has developed a detailed model for each BTA from which the NPV per PoP can be determined. The anticipated bid value is typically set at 50% of the NPV per PoP. Higher values can be placed, but a reservation price of 85% of the NPV will be set.

The following Table depicts the value per PoP depending on total market size and terminal penetration in year ten. It should be recalled that bidding is at 50% of NPV. The following Figure depicts this value per PoP in terms of the same factors.

NPV ($0.00)/PoP versus Number of PoPs (000) for PCS



The following Table depicts typical values for BTAs that were bid upon their total PoPs and bid values,

Boston Kernel and Cluster

CITY	STATE	POPS	NPV	NPV/PoP	Bid/PoP	Bid
Hartford	CT	1,123,678	$32,405,632	$28.84	$14.42	$16,202,816
New Haven-Waterbury-Meriden	CT	978,311	$27,018,810	$27.62	$13.81	$13,509,405
New London-Norwich	CT	357,482	$8,008,615	$22.40	$11.20	$4,004,308
Boston	MA	4,133,895	$223,745,901	$54.12	$27.06	$111,872,951
Hyannis	MA	204,256	$4,313,019	$21.12	$10.56	$2,156,509
Pittsfield	MA	139,352	$2,866,548	$20.57	$10.29	$1,433,274
Spingfield-Holyoke	MA	672,970	$16,859,882	$25.05	$12.53	$8,429,941
Worchester-Fitchburg-Leominster	MA	709,705	$17,999,199	$25.36	$12.68	$8,999,599
Bangor	ME	316,838	$6,989,902	$22.06	$11.03	$3,494,951
Lewiston-Auburn	ME	221,697	$4,713,778	$21.26	$10.63	$2,356,889
Portland-Brunswick	ME	471,614	$11,017,638	$23.36	$11.68	$5,508,819
Presque Isle	ME	86,936	$1,750,044	$20.13	$10.07	$875,022
Waterville-Augusta	ME	165,671	$3,444,571	$20.79	$10.40	$1,722,286
Keene	NH	111,709	$2,271,977	$20.34	$10.17	$1,135,989
Lebanon-Claremont	NH	167,576	$3,486,861	$20.81	$10.40	$1,743,430
Manchester-Nashua-Concord	NH	540,704	$12,945,488	$23.94	$11.97	$6,472,744
Providence,RI-New Bedford-Fall River,MA	RI-MA	1,509,789	$48,437,394	$32.08	$16.04	$24,218,697
Burlington	VT	369,128	$8,305,629	$22.50	$11.25	$4,152,815
Rutland-Bennington	VT	97,987	$1,981,600	$20.22	$10.11	$990,800
TOTAL		12,379,298	$438,562,490			$219,281,245

4.8.2 LMDS Economics

The economics of LMDS follow a similar path as does that of PCS. The differences are several:

i. Revenue is a combined revenue based on video, voice and data.

ii. Coverage can be more focused than can PCS since it does not involve mobility.

iii. Operations costs are the same per subscriber and thus they may be a smaller percent of the gross revenue.

iv. The capital per subscriber may be higher but the fixed amount may be smaller due to the smaller coverage.

v. Penetration is on a household basis not a PoP basis. Thus we typically must focus on the household density.

This then leads to a summary model for LMDS that simplistically shows what its value is. Specifically we assume:

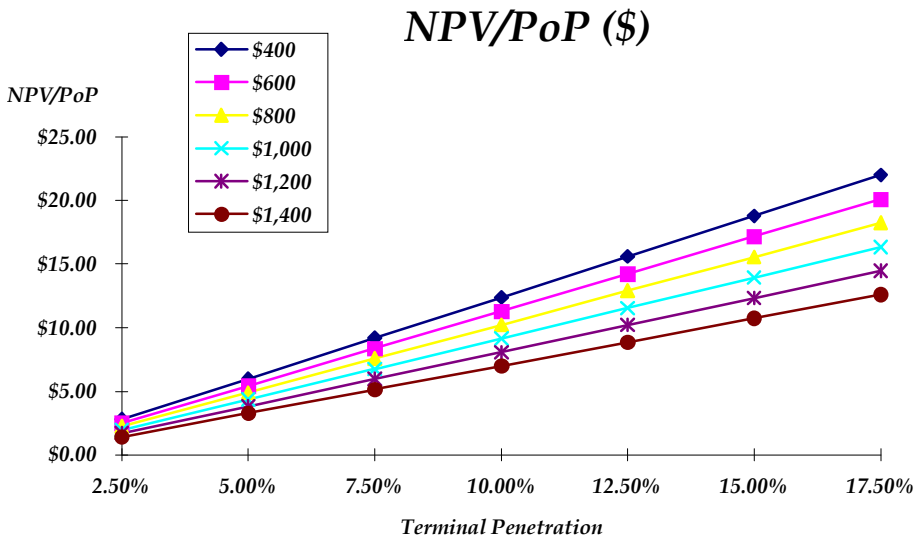
i. The revenue is a combination of voice, video and data. The assumption is that a user has $40 per month of voice, $30 of video and some added mix, say $10 of data. This is a revenue of $80 per household per month. We further assume 2.5 people or PoPs per HH, Household. These revenue assumptions are purely hypothetical and reflect no specific marketing strategy.

ii. The fixed operations expenses for the normal operations can be outsourced at the rate of $8.00 per month per subscriber. These numbers are readily achievable from an outsourced system of services.

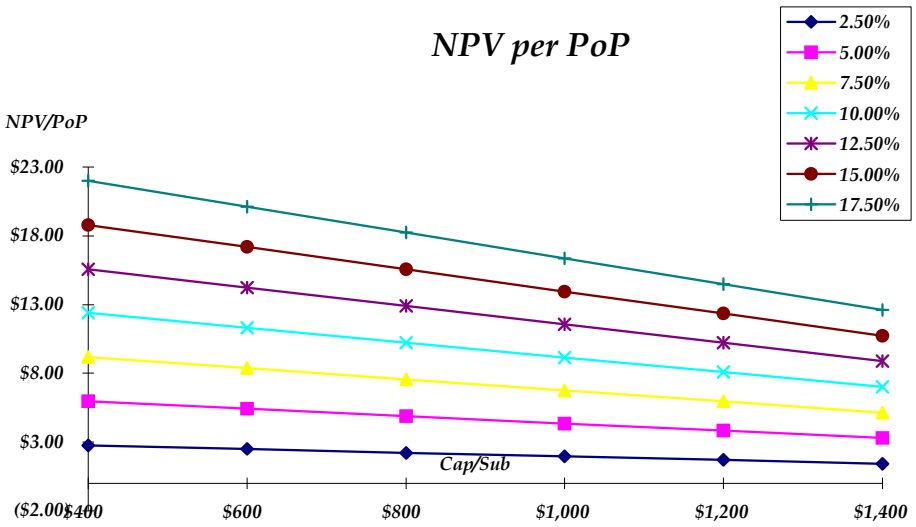
iii. The capital for infrastructure is assumed to be $1 million for a 2 mile radius of coverage. This is an effective of 10 square miles and thus is $100,000 per square mile. This number reflects an assumption based upon projection from PCS and assumptions from the up-banding to 28 GHz.

iv. The capital per household may be comparable to direct broadcast satellite systems and thus are about $1,000 per HH. Again, the hardware is similar but the difference is the 28 GHz front end. There is a major difference, however, an that is that this system is two way from the home. In the following analysis we vary this number significantly.

Based upon these assumptions and using a linear model for a rollout with the final percent being the tenth year of operations, the following two charts depict the net present value per PoP of LMDS as a function of the average capital per subscriber and as a function of the terminal HH penetration.



The following Figure presents the NPV/PoP as a function of the average capital per subscriber.

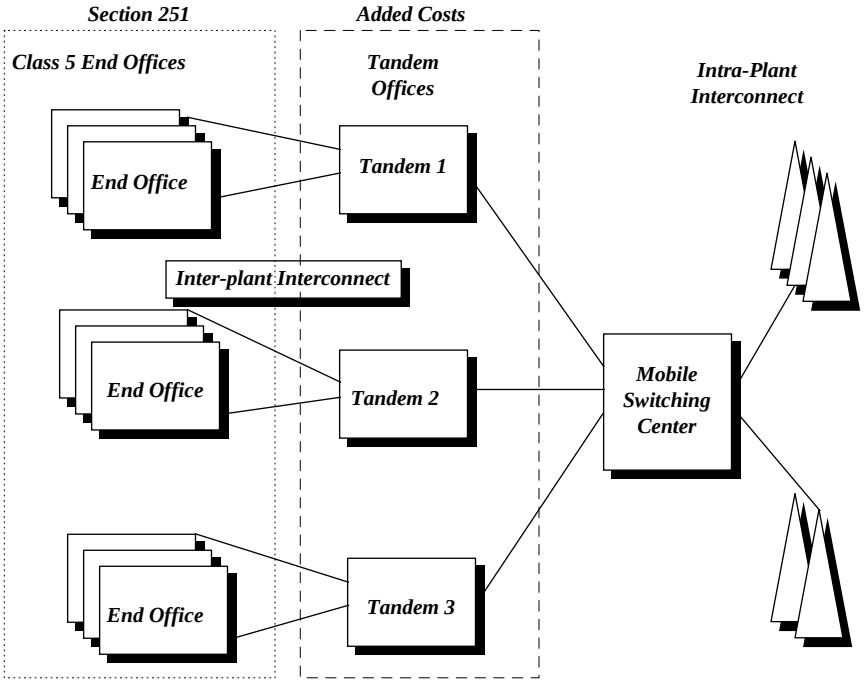


Those numbers are generally comparable to the PCS numbers. The bidding for these properties, again being based on BTAs are expected to be late in 1996 of sometime in 1997.

4.9 Interconnection

The interconnection issue is a major factor in the deployment of any wireless systems. The new Act provides a significantly changed platform upon which the new entrants may operate. This section provides an analysis of the interconnect problem from the CMRS's facilities to the I-LEC, the incumbent Local Exchange Carrier and from a C-LEC to the I-LEC. As has been discussed in previous papers, the interconnect issue for a wireless carrier falls into two categories; intra-plant and inter-plant.[121] The intra-plant issue is that between cell sites and the carriers own switch and the inter is between the carrier's switching facilities and the I-LEC's facilities. The intra was discussed in Telmarc Report TR-96-008. The overview of these issues is shown below.

[121]See the papers by McGarty in Interconnect and access. These discuss the detailed economics and the costs models. Also see the section by McGarty, Federal Communications Law Journal. This latter section presents a detailed antitrust analysis of the interconnection issue.



This Figure depicts three issues: first is that the intra-plant facilities are generally under the total control of the carrier. Second, that the end office I-LEC interconnect is clearly under the control of the Section 251 reciprocal compensation rule. Namely, such agreements as those between WinStar and NYNEX allow for termination of traffic here on a mutual compensation basis. Third, the real problem is how does one get from a single MSC, to several access tandems and then ultimately to dozens of end offices. This report addresses those issues.

The overall goal of this report is twofold. First to address the technical issues related to the interconnection, especially what options are available to tandem interconnection. Second, what are the resultant regulatory options that may be available to the carrier.

Any new carrier must be aware of these options before they interconnect since these interconnection options present significant fixed costs to the carrier and there may be ways to move these monthly fixed costs into some variable form or to move them into a form of carrier owned facilities.

4.9.1 C-LEC versus CMRS

In this section we develop a detailed review of the new regulatory structure as applied to interconnect. There is a difference between a C-LEC, a competitive LEC, and a CMRS, commercial mobile radio services provider. These are the two classes of players interconnecting under Section 251 of the Act.

A C-LEC is a non-incumbent LEC. An incumbent LEC is generally a RBOC. A LEC is defined by the Act as:

"LOCAL EXCHANGE CARRIER- The term "local exchange carrier" means any person that is engaged in the provision of telephone exchange service or exchange access. Such term does not include a person insofar as such person is engaged in the provision of a commercial mobile service under section 332(c), except to the extent that the Commission finds that such service should be included in the definition of such term."

The definition of telephone exchange services and exchange access services is as follows:

"EXCHANGE ACCESS- As per the Act, Sec.3(b)(2), the term Exchange Access means the offering of access to telephone exchange services or facilities for the purpose of the origination or termination of telephone toll services."

and,

"TELEPHONE EXCHANGE SERVICE - Telephone Exchange Service is defined in 47 U.S.C. Sec. 153 (r)means service within a telephone exchange, or within a connected system of telephone exchanges within the same exchange area operated to furnish to Subscribers intercommunicating service of the character ordinarily furnished by a single exchange, and which is covered by the exchange service charge."

Exchange Services is generally the provision of toll telephone services whereas telephone exchange services is local services directly to the end user or customer.

In contrast a CMRS is defined as:

"(i) CMRS: *A Commercial Mobile Radio Service ("CMRS") as defined by 47 U.S.C. Section 332 and from the Code, Section 153 (n). Specifically, Commercial Mobile Radio Service means any mobile service (as defined in section 47 U.S.C. Section 153(n)) that is provided for profit and makes interconnected service available (A) to the public or (B) to such classes of eligible Users as to be effectively available to a substantial portion of the public, as specified by regulation by the Federal Communications Commission."*

"(ii) MOBILE SERVICE *: As defined in section 47 U.S.C. Section 153(n), Mobile Service means a radio communication service carried on between mobile stations or receivers and land stations, and by mobile stations communicating among themselves,* ***and includes*** *(1)* ***both one-way and two-way*** *radio communication services, (2) a mobile service which* ***provides a regularly interacting group of base, mobile, portable****, and associated control and relay stations (whether licensed on an individual, cooperative, or multiple basis) for private one-way or two-way land mobile radio communications by eligible Users over designated areas of operation,* ***and*** *(3) any service* ***for which a license is required*** *in a personal communications service established pursuant to the proceeding entitled "Amendment to the Commission's Rules to Establish New Personal Communications Services" (GEN Docket No. 90-314; ET Docket No. 92-100), or any successor proceeding."*

The mobile service definition requires three elements; two way communications, over a an infrastructure and that the operator is in possession of an FCC license to provide such services. There is an exception as stated by the FCC for a CMRS, namely as relates to a reseller of CMRS services. Specifically, the FCC has ruled:[122]

"Finally, we conclude that mobile resale service is included within the general category of mobile services, as defined in Section 3(n) and for purposes of regulation under Section 332, since resale of mobile service can only exist if there is an underlying licensed service. There is no indication in the statute or the legislative history that resellers are not "mobile service" providers or exempt from the Section 332 regulatory classification, and we see no reason to establish such an exemption."

This simply states that even reseller are CMRS and thus also must be concerned with this issue.

4.9.2 Rates for Interconnection

The rates for interconnection have been established in the FCC First R&O. However this has been set aside by the Eight Federal District Court until it is reviewed. However, many f the RBOCs have already entered into interconnect agreements or are currently negotiating them. This section presents a comparison between several players in the market and presents the current pricing schedules.

The following Table compares the LEC status to that of a CMRS. This report focuses on the CMRS advantages

[122]See FCC GN Docket No. 93-252, February 3, 1994, FCC 94-31; ¶ 37.

Carrier Comparisons

Characteristic	***I-LEC***	***C-LEC***	***CMRS***
Coverage	Intrastate	Intrastate	MTA[123]
Jurisdiction	State PUC	State PUC	FCC
Interconnection	Section 251	Section 251	Section 251
Reciprocal Compensation	Mandated CFR §51.717		Allowable CFR §51.717
Bill and Keep	Optional	Optional	Optional
Resale	Mandated	Mandated	NA
Reciprocal Compensation	Mandated	Mandated	NA
Dialing Parity	Mandated	Mandated	NA
Access to Rights of Way	Mandated	Mandated	NA
Duty to Negotiate	Required	NA	NA
Unbundling	Required	NA	NA
Co-Location	Required	NA	NA
Interconnection	Required	NA	NA

The requirement by the new CFR is related to local termination traffic. This is defined as:

*"**Local Telecommunications Traffic** means: (1) telecommunications traffic between a LEC and a telecommunications carrier other than a CMRS provider that originates and terminates within a local service area established by the state commission; or (2) telecommunications **traffic between a LEC and a CMRS provider** that, at the beginning of the call, originates and terminates within the same Major Trading Area"*

The latter statement is of significant import to a CMRS carrier. It covers all of an MTA and since the New York MTA covers eastern New York, New Jersey, Vermont, and eastern Pennsylvania, it is a significant advantage over any LEC. The default tariffs applied by the FCC in the new CFR are as follows:

[123]See Title 47 C.F.R . §51.701(b)(2)

CFR Pricing Schedule

Connection	***Rate***	***Reference***
Symmetrical Reciprocal	Yes	CFR §51.711
Termination of Local Traffic	No less than $0.002 per minute and no more than $0.004 per minute	CFR 51.707(b)(1)
Transport of local traffic	Same as in Termination and in Tandem	CFR §51.707(b)(1), and §51.513(d)(3),(4),(5)
Tandem Switching	$0.0015 per minute of use.	CFR §51.715(b)(3)

The actual interconnect agreement negotiated between NYNEX and WinStar reflects the following rates. It should be remembered that although WinStar is a wireless carrier it is not a CMRS, it is a LEC. It is a C-LEC and thus there are certain distinctions. Also, all three are common carriers, namely the I-LEC, the C-LEC and a CMRS.

New England Telephone & WinStar Agreement[124]

Connection/Service	***Fixed***	***Variable***
Termination of Local Traffic		$0.0080 per minute
Transit Service		$0.0035 per min
Number portability	$1 per month residential $2 per month business $20 per ported number	
Unbundled ports	$8 per month	
911 Connections	$252 per month per DS1 plus $100 per month per voice grade trunk activation.	
Directory Assistance	$0.32 per message; branded $0.57 with DAC	
Reciprocal Rule Rate per minute Peak Rate = $0.009 per min OffPeak Rate = $0.0065 per min OPM=originated peak min OOPM orig. OffPeak min	[(Carrier OPM+ILEC OPM)* Peak Rate]+[(Carrier OOPM+ILEC OOPM)*OffPeak Rate]/ [Total Carrier Min+Total ILEC Min}	

The remainder of this section presents the detail regarding the regulatory, technical and operating issues of inter carrier interconnection.

4.10 Conclusions

This section has presented a detailed analysis of the costs of two wireless schemes; PCS and LMDS. The similarities are greatest as are the difference. PCS is a bandwidth limited system, 30 MHz of bandwidth, at 1.9 GHz center frequency. LMDS is 1 GHz of bandwidth at 28 GHz center frequency. One is longer range, although not really that great, and the other is greater bandwidth, but the issue is for what purpose. The underlying question is; is there a sustainable business in wireless or has a glut been created? Also the second question is, if universal service is a socially acceptable and required goal, then which of these technologies is the most resource effective in deployment.

[124]Filed with Massachusetts DPU on August 22, 1996.

We argue that any single service, if there is a market, can be competitive. We further argue that wireless may not be the most efficient service for large areas, especially when the population density falls below 200 PoPs/Sq mi. This is especially true in rural areas. Possibly point to point may work but even this is debatable.

The major concern is the general assumption that bandwidth is a scarce resource. This is true if can not been efficiently used. In the current models we see that with PCS alone we can service the entire US telephone network several times over. This may actually mean that the total capital deployed in PCS may be a poor use of capital resources on a national scale. On the other hand this excess capacity in a free market will drive prices down and drive for newer and more creative applications. The missing element has always been the load that data may apply on the system. This may be the savior for PCS.

As for Universal Service, the FCC seems to be focusing on the use of a fund type approach, taking the "taxation" control from the RBOCs. This may be the most effective mechanism. The issue that may academic policy analysts have tried to raise is that a wireless provider, in return for the right given them by the government, have a corresponding right to "play fair" with the monopolists and be required to provide universal wireless service. This bizarre set of reasoning goes beyond the wildest dreams of Schumpeter. First, the PCS entrants have risked billions to buy PCS spectrum, which is more than can be said for the monopolist RBOCs, who in may cases usurped their properties at the turn of the nineteenth century. Secondly, if economic efficiencies are of any importance, why not let the market determine who is the most efficient provider. Thirdly, why must the monopolist be protected. In fact if telecommunications is truly commodicized with wireless, then as we have seen in long distance, the market is very efficient without any governmental strictures such as compulsory universal service.

5 COMPARATIVE DEREGULATION OF FAR EASTERN TELECOMMUNICATIONS MARKETS

5.1 Introduction

This section discusses the entry into a set of dominant Far Eastern markets. It discusses the current status, the proposed changes in those markets and what is anticipated in terms of new entrants. In addition the section reviews the overall economy of each of these countries and presents an overview of the economic impact that changes in regulation will have on each specific market. The section also presents several case studies relating to each of these markets to demonstrate the changes that are occurring and by focusing on specific example attempt to project changes in these markets based upon actual results that have already occurred. The examples focused upon are competition in local telephony, competition in wireless/cellular, competition in the LMDS areas, and competition in international telecommunications.

The section analyzes each of the opportunity segments across each of the target countries. The target countries include the following: China, Hong Kong, India, Indonesia, Japan, Republic of Korea, Malaysia, Pakistan, Philippines, Singapore, Taiwan, Thailand, Vietnam. It discusses the potential economic impact upon the United States as well as between and amongst the target countries that the proposed changes in deregulation may have. The differing policy positions are reviewed and the relevance to the proposed current FCC positions are analyzed in detail.

In the section we specifically address the following questions:

- *Does the "Trade in Services" resulting from the settlement rates have a significant positive influence on the growth of telecommunications services?*
- *Does the growth in telecommunications services relate to the GDP or similar measures of the country's economic development status?*
- *Does the growth rate of a country's economy correlates with the openness of that country's market for Trade in Services as relates to telecommunications?*
- *What should the U.S. position be regarding its ability to influence access to markets by its unilateral power on settlements?*
- *Does there exist a set of economic efficiencies in the use of telecommunications via enhanced services, value added services, or Internet services that will allow such providers to have economic advantages to side step the settlement process?*
- *What will be the effect of Internet and Internet like voice, video and data services wherein the "path" of the message has no definition? Does any country have the tight to regulate a "mixed" message format?*

5.2 Trade in Services: Settlements

The GATS, General Agreement for Trade in Services, which is a part of the current WTO structure, has developed a set of rules and regulations an a schedule of timetable to open up the member markets to trade in telecommunications services. There are three dimensions for such trade in services. The first two are basically for the intra country markets and represent the local and long distance telephony market. The third is the international telecommunications market. In all three cases we can further break this up into voice, data, video, valued added services, and other types and classes of services. The breakout is shown as follows:

	International	***Long Distance***	***Local***
Switched Voice	Generally tightly controlled	Generally controlled by internal ownership.	Generally controlled by internal ownership.
Switched Data (Off Net to Off Net)	Generally tightly controlled	Generally controlled by internal ownership.	Generally controlled by internal ownership.
Non Switched Data (On Net to On Net)	Generally there is limited control.	Limited to little control.	Limited to little control.
Video (CATV)	Issue is ownership and content.	Not Applicable in General	The control is limited to any entity having a franchise or similar license
Internet	Generally open and limited by Government controls on content.	Generally open and limited by Government controls on content.	Generally open and limited by Government controls on content.
Value Added Services	Generally controlled as an On Net Service	Generally controlled as an On Net Service	Generally controlled as an On Net Service

The main concern is two fold; first, if there is a significant amount of trade differential flowing to these countries perforce of the accounting irregularities and second there is a need to expend the market for US services in international traffic that the accounting rules are a barrier to entry to.

5.2.1 Settlements as Part of Trade

The current International Record Carriers, IRCs, enter into bilateral agreements with other IRCs, namely the PTTs of the foreign entities to agree to settlement or accounting rates between each other. Generally these are bilateral agreements performed one at a time. The following is the FCC's current estimate of the size of the settlement process.[125]

> *"The United States paid roughly $5 billion in settlements to the rest of the world in 1995, up from $2.8 billion in 1990. The U.S. out-payment results*

[125]Federal Communications Commission, FCC 96-484, Washington, D.C. 20554 In the Matter of International Settlement Rates , IB Docket No. 96-261, Adopted: December 19, 1996, ¶ 17.

in part from the fact that U.S. consumers make more telephone calls to foreign countries than foreign consumers make to the United States. In fact, the size of the imbalance between U.S.-outbound and inbound minutes has accelerated in recent years, as the chart in Appendix C demonstrates. To the extent that these settlement payments exceed the actual costs foreign carriers incur in terminating U.S.-originated calls, they represent a significant subsidy to foreign carriers. Based on our estimate of the costs of international termination services, we estimate that at least three-quarters of the $5 billion in out-payments is such a subsidy from U.S. consumers, carriers and their shareholders to foreign carriers."

The system works in the following fashion. One carrier negotiates with another for the right to terminate traffic. For example Canada negotiates with the Ivory Coast. They agree on a settlement rate of say $0.40 per minute. This applies only to voice traffic. Say it is Teleglobe Canada and the Ivory Coast PTT. Now any traffic between he two is a $0.40 per minute. At the end of the year they add the traffic up and if there is more traffic from Canada to the Ivory Coast then the difference must be paid by Canada to the Ivory Coast at $0.40 per minute.

Now let us assume that Teleglobe Canada wants to place a call to Uganda. It places the call in transit through the Ivory Coats which charges a transit fee of say $0.020 per minute and the Ivory Coats has an agreement with Uganda for terminating at say $0.15 per minute. The Teleglobe gets charged the sum.

The following is Teleglobe Canada perception of this process:[126]

"For an international telecommunications service provider international telecommunication accounting practices distinguish between remuneration of the corresponding carrier in the country of destination or transit for the delivery of its traffic and the charge in national currency collected by an operator from its customers for the international facilities and services provided. According to CCITT Recommendations D.150 and D.155, which concern tariff and accounting practices in the international telephone service, the carrier in the destination country can be remunerated on the basis of a flat-rate price per circuit, on the basis of the traffic units carried, or through a procedure whereby accounting revenue is shared between terminal operators.

Under the flat-rate price and traffic unit price procedures the carrier at the destination establishes its prices broadly based on the cost of the international circuit section it provides, the use of its international exchange (gateway) and the national extension. Under the accounting revenue division procedure the value of traffic in each direction between

[126] See: "THE INTERNATIONAL TELECOMMUNICATIONS SETTLEMENTS PROCESS: WHAT'S NEEDED? DESTROY AND REPLACE IT OR ADJUST IT?", Peter A. Stern, Teleglobe Canada Inc., Montreal, IIC Telecommunications Forum, 25 - 26 October 1990. Washington.

two corresponding international carriers is multiplied by a mutually agreed tariff or "accounting rate" to give an accounting revenue which is "in principle, shared equally between the (carriers) of the terminal countries in respect of each traffic direction".

In theory, international carriers can agree on other than equal shares when their costs or the extent of the facilities that each provides vary significantly; however, in practice accounting rates are shared 50/50. If during a given settlement period (say a month or a quarter) there is more traffic flowing in one direction than the other, the carrier which receives more traffic than it sends will receive a greater amount of compensation from the corresponding operator for delivering its traffic than it has to pay out. The direction of the traffic imbalance, therefore, determines which operator has to pay its partner in a bilateral relation more than it receives.

If, for example, the accounting rate between Canada and a given foreign destination is SDR 1.66 and the accounting rate is divided 50/50 then Canada pays its foreign partner 1/2 x 1.66 = SDR 0.83 per minute of traffic to deliver that call to its destination from the mid-point (say mid Atlantic) to the destination subscriber; to facilitate accounting, however, partners in a bilateral relation look at the sum of the traffic in both directions for a given period and apply the accounting rate only to the difference.

If, therefore, during the period there are more minutes of traffic flowing out of Canada than flowing in, the imbalance obtained by multiplying by half of the accounting rate gives the "traffic settlement" which is due to the foreign administration. The greater country's traffic imbalance with another country, the greater its net payments outflow.

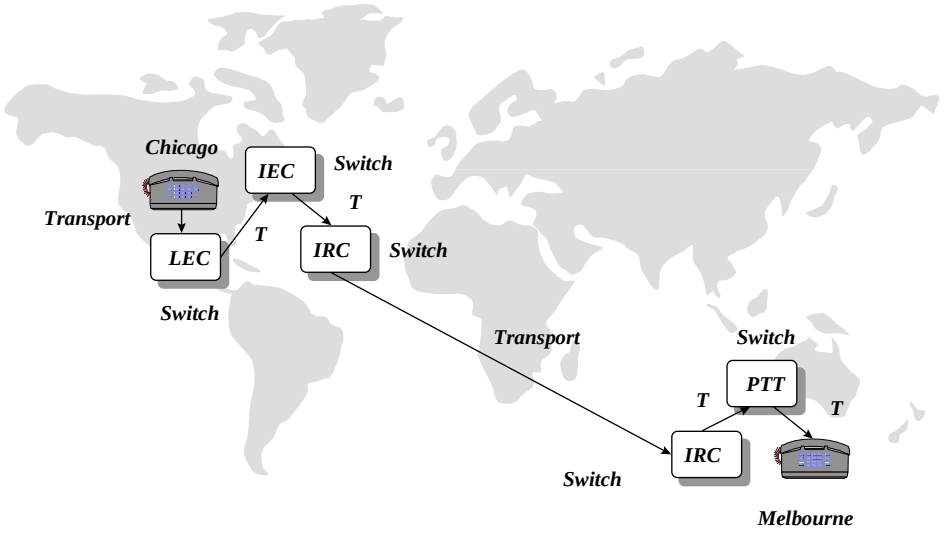
If traffic levels are equal in both directions the out-payments are the same in both directions. In certain relations where traffic levels are more or less equal, carriers may agree to not exchange international accounts. Contrary to the result of most other international trade in goods and services transactions where a net export results in a net payment inflow in international telecommunications a net outflow of traffic will result in a net payments outflow from the country that "exports" that traffic.

Collection charges are considered to be a purely national matter fixed by the provider of the international services subject to government, regulatory, financial and competitive constraints. The International Telecommunication Regulations like CCITT Recommendation D.150 emphasize the need "to avoid too great a dissymmetry between charges applicable in each direction of the same relation". 10

The key issue however is that Teleglobe has an agreement that any traffic that it terminates is voice and that it will pay the Ivory Coast at the agreed to rate. It cannot generally go back and say, this is Internet voice and I do not want to pay the Ivory Coast. A new entrant can start that way but an existing entrant places their existing agreements in jeopardy. Thus there is a general agreement that if there is an existing settlement agreement between two parties that the Parties shall honor the terms of the agreement and that any termination or transit of traffic shall be via the agreement and thus will require the payment of the pre-agreed settlement fees. This therefor places and existing carrier at jeopardy in view of attempting to get Internet terminations.

5.2.2 Accounting Rates and Settlements[127]

To understand the principles of accounting rates and settlement costs it is necessary to understand how a call is made in an international call. The accounting rules are to international traffic what the access fees are to domestic. The senior author has discussed this issue in detail elsewhere. [128]The following Figure depicts that process.



A customer in Chicago desires to place a call to Melbourne, Australia. The customer first uses the transport and switch of Ameritech, who then connects to MCI. MCI provides transport and switching. The international record carrier chosen by the customer is AT&T. MCI then hands the call off to AT&T and AT&T has an agreement with the Australian IRC, International Record Carrier, namely an accounting agreement, to handle

[127] See FCC IB Docket No. 96-261 which describes the process of accounting rates and see R. Frieden, "International Toll Revenue Division", 17 Telecommunications Policy, No 3 pp. 221-233, April, 1993.

[128] See multiple McGarty references.

all traffic at the net rate of say $0.55 per minute. For that, the Australian PTT then handles the call and places it to the terminating point in Melbourne. The customer is billed $1.55 per minute. The IRC in the US charges the customer for their switching and transport and then adds on the costs of MCI and that of Ameritech, generally visa the access fee applied as a LEC.

The accounting rate is the rate agreed to by and between and amongst international record carriers for the provision of a unit, say a minute, of telecommunications, generally voice, between two locations or terminations. For example the United States carrier AT&T may agree to a number, say $0.45 per minute, with France Telecom, for all traffic between the United States and France, no matter what the direction of the traffic. This fee is the full and complete fee for the delivery of that minute from the midway point of the cable to the end destination point in the called location. The accounting rates is supposed to represent the total cost of carrying the traffic from point of origin to point of destination.

The settlement rate is the mechanism that any pair of carriers select to divide up the number of minutes from and to each other based upon the accounting rate already agreed to. Namely, if AT&T provides France Telecom with 500 million minutes, and France Telecom provide AT&T with only 400 million minutes, and the agreed accounting rates if $0.045, then at then end of a period, AT&T owes France Telecom, 500 million less 400 million, namely 100 million times $0.45, or $45 million dollars.

There is the third factor of why a call is $0.55 from the US to Israel but is $1.90 from Israel to the US. The answer is quite simple. The US and Israeli carriers have agreed to a settlement fee of say $0.35 per minute. The US market is competitive for barriers thus there cannot be an excessive distortion in price. Thus the $0.55 represents a fail demand based price subject to the $0.35 "subsidy" paid in the accounting rate. However, in Israel there is a pure monopoly and thus there is no clearing of the market and the PTT charges a rate based upon a social and fiscal policy that states that this is a means to subsidize those who cannot afford to call internationally. It is social policy and not economic policy that dictates the actual price.

The FCC states that the accounting rate system has the following characteristics:[129]

> *The current accounting rate system was developed as part of a regulatory tradition that international telecommunications services were supplied through a bilateral correspondent relationship between national monopoly carriers.*[130] *An accounting rate is the price a U.S. facility-based carrier negotiates with a foreign carrier for handling one minute of international telephone service. It was originally intended to allow each*

[129] Federal Communications Commission, FCC 96-484, Washington, D.C. 20554 In the Matter of International Settlement Rates , IB Docket No. 96-261, Adopted: December 19, 1996, ¶ 6

.

[130] *We note that this tradition is not compelled by the international legal regime.* See *Article 9, International Telecommunication Regulation (Melbourne, 1988) and Article 31, Constitution of the International Telecommunication Union (Nice, 1989).*

carrier to recover its costs for terminating an international call.[131] *Each carrier's portion of the accounting rate is referred to as the settlement rate. In almost all cases, the settlement rate is equal to one-half of the negotiated accounting rate. At settlement, each carrier nets the minutes of service it originated against the minutes the other carrier originated. The carrier that originated more minutes of service pays the other carrier a net settlement payment calculated by multiplying the settlement rate by the number of imbalanced traffic minutes.*[132]

There is also some discussion of the sender keeps all system or the bill and keep approach. This has been discussed by Tarjanee the head of the ITU as follows:

Call termination fees offer a methodology which fits well with the World Trade Organisation's trade liberalisation framework. They fulfil many of the principles defined earlier for accounting rate reform. The idea would be that each country, or operator, would define one standard charge for terminating calls, irrespective of where those calls come from. The call termination charge would be comparable to the national interconnection charge levied, for instance, on mobile operators interconnecting with the public telephone network. The system would be transparent, flexible, non-discriminatory and (hopefully) cost-based. The latter will probably depend on the degree of market competition which is allowed in each national market.

Call termination fees have received the blessing of the OECD and are currently under discussion in the WTO and the ITU. They are opposed by some carriers who are unwilling, or unable, to disclose their cost structures for terminating calls. They are also opposed by those carriers who feel that they should not be required to pay more for having their calls terminated in foreign countries than they themselves charge for terminating calls. But the fact is that providing telephony service is more expensive in some countries than others. The accounting rate system, which is based on a 50/50 revenue sharing agreement, implicitly assumes that costs are equal in all countries. This is patently not the case. The possibility exists for countries to agree on a split which departs from 50/50 but in practice this is never adopted except in "sender keeps all" arrangements. A system, such as call termination fees, which does not pretend that costs are equal in all countries would be much to the advantage of developing countries.

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[131] *See, e.g., Regulation of International Accounting Rates, CC Docket No. 90-337 (Phase II), Second Report & Order and Second Further Notice of Proposed Rulemaking, 7 FCC Rcd 8040, n.3 (1992).*

[132] *Every carrier is required to file a copy of its settlement agreements with the Commission. 47 C.F.R. § 43.51.*

Thus under the existing settlement agreement, bilateral and multilateral, the existing carriers have generally affirmed and agreed to pay settlements on their voice circuits and that any change by them directly or otherwise would put their agreements in breach and could result in the immediate termination of their traffic from their home locations to the countries with whom they have agreements. The existing agreements are generally and in most cases expressly for the provision of voice traffic and have followed the generally accepted terms in existence for the past one hundred and thirty years.

5.2.3 Technological Challenges

We will focus initially on voice telecommunications since it represents the bulk of the telecommunications market. There are several technologies that can be used to provide voice communications; the standard approach plus those whom we shall call the new entrants.

Standard Telecommunications: This approach is as described above. It is the standard way that telecommunications, especially voice telecommunications is provided.

The new entrants are comprised of the following:

Call-Back: The call back approach assumes that a call from a foreign country, say Israel, is charged at the rate of $1.90 per minute to the United States. However, in the United States the charge for a call to Israel is $0.50 per minute. Thus if the caller could call the United States From the United States, and call himself from the United States he could lower the costs dramatically. The system then allows the caller to call a data node which then places a call back to him from the United States and completes the call.

On Net to On Net: This is a standard corporate network and generally is at dramatically lower rates. Hotels also use this approach for in hotel to foreign connections. Generally these circuits are on a private network that is outside any settlement agreement. Frequently they carry voice, data and even video.

Leaky PBX, On Net to Off Net: The leaky PBX is the source of much concern from foreign countries. A hotel may allow calls to "leak" from the hotel to other locations, thus bypassing the local telephone companies termination rates.

Internet: This is the newest possibility. It allows for the call to be placed over the Internet or Internet like/connected network. These are generally free of settlements and also generally cannot even asses settlements since they go over different routes for each packet. Namely, in a TCP/IP packet type network, it is possible that a call from the US to Israel, may in one packet go through London, and in the very next packet to Warsaw, then to Rome, and then to Tel Aviv.

Of all of the above new entrants, the Internet and Internet like entrants are those with the greatest innovative potential and thus we argue latter they should be the one the most free of regulation.

5.3 Economic Factors

The following is a summary of the economic factors relating to each of the countries that we have addressed as well as a brief status of their telecommunications infrastructure. We have selected several of the key countries and have depicted the key economic factors as well as the key telecommunications factors. It is clear that there are significant opportunities in each of these nations but that they are clearly divided into four categories depending upon the state of economic development and the state of political development. We argue that these states can be divided into the extremes as follows:

5.3.1 Basic Economic and Telecommunications Demographics

The population of these countries estimated in 1998 is shown in the following Table. Clearly the largest is China and the second being India. The place of Indonesia, the Philippines, Thailand, Vietnam, and even Malaysia make them a significant player in the evolving markets. The relative positing of each country using 1998 estimates of population is shown below. Despite Singapore's significant advanced economic success it is an almost insignificant player in the overall set of market players.

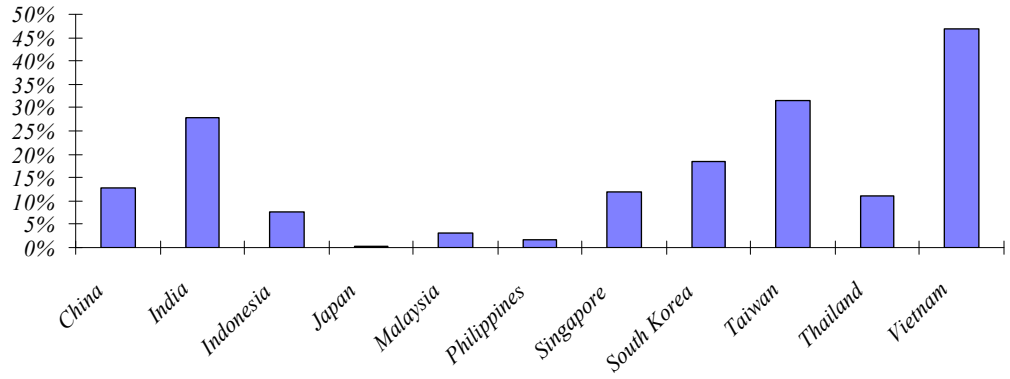
The telecommunications sector in this region of the world is a dominant sector of the international trade in services. In this sections we present a summary overview of the sizes of that sector for the Asian market of focus. In this section we evaluate several key issue regarding telecommunications infrastructure and the international market for services as represented by the initiation and termination of international traffic. Each of the countries in question has demonstrated a rapid growth potential but each country has taken the position of handling entry into the international market in a different fashion. Japan has been the most liberal in opening up its international market and the Philippines has been the most restrictive.

The detailed economic factors relate strongly to the overall telecommunications environment. The following Table summarizes the results for the countries described above. The following Table is a detailed summary of these countries.

Country	Population (000)	GDP/Capita	GDP ($000,000,000)	Settlement Payout	Settlement/ GDP	Telephones (000)	Settlement/ Telephone
China	1,282,510	$2,900	$3,719,279	$309,753,604	0.0083%	36,364	$8.52
India	937,851	$1,500	$1,406,776	$256,291,264	0.0182%	20,434	$12.54
Indonesia	205,833	$3,500	$720,417	$54,945,148	0.0076%	2,137	$25.71
Japan	125,960	$21,300	$2,682,937	$275,446,516	0.0103%	66,016	$4.17
Malaysia	19,768	$9,800	$193,722	$26,815,150	0.0138%	3,261	$8.22
Philippines	71,222	$2,530	$180,191	$184,285,405	0.1023%	902	$204.25
Singapore	2,902	$22,900	$66,463	$46,527,312	0.0700%	1,375	$33.83
South Korea	45,622	$13,000	$593,086	$224,585,206	0.0379%	19,683	$11.41
Taiwan	21,511	$13,510	$290,609	$162,976,907	0.0561%	13,480	$12.09
Thailand	60,078	$6,900	$414,540	$71,958,693	0.0174%	3,259	$22.08
Vietnam	73,185	$1,300	$95,141	$65,305,158	0.0686%	3,712	$17.59

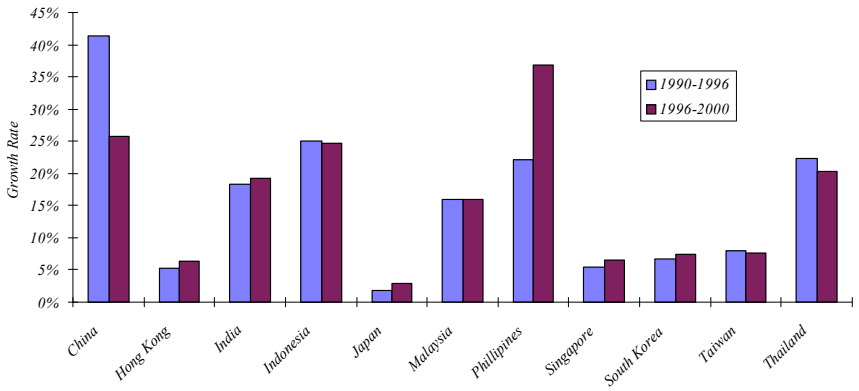
The following depicts the annual growth rate in telephone lines for each of the above countries for 1998. This is based upon an analysis of ITU, CIA, World Bank and other sources and as with the other analysis in this section is preliminary in form and does not reflect any commitments by the governments involved. Vietnam has the largest growth rate and is expected to remain that way for a while.

Annual Growth Rate Estimates 1998



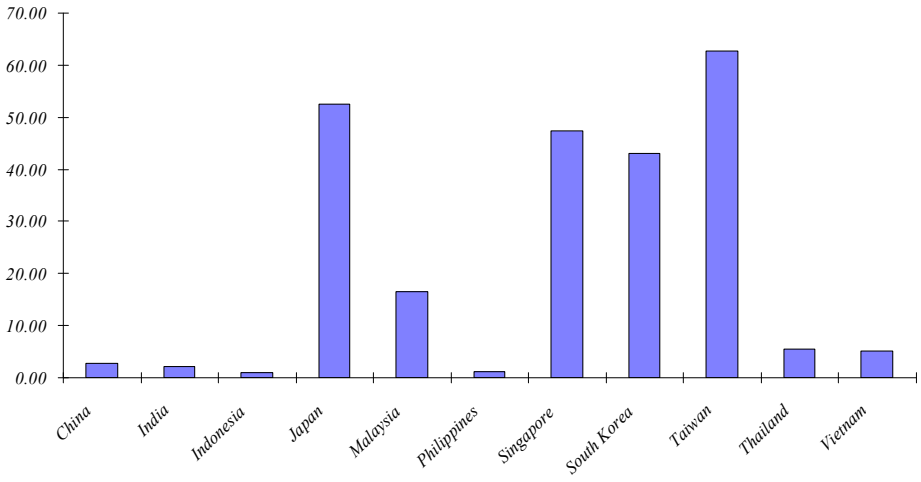
The following Table presents the growth rate for two periods based upon the DLJ report. Note the differences in key countries such as China. They argue that China has a CAGR in excess of 40% over the past seven years. Note that the prior chart was a projection for 1998 alone. They project a CAGR for China in excess of 25% for the next three years. The Philippines is the greatest over the next period but that is generally because of the low base level. China is clearly adding one or more RBOCs per year. Clearly Indonesia, Thailand, and Malaysia are good growth markets.

Growth Rate vs. Country (DLJ Report, May 1997)

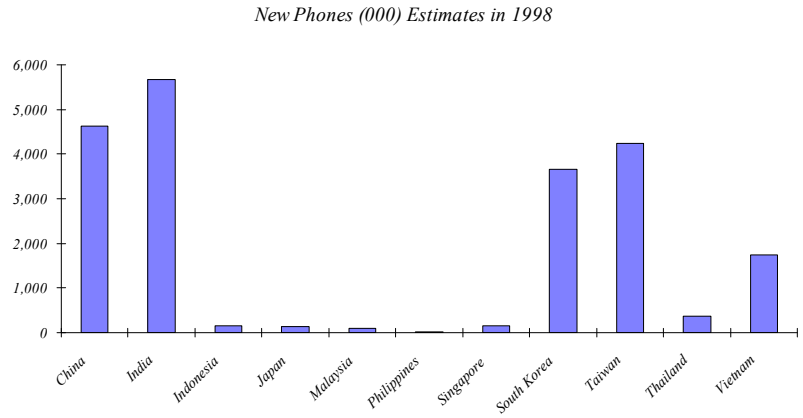


The following Table depicts the telephone density in telephones per 100 people. Clearly Taiwan, Korea, Singapore and Japan are on a par with the Western developed countries. In contrast the other countries are at least an order of magnitude lower in scale.

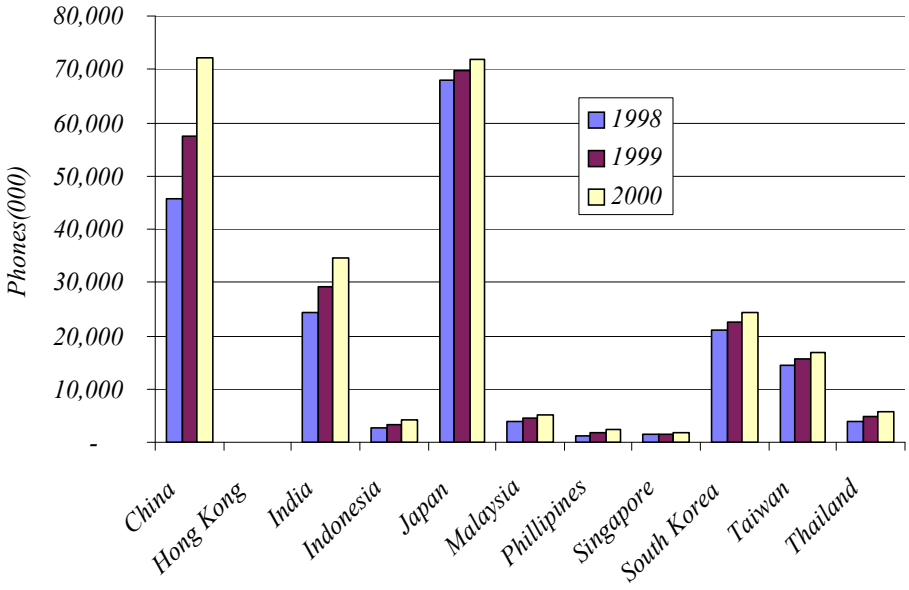
Phone Density per 100 Person Estimates 1998



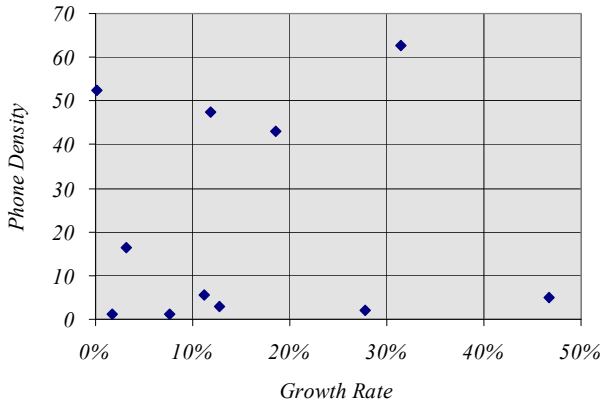
The following is an estimates of the number of new phone lines to be installed in 1998. The total number is in excess of 26 million and each line generally costs $2,000 US to install with a total investment of in excess of $52 billion just in new growth. This does not include the growth of new wireless lines, be they cellular or wireless local loop. These estimates are based upon the more conservative numbers and not the DLJ numbers



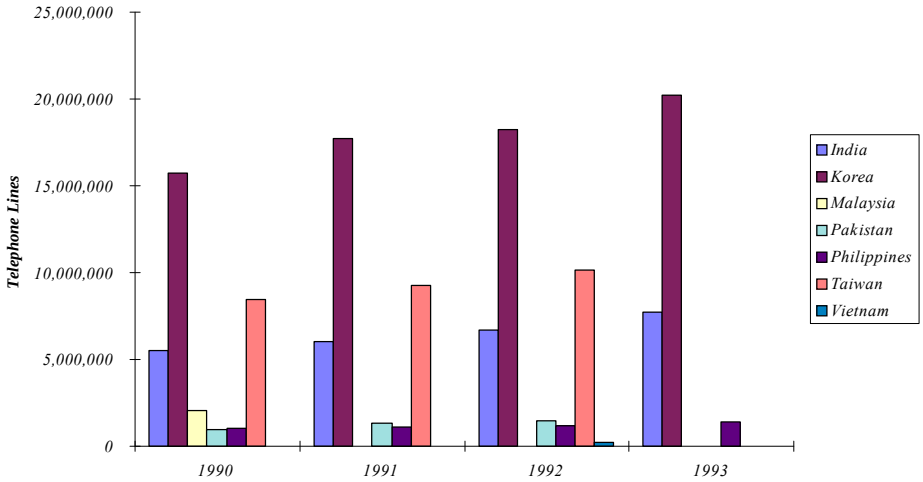
What this shows is that China, India, Thailand and Vietnam appear to have the greater growth rate, Malaysia, Indonesia, and the Philippines are not growing as rapidly. Using the DLJ data the following chart depicts the growth projections for the next three years in total lines.



The following chart depicts the phone density versus annual growth rate of telephone lines. It clearly demonstrates that there is no significant correlation between infrastructure growth rate and total market availability. Namely, densely populated telephone markets may grow as fast or as slow as the less densely populated. Thus it is not necessarily the case that the current status is a predictor of the further potential.



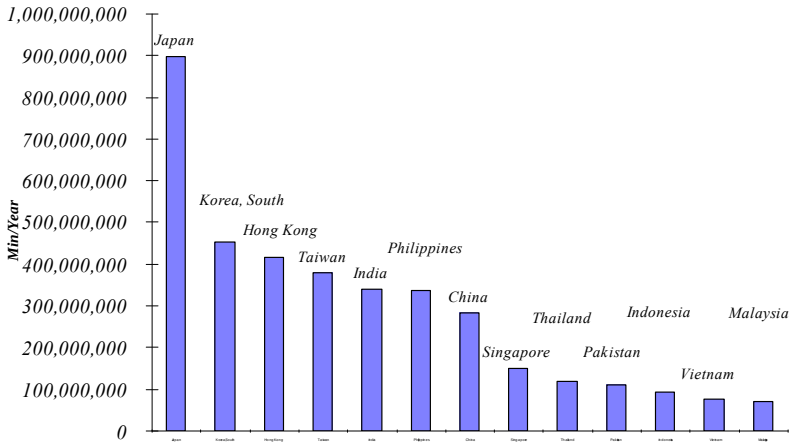
The following table depicts the growth in telephone sets over the past several years in the target countries.[133]



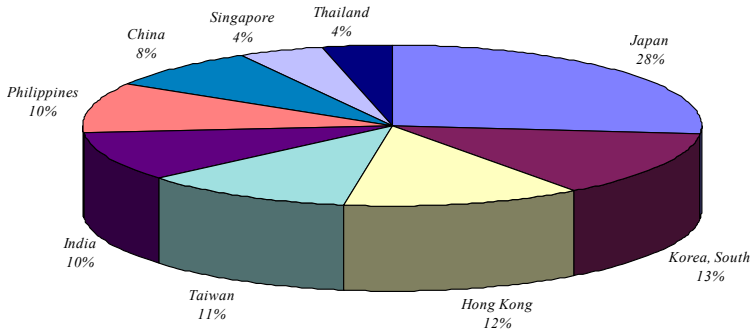
The following chart depicts the total traffic in minutes per year for each of these markets for 1995.[134] The interesting fact is that Indonesia and Malaysia have much lower traffic to and from the US than does the Philippines. The may be understood better in that most of their traffic in intra regional in nature. For example Singapore to Malaysia is twenty sixth in total traffic volume inter-country in the world. This is shown latter.

[133] See ITU Database.

[134] See FCC data base in the International Bureau.



This traffic usage is summarized below in terms of the overall share of this traffic flow by each of the key countries. What this shows is the currently Japan is still the dominant tariff producer and consumer. Korea, not surprisingly, is second. When we add Hong Kong to China, the combination now becomes number two and is probably the fastest growing in terms of both rate and volume.



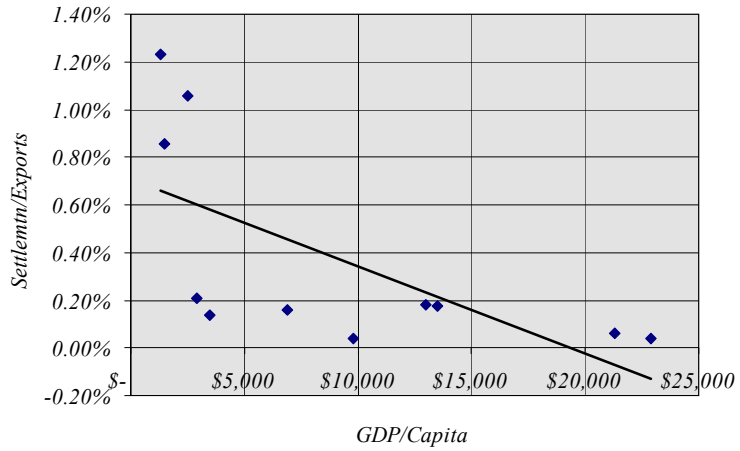
The following Table depicts the recent summary by Donaldson regarding the penetration of telephones as well as the growth rates in each of the target countries with the exception of Vietnam. The telephone numbers are in 000,000s and the most significant penetration expectations is in China, growing at the rate of several RBOCs per year.

Country	Telephones (000,000) 1990	1996	2000	2005	CAGR 1990-1996	CAGR 1996-2000
China	6.90	55.30	137.90	170.00	41.4%	25.7%
Hong Kong	2.50	3.40	4.30	3.90	5.2%	6.4%
India	5.10	17.00	28.30	45.70	18.3%	19.2%
Indonesia	1.10	4.20	10.20	22.10	25.0%	24.7%
Japan	54.50	61.10	68.50	73.00	1.9%	2.9%
Malaysia	1.60	3.90	7.00	8.20	15.9%	16.0%
Philippines	0.60	2.00	7.00	12.20	22.2%	36.8%
Singapore	1.10	1.50	1.90	2.10	5.4%	6.5%
South Korea	13.30	19.60	26.10	25.10	6.7%	7.4%
Taiwan	6.30	10.00	13.40	12.80	7.9%	7.6%
Thailand	1.30	4.40	9.20	18.10	22.4%	20.3%
Total	2,084.30	2,178.40	2,313.80	2,398.20	15.7%	15.8%

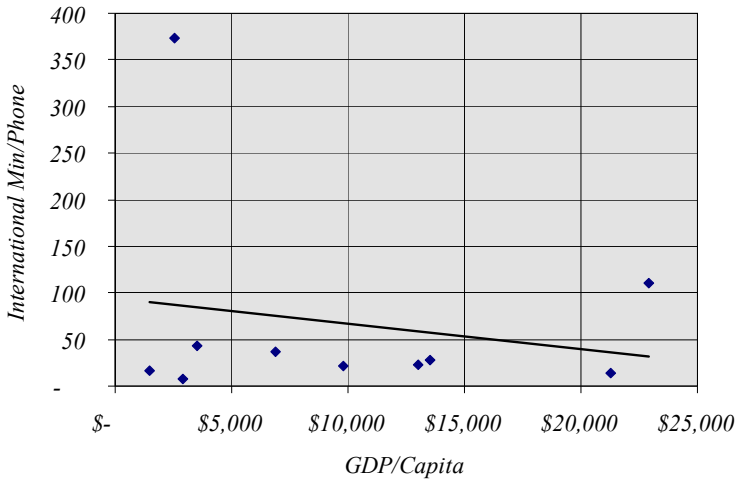
5.3.2 Settlement Demographics

Using the above data, we have related it to the settlement rates and to the overall settlement amounts on a per capita basis. It is through this analysis that we can develop a more detailed understanding of the economic impact of settlements and the distortions of this process on economic growth.

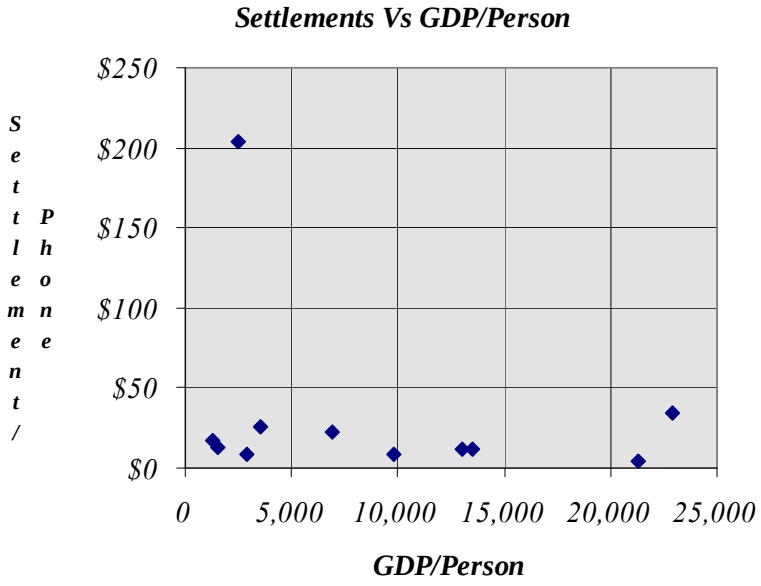
The following chart depicts the percent ratio of Settlements to Exports versus GDP per capita. What this clearly depicts is that there is a strong inverse relationship between settlements and GDP, albeit the causal relationship is still problematic. Namely such countries as Japan have strong economies and thus depict both low settlement rates as well as high GDP. However, such countries as the Philippines relies heavily upon the settlement as a means to "fund" telecommunications infrastructure.



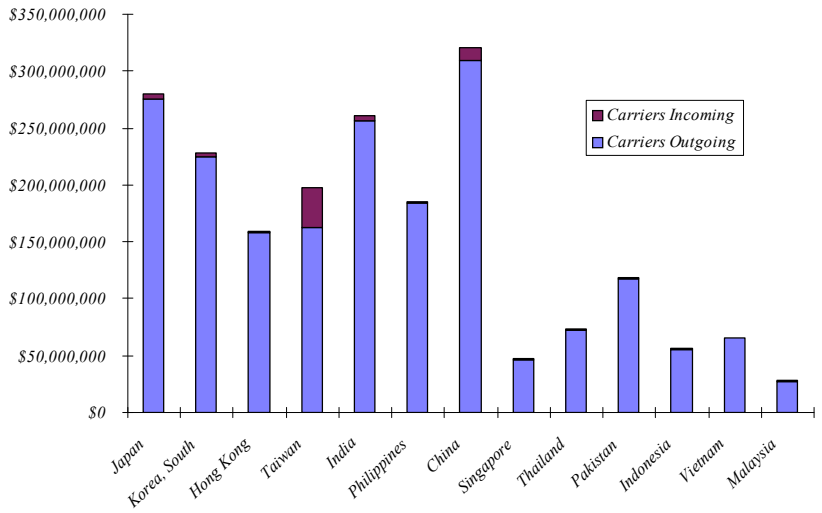
The following chart depicts the total number f minutes per telephone versus the GDP per capita. Again it shows a negative slope indicating that more people are using the service and that the economies that are stronger are generally more open to usage.



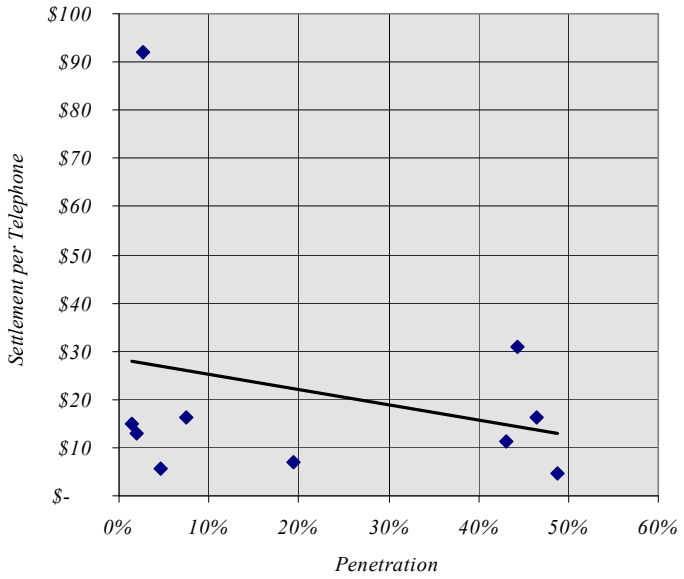
We have plotted Settlement per Telephone versus the GDP/Person. There seems to be no logical basis to the relationship. The exceptionally high value is the Philippines and the lowest is Japan. Even at high GDPs there is a high settlement fee. The argument has generally been that with lower infrastructure costs the costs of settlements were justifiably higher. This analysis seems to indicate that despite all reasonable variable being explored, there is a settlement rate agreed to solely on the basis of local custom.



The following Chart depicts the total flow of funds based solely on telecommunications settlement fees.[135] This chart shows the funds from settlement from and to the US in traffic flow.



The following Chart depicts the relationship between settlement rate and growth in GDP. There is an indication that and increase in settlement is a negative factor in growth of GDP. Namely that one may suspect that based upon this type of data that the more open the market is for trading the greater the possibility that the for growth.



[135] See the FCC data base in the International Bureau.

5.3.3 Traffic Flow

The following Table depicts the international traffic for the top fifty rated links or routes as relates solely to the Asian market. These traffic links represent a significant portion of the overall world trade flow under the services portion of the WTO regarding telecommunications services. [136]

Rank	***Route A***	***Route B***	***Outgoing****	***Incoming****	***Total****
1	United States	Canada	2,787.28	1,795.00	4,582.28
3	Hong Kong	China	821.00	707.00	1,528.00
6	United States	Japan	469.22	295.04	764.26
22	United States	Korea (Rep.)	283.45	123.99	407.44
26	Singapore	Malaysia	190.00	159.80	349.80
28	United States	Taiwan-China	225.99	93.54	319.52
30	United States	Hong Kong	213.86	100.55	314.41
31	United States	Philippines	267.34	41.77	309.11
41	Japan	Korea (Rep.)	150.28	106.50	256.78
44	United States	India	191.59	51.96	243.55
45	Japan	China	171.01	71.00	242.01
47	United States	China	169.54	64.00	233.54

The above chart depicts several key facts. Namely:

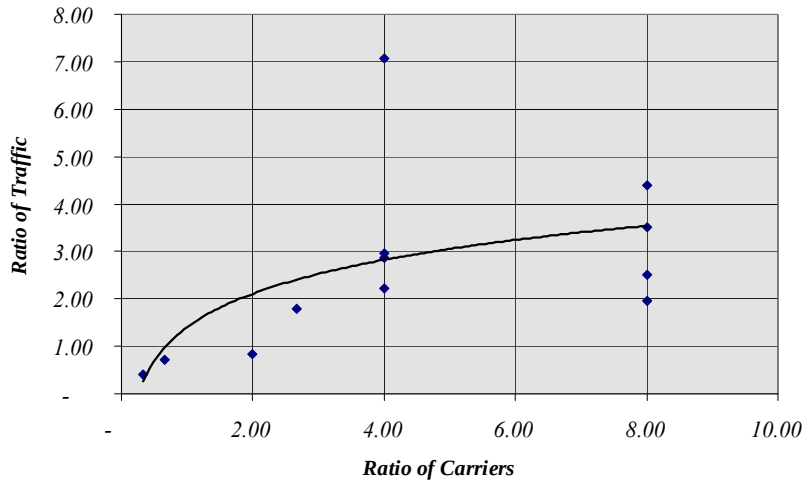
- *If one looks at the traffic differences, namely the imbalance due to traffic from one country to another, generally the country with the greater internal costs has the lower traffic flow outbound. Namely, there is a 6:1 difference between the US and the Philippines. On the other hand Singapore and Malaysia are almost equal.*

- *If one looks at the economic development imbalance, namely the GDP per capita difference, and attempt to use that as a discriminate, there appears to be little GDP factor and the pricing of telecommunications internally is still the dominant factor.*

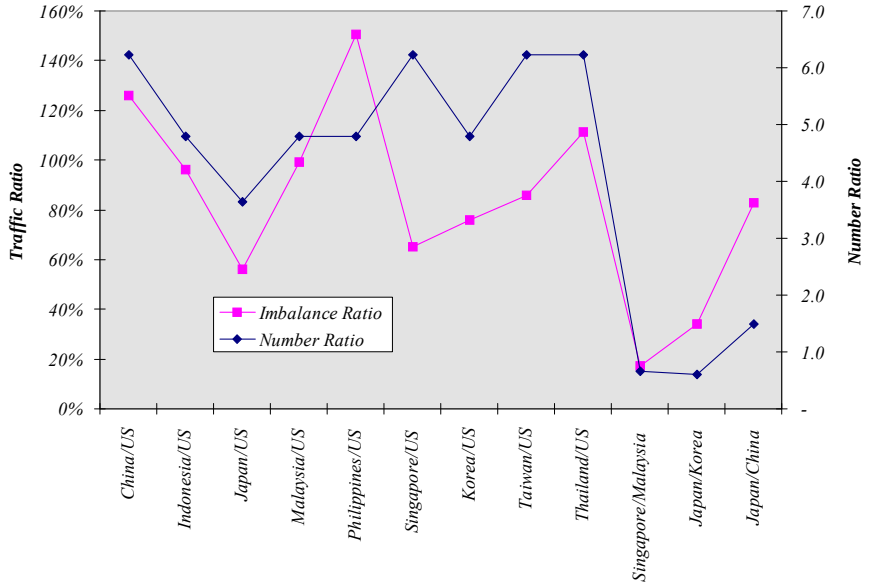
- *The dominant links based on total traffic are still to and from the United States even though there is significant intra region commerce. This is expected to change as liberalization of international termination rules are effected.*

In addition if we plot the ration of traffic from country A to country B versus the ratio of international carriers from country B to country A we obtain the following.

[136] Notes: Outgoing and incoming refer to the first economy shown.* Million of minutes of telecommunications traffic. Source: ITU/TeleGeography Direction of Traffic database.



This clearly shows that as the distortion in the number of carriers in each market changes that the traffic is imbalanced proportionately. This is the essence of the trade imbalance. The following chart however depicts the traffic ratio and the number ratio by country pair. The traffic ratio is the normalized traffic imbalance, namely traffic difference. The number ratio is the normalized number imbalance between carriers in each country. Perfectly balanced traffic is a 0% traffic ratio. The greater the traffic ration the greater the settlement. The conclusion is simple, the more competition in carriers the more balance in traffic. Thus zero settlements.



5.3.4 Dominant Players

The dominant players in each market are summarized in this section. For the most part they are the PTTs and also for the most part the relationship between the government and

the PTT is singular and thus is essentially an agent of the government policy. In many countries there is also the closely linked relationship between the manufacturers and the PTT. The following Table summarizes many of the key and dominant International, Long Distance and Local telecommunications players in the markets.[137]

Country	*International*	*Long Distance*	*Local*	*Ownership*
China	China Telecom		China Telecom Lian Tong Telecom Ji Tong	China Telecom (100% Government, MPT) Lian Tong (25% Ministry Electronic Industry, 25% Ministry Railways, 25% Ministry Energy, others) Ji Tong (100% Government, various)
Korea	Korea Telecom Dacom	Korea Telecom Dacom	Korea Telecom	Korea Telecom (80% Govt, pubic) Dacom (Lucky Goldstar, Samsung, KLB, others)
Indonesia	Indosat Satelindo	PT Telkom	PT Telkom	PT Telkom is 80% Govt and public. Indosat is 65% Govt Satelindo is PT Bimgraha, and 25% Deutsche Telekom
Malaysia	Telekom Malaysia Binariang	Telekom Malaysia Binariang Syrikat Telefon	Telekom Malaysia Binariang Syrikat Telefon	Telekom is 69% Govt. Binariang is 47% Burnhannudin/TF Stephens
Philippines	PLDT Digital Eastern Telecommunications	PLDT Digital Eastern Telecommunications	PLDT Digital Eastern Telecommunications	
Singapore	Singapore Telecom	Singapore Telecom	Singapore Telecom	65% Govt. and public
Taiwan	Chunghwa Telecom	Chunghwa Telecom	Chunghwa Telecom	100% Govt.
Thailand	Communications Authority of Thailand	Tele. Organization of Thailand	Telecom Asia Thai Tel. & Tel. Tele. Org of Thailand	Telecom Asia (NYNEX 18%, Charoen Pokphand) Others all 100% Govt. of Thailand

The following is a summary of some of the major status factors for the countries discussed above. He primary focus is on each countries international settlement efforts.

China China is a non-WTO country which has recently integrated what was Hong Kong into its overall structure. Recently the Chinese government carriers have commenced discussions with Hong Kong Telecom regarding the government telecommunications entity taking an equity position in the company. This seems t indicate that the Chinese government will be taking a stronger hand in the overall operations and control of that entity.

Indonesia Indonesia's telecommunications entity has been focusing on using its telecommunications network as a critical factor in developing and expending its economy.

Japan Japan seems to be the most open market. For example KDD and AT&T have recently entered into an agreement for a settlement rate that differs from the standard that has been used. Namely, the rate will be adjustable and will reflect the "market conditions". In contrast NTT, the local telephone company, has vacillated from a position of breaking itself apart to keeping itself together. Government officials seem to now believe that a strong and dominant NTT is a strategic play for Japan in negotiating a position as a player in the interconnection of other carriers in Asian markets. This will potentially give NTT a strong negotiation position in becoming a dominant player in these markets.

Malaysia

Philippines The Philippines is a developing nation and has the most strict controls on the ownership and openness of the telecommunications market. It is expected that this market, also being one of the slowest growth markets in economic terms, will also be the slowest in terms of telecommunications liberalization.

[137] See Donaldson, Lufking & Jenrette Report on Asia Communications, May 1, 1997.

Singapore	Singapore Telecom is a major player in Asian Telecommunications markets. It tightly controls all of the internal Singapore telecommunications services and generally maintains a tight telecom market place. There seems to be a liberalizing trend as exhibited by WorldCom's bid for a fixed line telecommunications license. Singapore Telecom's monopoly ends on March 31, 1997.
South Korea	Korean Telecom has recently lost its local monopoly position. The Ministry of Information and Communications will award one new national license for basic telephone service. The potential winner may be a group led by Dacom, Hyundai, Korea Electric Power, Samsung, and other locals. Companies such as Sonkyong have also indicated an interest in getting into international telecommunications. Dacom has recently ventured into the Internet voice arena with agreements with Alphanet and VocalTec.
Taiwan	Taiwan is still a tightly controlled monopolistic telephone company controlled by the government.
Thailand	Thailand has a significant infrastructure and seems to have a rapidly growing set of interconnections driven by its growing industry. However there also seems to be a policy vacuum that has slowed rapid growth. Several years ago NYNEX along with a consortium of local companies established a new local telephone entity and have even set up a R&D facility in Bangkok.
Vietnam	

5.4 WTO Status

The foreign PTTs, through their countries, generally have entered into the WTO agreements that generally place voice in the settlement arena and data in the non-settlement elements. The World Trade Organization (WTO) is the principal international body concerned with solving trade problems between countries and with negotiating trade-liberalizing agreements. WTO replaces of General Agreement on Tariffs and Trade (GATT) and is the embodiment of the results of the 1986-1994 Uruguay Round of trade negotiations conducted under the GATT. The Director General of the WTO is Renato Ruggiero of Italy.

5.4.1 WTO Overview and Status

WTO has a cooperative relationship with the United Nations but is not a UN specialized agency. It was established on January 1, 1995 as a result of the implementation of the Uruguay Round results. The WTO encompasses previous GATT legal instruments as they existed when the Uruguay Round was completed (known as GATT 1994), but also extends new disciplines to economic and trade sectors not covered in the past. Whereas the GATT's scope was limited to trade in goods, the WTO also covers trade in services, including such sectors as banking, insurance, transport, tourism, and telecommunications sectors as well as the provision of labor. In addition, the WTO covers all aspects of trade-related intellectual property rights (copyrights, patents, trademarks, etc.). Furthermore, while the GATT had a relatively ambiguous status as a multilateral agreement without any institutional provisions, the WTO is an international organization with a stature commensurate with that of the World Bank or International Monetary Fund (IMF).

WTO's precursor, the GATT, was established on a provisional basis after World War II. When the agreement took effect in 1948, it was expected to be the forerunner of the International Trade Organization (ITO) which would have been a UN specialized agency. But plans for the ITO were abandoned when it failed to get U.S. congressional approval,

and the GATT remained the only international instrument laying down rules accepted by nations carrying out most of the world's trade.

For 47 years the GATT provided the main international framework in which countries could discuss trade problems and, if need be, use the General Agreement's dispute-settlement provisions to solve trade disputes. The basic principles and rules of the WTO are much the same as those for the GATT, but with a broader scope, a more solid legal and institutional basis, and enhanced decision-making provisions which preserve individual members' national sovereignty while precluding the damaging single-country blockages which plagued GATT's dispute settlement system.

Like the GATT, WTO embodies many reciprocal rights and obligations for trading countries, and its core principle is the Most-Favored-Nation (MFN) clause. Under this, trade must be conducted on the basis of nondiscrimination -- all members are bound to accord each other treatment in tariffs and trade as favorable as they give to any other member-country.

A second principle common to both WTO and GATT is that, to the maximum extent possible, trade protection should be given to domestic industries only through the customs tariff and not through other measures (i.e. non-tariff measures such as quantitative restrictions, arbitrary technical standards, and health regulations), so that the extent of protection is clear and competition is still possible.

One of the most important accomplishments of the Uruguay Round was the establishment, for the first time, of a set of rules governing trade in services. GATT economists estimated in 1990 that services -- such as banking, insurance, tourism, construction, or telecommunications -- accounted for as much as 20 percent of total goods-and-services world trade. The GATS agreement establishes a multilateral framework for trade in services and provides a specific legal basis for future negotiations aimed at eliminating barriers that discriminate against foreign services providers and deny them market access. The principal elements of the GATS framework agreement include the most favored nation (MFN) treatment, national treatment (each government shall treat foreign services and service suppliers no less favorably than its own), market access, and free flow of payments and transfers. The rules are augmented by annexes addressing the special situations of individual service sectors (financial services, telecommunications, air transport, and movement of labor). The GATS' strong provision on national treatment specifically requires GATS countries to ensure that domestic laws and regulations do not tilt competitive conditions against foreign firms. Complementing the GATS rules are binding commitments to market access and national treatment in service sectors that countries schedule as a result of bilateral negotiations. These commitments became effective upon entry into force of the WTO.

5.4.2 WTO Agreement Details

The following Tables summarize the WTO agreements that exist for countries in question. The Tables are for each country and correspondingly detail the services and time under which opening of the markets are to be expected.

Indonesia	Sector or Sub-sector	Limitations on Market Access
	Local service: Public switched telephone service Circuit switched public data network services	Local services are provided exclusively by PT Telkom and 5 regional joint operation scheme operators. Foreign equity participation is limited to 35 per cent.
	Long distance: Public switched telephone service Circuit switched public data network services	Long distance services are provided by PT Telkom exclusively. Foreign equity participation is limited to 35 per cent.
	International: Public switched telephone service Circuit switched public data network services	Only through networks of PT Indosat and PT Satelindo. Callback is not permitted. International services are provided exclusively by PT Indosat and PT Satelindo (duopoly). Foreign equity participation is limited to 35 per cent.
	Internet Access Services	Until 2005, only through networks of PT Indosat and PT Satelindo for international access. More than 30 licences have been issued Foreign equity participation is limited to 35 per cent.

Malaysia	Sector or Sub-sector	Limitations on Market Access
	Basic Telecommunications[138] Basic local, inter-exchange and international services; supplied over public telecommunications transport networks using any network technology; facilities-based; in each of the market segment. [139] Voice Service (wired or wireless) Packet-switched data transmission services, including frame-relay services Circuit-switched data transmission services Private leased circuit service International switching and other international gateway facilities	Only through acquisition of shares of existing licensed public telecommunications operators: Foreign shareholding of up to 30 per cent in these service providers is allowed. Unbound except as indicated in horizontal commitments.

[138] Excluding broadcasting services as defined under Broadcasting Act 1988.

[139] Pro-competition regulatory principle in respect of interconnection arrangement and competition (Refer to Annex I).

India	Sector or Sub-sector	Limitations on Market Access
	Telecommunication Services[140],[141] Voice telephone service (CPC 7521**) Limited to local/long distance, for public use over a public telecommunication transport network. Wire based (i.e. for fixed network of subscribers).[142]	The service will be permitted to be provided only after the operator gets a licence from the Designated Authority who shall determine the need, if any, for issuance of new licences. The terms and conditions of the licence will be as laid down by the Designated Authority or Government or the prevailing laws in the country. There will be one operator other than Department of Telecommunications (DOT)/Mahanagar Telephone Nigam Ltd. (MTNL) in each service area for a period of 10 years from the grant of licence after which the position will be reviewed. The private operator should be a company registered in India in which total foreign equity must not exceed 25%. Service operator will be permitted to provide long distance service within the licensed service area only. Also, the subject of opening up of international service to competition will be reviewed in the year 2004. Resale of voice telephone services will not be permitted. However, licensees can grant franchises on commission basis for providing public call offices (PCOs) service. The detailed terms and conditions for providing the service will be as per licence conditions

Philippines	Sector or Sub-sector	Limitations on Market Access
	The following services (a-g) are offered only on a facilities basis, for public use, using either wired or wireless technology except cable television (CATV) and satellite. Voice telephone services Local services Toll services Domestic International Packet-switched data transmission services and Circuit-switched data transmission services	Entry is subject to the following requirements and conditions: Franchise from Congress of the Philippines Certificate of Public Convenience and Necessity (CPCN) from the National Telecommunications Commission Foreign equity is permitted up to 40% Resale of private leased lines is not allowed Call back, dial back and other similar schemes which result in the same operation are not authorized. Subject to the availability and efficient utilization of radio frequencies.

[140] Excluding broadcasting services and measures affecting such services. Broadcasting is defined as a form of the uni-directional telecommunication intended for large number of users having appropriate receiving facilities and carried out by means of radio or cable network. This may include sound transmission, television transmission or other types of transmission.

[141] The definition and principles on the regulatory framework for the basic telecommunication services subscribed to by India are contained in the annex titled "Explanatory Section on Additional Commitments by India".

[142] The subject of opening up of national long-distance service beyond service area to competition will be reviewed in the year 1999.

Japan	Sector or subsector	Limitations on market access
	Telecommunications services[143] The following basic telecommunications services supplied by Type I or Type II Telecommunications Business: Voice telephone services Packet-switched data transmission services Circuit-switched data transmission services Type I Telecommunications Business is the business which provides telecommunications services by establishing telecommunications circuit facilities. Type II Telecommunications Business is any telecommunications business other than Type I Telecommunications Business. Telecommunications circuit facilities are transmission line facilities connecting transmitting points with receiving points, switching facilities installed as inseparable units therefrom, and other facilities accessory to such facilities.	Foreign capital participation, direct and/or indirect, in NTT and KDD must be less than one-fifth.

[143] Japan undertakes the obligations contained in the reference section attached hereto.

Korea	Sector or Sub-sector	Limitations on Market Access
	C. Telecommunications services Facilities-based: Voice telephone services Packet-switched data transmission services Circuit-switched data transmission services Private leased circuit services	None except that the provision of all services is subject to commercial arrangements with licensed Korean service suppliers None except that: (i) Each service supplier must be a licensed Korean juridical person. (ii) Until 31 December 1998, a licence, including radio station licence, may not be granted to a juridical person whose largest shareholder is: (a) Foreign government, (b) Foreign person, or (c) Juridical person 50 per cent (15 per cent, if the largest shareholder of the juridical person is a foreign government or a foreign person) or more of whose voting shares are owned by foreign governments or foreign persons. (iii) Until 31 December 2000, a license, including radio station licence, may be granted to a juridical person in whom no more than 33% of the aggregate voting shares are owned by entities identified in (a) through (c). From 1 January 2001, a license, including radio station licence, may be granted to a juridical person in whom no more than 49 % of the aggregate voting shares are owned by entities identified in (a) through (c). (iv) A licence, including radio station licence, may not be granted to a juridical person more than 33 per cent (10 per cent, in the case of wireline-based voice telephone services) of whose voting share is owned by a person[144] (v) The largest shareholder of KT must be Korean government or a Korean person. While KT's share owned by a person[145] must be no more than 3 per cent, the aggregate foreign shareholding in KT must be no more than 20 per cent until 31 December 2000, and no more than 33 per cent from 1 January 2001. (4) Unbound except as indicated in horizontal commitments
	Resale-based: Voice telephone services Packet-switched data transmission services Circuit-switched data transmission services Private leased circuit services	None except that: Provision of all services is subject to commercial arrangements with licensed Korean service suppliers. Until 31 December 2000 resale of voice telephone services interconnected to the public telecommunications network can only be supplied by companies established in Korea. None except that: Each service supplier must be a licensed Korean juridical person. Foreign shareholding in suppliers of resale voice telephone services, interconnected to the public telecommunications network, will be permitted only after 1 January 1999. From 1 January 1999, foreign shareholding will be permitted up to 49 per cent. As of 1 January 2001, 100 percent foreign shareholding will be permitted.

5.4.3 Summary of Agreements

The following chart summarizes the dates for the market openings for each of the WTO countries and summarizes it for the non-WTO participants such as China. It will be interesting to see how China deals with the Hong Kong agreements and if they will be sustained and used as a basis for China's participation in a WTO agreement.

[144] The definition of "a person" is in accordance with the relevant provision of the Presidential Decree of the Korea's Telecommunications Business Law.

[145] The definition of "a person" is in accordance with the relevant provision of the Presidential Decree of the Korea's Telecommunications Business Law.

Country	*Start Date*
Countries In Agreement	
Australia	January 1, 1998
Hong Kong	January 1, 1998
Japan	January 1, 1998
Korea	January 1, 1998
Malaysia	January 1, 1998
New Zealand	January 1, 1998
Countries Beginning after Official Start Date	
Singapore	January 1, 2000
Brunei	January 1, 2004
Indonesia	January 1, 2005
Thailand	January 1, 2006
Countries Excluded from the Agreement	
China	NA
India	NA
Pakistan	NA
Vietnam	NA

5.5 US Policy Implications

The FCC in its Docket IB Docket No. 96-261, adopted December 19, 1997, stated the major policy issue in a clear and precise fashion. Specifically it stated,

> *"U.S. consumers pay on average 16¢ a minute for a domestic long distance call, but they pay 99¢ a minute for an international call. Yet, the difference in cost between providing domestic long distance and international service is no more than a few cents. As a result of recent technological advances, the underlying costs of providing telephony are becoming virtually distance insensitive. For example, because of new fiber optic technology, the cost of undersea cables on a per circuit basis is only one eighth of what it was seven years ago. We anticipate that increased competition in international satellite services will bring similar potential benefits to countries that are not now served by undersea cables and comparable land facilities. Differences in underlying costs therefore do not explain why international services are so much more expensive than domestic long distance services. The difference is attributable in part to limited competition in the IMTS market and in part to the inflated settlement rates paid by U.S. carriers to terminate traffic in foreign markets."*

We address two policy areas in some detail; first is the issue of what should the accounting rate be and how should it relate to a cost based system, and second, what is the policy future of Internet like telecommunications which is currently free from any settlement process.

5.5.1 Cost Based Settlement

The FCC has argued in its recent NPRM on Settlements that costs should be the key factor in establishing settlement rates. The FCC proposes that the costs be based upon three elements; international transmission, local switching, and national extension.[146] The Commission then predicates all of its costs analyses on these numbers. While the author agrees with this approach for the current means and methods for switched based voice telecommunications, the author argues that such an approach fails when applied to alternative telecommunications approaches.

The specific model as proposed by the Commission for costing contained the elements mentioned above. The Commission applied a specific methodology to those elements to come up with certain costs. [147] The three elements are: international transmission, local switching, and national extension. The author argues that rather than using tariffs as the sole arbiter of setting settlement rates that there is also a method for setting those rates on a costs based basis that reflects the actual costs incurred by the in-country provider. This additional approach shows that there can be an argument made for costs based upon forward looking technology as well as obtaining returns on past investments, if such be the case.

5.5.1.1 International Cost Based Elements

The cost elements for each relate to the following elements:

Capital Equipment Costs: It can be argued that the capital plant and equipment is generally the same for any country exclusive of tariffs and other tax like costs that the country must pay on the procurement of the equipment. The country may also have a costs of capital, so then when the capital and plant and equipment is equated to an annualized leased rate the lease rate must reflect that changing costs of capital. For example, in Poland, the respondent sees a 25% excise tariff on any imported telecommunications equipment that increase the capital costs base by that amount. In addition there is a risk premiums on capital financing of 2% to 2.2% that raises the annualized effective lease rates. The following Table presents a typical example using Poland as a case. If we assume an effective life, a tariff or excise tax rate, an interest rate

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[146] See ¶ 35 of IB Docket No 96-261, FCC 96-484, December 19, 1996.

[147] See ¶ 37, wherein the components are defines as: *" **International facility component:** The international facility component consists of international transmission facilities, both cable and satellite, including the link to international switching facilities. This component includes only the half-circuit on the terminating end because originating carriers have traditionally been responsible for the half circuit on the originating end of a call. High capacity circuits, normally 1.544 Mbps or 2.048 Mbps circuits, are used for IMTS and most telephone administrations offer these circuits to customers on a dedicated basis. The cost element for this component, therefore, is based on foreign carriers' private line rates for dedicated circuits. Multiple 64 Kbps circuits are derived from the high capacity channels and multiplexed into voice grade circuits based on standard U.S. operating practices. This information, along with average monthly traffic volume per circuit, is used to convert the private line rates to a charge per minute for each country. **International gateway component**: The international gateway component consists of international switching centers and associated transmission and signaling equipment. Foreign carriers do not generally offer a separate tariff rate for the international gateway component, so the study relies on information published by the ITU. The cost of this component varies with the level of digital facilities. **National extension component:** The national extension component consists of national exchanges, national transmission, and the local loop facilities used to distribute international service within a country. Foreign carriers' domestic rates and the distribution of U.S. billed service within a country[147] are used to compute an average charge per minute for cost of this component."*

and a risk market premium, then for every dollar the costs of switching per month is as shown below.

Effective Life (Years)	*Tariff Rate*	*Interest Rate*	*Market Premium*	*Monthly Fee*
5	*25%*	*8.00%*	*1.50%*	*$0.0263*
5	*25%*	*10.00%*	*1.50%*	*$0.0275*
5	*25%*	*12.00%*	*1.50%*	*$0.0288*
5	*25%*	*14.00%*	*1.50%*	*$0.0301*
10	*25%*	*8.00%*	*1.50%*	*$0.0162*
10	*25%*	*10.00%*	*1.50%*	*$0.0176*
10	*25%*	*12.00%*	*1.50%*	*$0.0190*
10	*25%*	*14.00%*	*1.50%*	*$0.0206*
15	*25%*	*8.00%*	*1.50%*	*$0.0131*
15	*25%*	*10.00%*	*1.50%*	*$0.0146*
15	*25%*	*12.00%*	*1.50%*	*$0.0162*
15	*25%*	*14.00%*	*1.50%*	*$0.0179*

Now let us assume that each trunk associated with switching is approximately $200.00 US. This is a reasonable costs for switching in large numbers. Then we further assume a usage of 100 minute per month per use or equivalently a 1% Erlang load, a trunk can then support 100 subscribers. Thus we find that the capital per subscriber per month, and corresponding per minute is:

Per Month Per Subscriber: Assume a ten year, 8% rate, and we have $2.60 per trunk per month or $0.0260 per subscriber per month.

Per Minute Per Subscriber: On a per minute basis this is $0.00026 per minute for switching.

The general conclusion is that switching is de minimis as a cost element.

Transport Costs: The transport costs are the costs for the fiber or other telecommunications facilities. They are generally distance sensitive but with fiber being more prevalent this distance sensitivity is no longer a significant factor. We assume a similar capital costs for transport but we double it, thus it is $0.00052 per minute as with the above argument.

Direct Operations Costs: These costs include the provisioning of network management, customer services, billing, provisioning, inventory management, and repair and dispatching. These costs are generally personnel driven and thus are produced at local market rates. Frequently these costs dominate the overall costs element of the system. In US costs the total cost for these elements is between $4.00 and $8.00 per month per subscriber. This is allocated across all of the subscribers usage, local, long distance and international. If we assume that a typical international call represents 10% of the total usage, a high number, we have an average of $0.60 per subscriber per month. This is $0.006 per minute.

Overhead Operations Costs: Generally this represents a 40% to 70% overhead. We shall use 50% based upon the most likely costs as an overhead on the operations costs. This then is $0.003 per minute.

Sales and Marketing Costs: These should relate solely to local in-country operations.

The summary of cost basis is as follows:

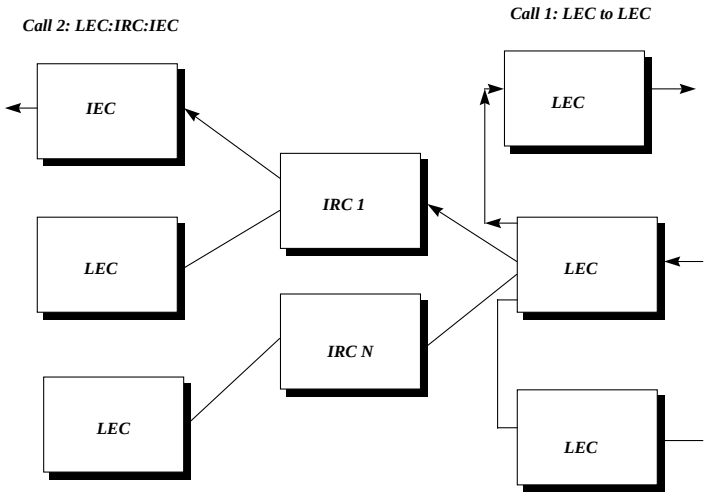
Cost Element	*Unit Cost*	*Number Units*	*Total Costs*
Capital Plant	*$0.00026*	*3*	*$0.00078*
Transport	*$0.00052*	*2*	*$0.00104*
Operations Costs	*$0.00600*	*3*	*$0.01800*
Operations Overhead	*$0.00030*	*3*	*$0.00090*
Sales Costs	*$0.00000*	*1*	*$0.00000*
Total			*$0.02072*

In the above we have assumed that there are multiple Units of each element involved in any transmission. This is consistent with the model shown previously. If we further assume that the system is at best loaded at only 25% then the change to above model occur only in the Capital Plant and transport elements. We then quintuple those numbers, increasing the costs about $0.0050 per minute, or at most 25 % increase. This is because the dominant costs are operations. We have kept the operations costs at US rates, and we know if we factor in local economy costs the rates drop a factor of four in most markets, thus reducing the costs to well less than $0.0100 per minute. It should be noted that these costs are dramatically lower than AT&T costs. These costs do not include the sales costs, a significant factor, nor do they include any R&D, product development, marketing, legal or other similar costs. These elements may easily, along with profit, raise the rate to a number comparable to AT&T.

The point we seek to make is that a “bottoms up” analysis of costing is essential by a market by market basis. The Commission has taken the approach of doing a “top down” approach using the “answer” of the tariffs. We argue that a “bottom up” approach using the actual costs is the better approach.

5.5.2 Principle of Cost Based Pricing

We conclude this with the Principle of Cost based Pricing. The principle can be explained via the following example. Consider the interconnection shown in the following Figure. Here we have a CMRS, an I-LEC, a C-LEC, several IRCs, and their interconnection. The CMRS will be the focal point. The CMRS connects to the IECs and to the I-LEC and C-LEC as well as to other similar players on the other side of the IECs.



Consider two calls. Call 1 goes from the CMRS to the local I-LEC. Call 2 goes from the CMRS, over an IEC to a customer at a distant I-LEC. Both calls are originated by a CMRS customer and terminate on an I-LEC customer.

Today, any IEC call must pay an interconnection access fee to the I-LEC to terminate on their network. As we indicated this is a wealth transfer policy and does not reflect any true cost. The CMRS before the Act paid the I-LEC a termination or origination fee and there was no compensation from the I-LEC to the CMRS. As we have demonstrated that is no longer the case.

The Principle of Cost Based Pricing states the following: The consumer should pay for each link separately and they should pay only for those links for which they are customers of that link provider. The payment the customer makes should reflect a price that is in turn based on the costs of that link.[148]

The basis for the Principle is the same basis for the Baumol Willig theorem, namely maximizing consumer welfare. The argument is based upon the theory of Ramsey pricing. The classic approach taken by Baumol and Willig is as follows:

$$maximize^{\{P1, \ldots, Pm\}} [\, CS + PS \,]; \text{ subject to } PS = F$$

[148]The issue here is a quid pro quo issue of parity in providing interconnection in a commodicizable market. For example, if two or more LEC or LEC like carriers enter a market, then there should be not interconnection fee and each carrier should price their services at the price based upon their costs and have no third party intervenor establish a de facto subsidization. If however, one carrier provides a service such ad aggregation to more efficiently interconnect, then this added non pari passu facility should be compensated at an equal, comparable, and costs based level, shared amongst all players. The Baumol-Willig approach can apply here if we merely eliminate the artifact of ensuring a profit to the monopolist as Baumol has consistently done. By maximizing consumer welfare at the expense of the suppliers, namely by creating a competitive market, one arrives at the principle of cost based pricing.

where CS is the consumer welfare and PS is the production surplus or the profit of the monopolist provider.[149] If however, we eliminate the monopolist totally, that is maximize it on the basis of consumer welfare alone, and if we assume a fully displaceable and commodicizable service, and if we further assume the change in technology that eliminate scale in toto, then the resultant position is the Principle of Cost Based Pricing. Namely, each separate provider sells their service on the basis on their own costs and the interconnection is free and reflects not costs to the consumer.

5.5.3 Interconnection Agreements

The Commission has raised concerns about individual settlement agreements and the possibility of various large international carriers taking undue advantage of arbitrage opportunities within their own field of operations.[150] The author recognizes that the opportunities not only exists but lead to clear anticompetitive practices. The smaller nondominant carrier has no recourse to this procedure and no remedy under international law if the settlement agreement are allowed to be set on a company by company basis. The author argues that the rates must be set as if they were standard tariffs, and in fact similar to the benchmark rates for interconnect suggested by the Common Carrier Bureau in the Section 251 proceedings. The author argues that the Commission should itself or through an appropriate government agency establish and set those rates. In the case of interconnection, the Commission had established a process and procedure that has a default to the local PUCs. The respondent believe that this process is a common process. Without recourse or remedy however, the FCC should, if they are the entity of choice, set standard rate based upon the TSLIRC or similar pricing models.

5.5.4 Internet Telecommunications

Data is generally free from settlements. This is the accepted result of the WTO negotiations and has been opined on by various entities. The FCC states its position in the following in the following:

> *"There are other technological developments that accentuate the market distortions caused by above-cost settlement rates. For example, the routing of bilateral traffic through third countries has become increasingly prevalent as a means to arbitrage settlement rate differences. Such re-routing can be helpful in undercutting the settlement rate system, but it can also lead to inefficient traffic routing patterns that are not aligned with underlying economic network costs. Use of the Internet also has emerged as an alternative to higher priced IMTS. Though internet traffic and switched voice traffic are carried over virtually identical facilities, the price for internet service is far cheaper because switched traffic is subject to international settlement rates, while internet traffic is exchanged outside of the traditional accounting rate system."*[151]

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[149] See Brown and Sibley, The Theory of Utility Pricing, Cambridge University Press, 1986, p. 39.

[150] See ¶ 75, ID-96-261.

[151] *See: Federal Communications Commission, FCC 96-484, Washington, D.C. 20554 In the Matter of International Settlement Rates , IB Docket No. 96-261, Adopted: December 19, 1996, ¶ 17.*

The Organization for economic Co-Operation and Development, part of the European Common Union, ECU, in its recent report further opines on the introduction of Internet type telephony and its advantages in its ability to have zero settlements. The OECD Study states the following:[152]

> *"In the previous section, the call-back services which were examined provided service within the framework of the accounting rate and collection charge system. In this section, services which by-pass the international telecommunications charging system are examined. These services include international simple resale, which is already being offered in some countries. Other services, such as telephony using packet switched networks, including the Internet, would also be included in this group of services.*
>
> *An overview of the different charging and settlement for a number of technologies is shown in Table 9. The services where there is no settlement are to a large extent used mostly by large business customers, but they are becoming increasingly available to the smaller customers given developments in technology, and regulation.*
>
> *In general, the pricing structure for telecommunication services other than telephony does not depend on time and distance, and does not normally incur a settlement between the operators 12 . Telephone collection charges have also shown a trend toward being less time and distance related reflecting the digitalization of networks. There is, therefore, precedence for using systems other than accounting rates. Despite different charging frameworks many of these other services based on technologies other than the PSTN are profitable.*

Table 9. Collection Charges and Settlement for Different Services[153]

Service	***Technology***	***Collection Charge Type***	***Settlement***
		Subscriber Line/ Trunk Line	
Telephone	*Switched Line*	*Time/Flat/ Time/Distance*	*Accounting rate system*
Packet	*Packet*	*Time/Volume/ Volume*	*Settlement by traffic volume*
X 400	*Store-and-Fwd*	*- /Volume*	*No settlement*
Leased line	*Leased Line*	*Flat*	*Half split (No settlement)*
Frame Relay	*Frame Relay, ATM*	*Flat*	*Half split (No settlement)*
Internet	*Packet / Others*	*PSTN, ISDN, L. lines, etc. / Flat*	*No settlement*

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[152] Organization for Economic Co-Operation and Development, Paris, 1997, "New Technologies and Their Impact on the Accounting Rate System", p. 35.

[153] *FR stands for Frame Relay Service. Source: OECD*

The above table depicts the WTO agreements as reflected in the Uruguay round of GATT talks. Namely that Internet, namely TCP/IP, is free from settlements and is the only one free on a full circuit basis.

Tarjanee, head of the ITU has also stated:[154]

> *"If market distortion were the only fault with the accounting rate system, it could probably survive. After all, economists usually agree on only one thing, namely that no market is ever perfect. The difficulty is that there are a growing number of other pressures for reform.* ***An increasing share of traffic bypasses the accounting rate system completely because it is carried by just one operator instead of two (end-to-end service), because it travels over private networks, or because it travels over the Internet.*** *Increasingly, owners of infrastructure wish to provide service directly to end-users instead of relying on correspondent partners. Furthermore, at the local level, callback operators and resellers exploit the fact that tariffs are not cost-based by arbitraging different prices between countries."*

The OECD report goes on to state:[155]

> *"Internet Telephony*
>
> *The ability to provide voice services based on packet switched network technology is increasingly providing a competitive threat to traditional public switched telecommunication networks. Although the use of this technology for voice is only emerging, there is considerable interest in its potential. This interest is being fuelled by the fact that time-based usage charges are not traditionally used for packet switched networks. The Internet is providing the underlying infrastructure to begin experiments with providing international voice communications over networks based on packet switched network technology. Although initially voice communications tended to be computer to computer communications, developments are now emphasizing computer to telephone communications. The advantage of packet switched networks also includes, as well, the ability to handle integrated voice, data, and video services which many customers are increasingly requiring for day-to-day business. The fact that there are no international usage charges and only the price of local calls is paid is evidently providing an impetus to Internet telephony. Although arguments have been made that existing Internet capacity will not be able to handle an explosion of voice communication*

[154] Rome, 25 March 1996, How will the accounting rate system need to be modified in a liberalised market? Liberalisation & Privatisation of the European Telecommunications Sector Preparing for 1998 & Beyond, Dr Pekka Tarjanne, Secretary-General, International Telecommunication Union (ITU),An International Conference arranged by IBC UK Conferences Ltd.

[155] OECD p. 39-40.

on these networks, it is not evident that the required capacity will not be forthcoming if the demand for services is there.

The development of Internet telephony (see Information Infrastructure and Pricing: The Internet, OECD/GD(96)73 for a comprehensive overview of pricing on the Internet) threatens the viability of the existing accounting rate system. The fact that telecommunication operators, and many governments, seem to continue to support high collection charges (and accounting rates) is in fact accelerating the development of new technologies which help by-pass the existing payments system. Long-term strategy by operators, if they wish to maintain their viability, would argue for lower, more competitive prices which would serve as well to slow down the development and diffusion of alternate calling procedures.

Governments, given the increasing liberalisation of data networks and in PSTN markets, will have difficulty in regulating the entry of many new services which use packet switched network technology, including voice communications. First, there is the problem in differentiating one type of digital message from another. Second, there is the difficulty in disrupting communications with any one 40 relation in that re-routing of traffic is a simple procedure. Third, there is the policy emphasis that many governments have placed on the diffusion of broadband infrastructures to create the information infrastructures of the future. To have an economic impact, usage prices on these infrastructures need to be low otherwise new services and on-line applications will be slow to develop. ***Many of these new services will gravitate to packet switched networks because of price advantages****."*

Furthermore Tarjanee further states:

"But such dependence on settlement payments is an unwise strategy. Experience shows that traffic stimulation and creating an attractive investment climate are more effective strategies for telecommunications development. By keeping charges high, developing country PTOs create incentives for callback and other forms of bypass which erode their competitive position. Furthermore, a new threat is emerging in the form of Internet telephony. The Internet famously does not employ the usage-based tarrifing schemes on which the financial structures of PTOs are based, but instead employs flat-rate tariffs. Furthermore, the Internet has developed without any revenue-sharing mechanism between operators. In so far as there are payments from end-users, they are retained by service providers on a "sender keeps all" basis.

Internet telephony is based on packet switched rather than circuit switched networks. It would probably cost more to trace and bill the precise route taken by each data packet across the network than it would

to send the call in the first place. The current state of the art in Internet telephony is quite primitive, attractive mainly to hobbyists and enthusiasts. But one can envisage a rapid evolution over the coming months. Already callback operators are offering to terminate calls originating from computers. Soon, those callback operators and resellers will use the Internet itself as a backbone for their calls.

If we lived in a rational world, few consumers would choose to have their conversations garbled by computers. But the prevailing price structures in international telephony are not rational. The ultimate commodity being sold is bandwidth. Voice traffic uses tiny amounts of bandwidth but is charged a high price. Data traffic uses huge amounts of bandwidth but is charged a low price. Consequently, "cross-over" technologies, such as voice over data networks, exploit these economically irrational tariff structures."

Thus under the WTO and under the generally agreed to terms of the WTO agreements on services, especially in telecommunications, data is free from both transit fees and settlement fees, and TCP/IP is defined as a form of data and is thus free from such fees. If a country who is a signatory to the Uruguay rounds decides to unilaterally violate that terms then it subjects itself to the severest penalties under the WTO.

5.6 Conclusions

There will continue to be significant and dominant growth in these Asian markets. There are several major concerns for US companies ranging from market entry for products as well as for services. The WTO agreements open these markets for services in the next several years. The FCC has commenced its efforts in attempting to address the settlement and accounting rate issue. The growth in international telecommunications traffic and the pursuant growth in the internal economies will be strongly reliant upon free and open trade. An element of that trade is telecommunications. The telecommunications market is internal and external. We have argued herein that the internal portion is generally under the control of the local country and as best we might try we can at best influence that in the normal course of trade and tariff discussions. The traffic in international voice, data, and other service however is a new development within WTO, being part of GATS, and thus demands closer attention. The trade barriers of telecommunications must be realigned to meet the changes in these markets.

- *Does the "Trade in Services" resulting from the settlement rates have a significant positive influence on the growth of telecommunications services?*

The answer seems to be that the more open the market the more growth. Settlement rates open the markets and the assumption that high settlement distortions are used for infrastructure growth are wrong. In fact infrastructure growth is exogenously fueled and open telecommunications markets are the elements of that fuel.

- *Does the growth in telecommunications services relate to the GDP or similar measures of the country's economic development status?*

The analysis that we have performed seems to directly correlate open markets with high GDP per capita. This clearly is a questionable cause and effect relationship which needs further study. The answer however is clear that they are correlated.

- *Does the growth rate of a country's economy correlate with the openness of that country's market for Trade in Services as relates to telecommunications?*

The answer is the same as the above question. The best examples are Japan versus the Philippines. The Philippines has the most tightly controlled telecommunications market. The intent seems to be to provide financing from these market distorting mechanisms.

- *What should the U.S. position be regarding its ability to influence access to markets by its unilateral power on settlements?*

Trade in services is protected under the WTO and the US should take all steps as is necessary to secure the position of US companies in this trade process. Namely, the US should not take punitive actions against any US company that through technology effects an open market. If the company, via technology such as Internet telecommunications, can provide voice and similar services, then the US should, as it has already done in call back, support and not penalize those companies.

- *Does there exist a set of economic efficiencies in the use of telecommunications via enhanced services, value added services, or Internet services that will allow such providers to have economic advantages to side step the settlement process?*

The Internet options clearly are the best options available for opening telecommunications markets. The TCP/IP protocol supports voice, data, video and other options. Internet allows for the deployment of many types of services in a global market with the shortest deployment time and at the lowest capital costs. We argue that Internet applications are the most bandwidth efficient, are deployed in a fashion wherein the fixed capital is the lowest, and wherein the use of TCP/IP protocols allow for immediate integration of video, voice and data. There are dramatic economic efficiencies that we argue lead to enhancement of telecommunications infrastructures and this immediate economic gains to the country.

- *What will be the effect of Internet and Internet like voice, video and data services wherein the "path" of the message has no definition? Does any country have the tight to regulate a "mixed" message format?*

The use of Internet is an enabling technology. Unlike call back, which is a true arbitrage situation, Internet and Internet like applications allow for rapid global expansion at an extremely low cost of entry for the backbone costs and arguable for the local switching costs. Regulation of Internet like telecommunications is highly problematic since there is an admixture of systems and services, and any regulation will result in immediate

delimitation and eliminate and economic externalities that have been found to flow from Internet applications. We further can argue that the recent FCC ruling on Settlements may actually have a negative effect on the growth of telecommunications in developing countries. We argue that in other papers.[156]

[156] See McGarty, T.P. Telmarc Policy Section 97.005, available from the author, August 9, 1997.

6 MUNICIPAL BROADBAND NETWORKS

6.1 Introduction

Towns and municipalities have over the past one hundred and fifty years or more deployed multiple types of local utilities; water, sewer, gas, electric, and in some cases telephony. Recently, there has been a trend on the part of some municipalities to deploy broadband communications, namely local fiber networks.

This section discusses the viability of municipalities providing a local broadband fiber based network which would allow service providers to interconnect at a common point and provide their services, via this network, to the community. The network is merely a fiber broadband connection, with no services. It is viewed as a project effort rather than a general obligation effort to the municipality. The municipal broadband network has a head end which is an open interface to a wide variety of service providers. The network is an open network allowing and enabling the maximum use to the most service providers available.

The driving forces for this concept are as follows:

1. Local broadband has not been met by many private sector providers in an adequate manner to many municipalities. This includes cable and telco providers.

2. The current economic environment, especially as regards to telecom, makes such deployment highly unlikely in the near future.

3. Regulatory and legal delays caused by the 1996 Telecom act and initiated by the RBOCs have resulted in institutional stalemates and excessive cost factors to make a competitive environment the most inefficient path to broadband deployment.

4. Municipalities have, via municipal bonds, the most efficient capital raising capabilities of any providers. They can use their low cost of capital to raise financing for provide broadband projects.

5. Precedent exists for the establishment of a separate municipal network. There are over 200 broadband networks today in towns and municipalities. Moreover, historically, in the old AT&T days in New York, Empire City Subway, a separate company, owned and operated all telephone networks in New York. New York Telephone provided for switches and offices. AT&T provided long distance via Long Lines, and Western Electric the equipment. Thus even in the old days of monopolies, the “natural” partition of the local network was an integral part of AT&T operations. In effect the new paradigm is a deployment of the old paradigm.

6. Competition and value exists amongst the private sector services providers.. The service providers need scale and efficiency in local distribution and they cannot each deploy such distribution. A municipal network is at the very most efficient and economically viable alternative to get service providers to homes and local businesses.

6.1.1 Definition of Broadband

There is a general consensus that broadband, whatever that is, is beneficial and that most people want access to it. For the purpose of this section we define broadband in a variety of ways. In the National Academy of Sciences (NAS) report, "Bringing Home the Bits", they state:

"Defining broadband is more than an academic exercise. Numerous groups would stand to benefit from workable definitions of what constitutes broadband. They include:

- *Consumers, who would like to be able to evaluate service offerings to see if the offerings are likely to meet their needs;*
- *Service providers, who would like to develop, invest in, and deploy services that consumers will need and want;*
- *Application and content developers, who would like to understand and track the connectivity performance options available to consumers;*
- *Policy makers or regulators, who seek to monitor broadband service deployment and measure the impact of policy or regulatory decisions on deployment, define the characteristics of services eligible for tax credits or loans, or define the characteristics of services required in build-out commitments associated with regulatory relief; and*
- *Public interest groups, which seek to evaluate capabilities available to consumers and to understand the implications of alternative policy approaches that influence those capabilities.*

Framed in this way, defining the term "broadband" in some sense also involves (1) identifying the kinds of applications that consumers are likely to find useful and desirable and (2) determining the benefits that different segments of the public anticipate from access to broadband services. The definition of broadband used by each of these groups will reflect that group's expectations and, consequently, can have a significant effect on decision making. Too limited a definition, such as establishing too low a data transmission rate as the broadband threshold, could result in a mismatch between expectations and capabilities, while a definition that is unrealistic in terms of technological capabilities, costs, or consumer demand could prompt inappropriate or poorly aimed policy interventions. The absence of a consensus on definitions will confuse political debate on the subject and require ongoing debates about what definitions to use."

The FCC does not specifically define broadband, but uses the term "advanced telecommunications capabilities" to describe services and facilities with an upstream (customer-to-provider) and downstream (provider-to-customer) transmission speed exceeding 200 kilobits per second (kbps).[157] The FCC uses the term "high-speed" for those services with over 200 kbps capacity in at least one direction.

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[157] More specifically, the FCC defines broadband as,

"Broadband refers most commonly to a new generation of ***high-speed transmission services****, which allows users to access the Internet and Internet-related services at significantly higher speeds than traditional modems. It has the potential technical capability to meet consumers' broad communication, entertainment, information, and commercial needs and desires."*

See http://www.fcc.gov/cgb/broadband.html#broadband

The NAS study group goes on to provide two definitions for broadband:

"Broadband Definition 1. Local access link performance should not be the limiting factor in a user's capability for running today's applications….

Broadband Definition 2. Broadband services should provide sufficient performance--and wide enough penetration of services reaching that performance level--to encourage the development of new applications."

The first is technical and the second is service oriented. Neither play a role in what we present in this section. Herein we state that a minimum of a single strand of fiber to the home or business, or place of business end user, is the basis of broadband infrastructure. It is not services, it is not what technical things are performed on the fiber, it is the fiber itself.

Broadband is like water pipes, sewer pipes, electrical wires, and gas pipes. It gets a utility from one point to another. In this case, it is bits. It does not care what the bits does, it does not care that people are connecting different types of bits, it does not care if the end user is buying bits from different people. When one gets electricity today from a town owned facility, the town gets paid for local distribution, but the customer can buy electricity from any one of potentially several providers. When one buys water from the town, one gets to do whatever one wants with the water; flush it, drink it, or wash with it. The same goes for gas in heating, cooking, or cooling.

Thus the definition for broadband herein is just local bit transport on a strand of fiber. Nothing more, nothing less. This is not wireless, not 3G, it is not twisted telephone loop, nor is it cable. The broadband system herein defined is a local utility which can be interconnected to by a wide variety of service providers of Internet, video, and telephony.

When the Bell System broke up, the intent was to disassemble manufacturing from services. Thus, AT&T offered long distance and manufacturing, and the RBOCs (Regional Bell Operating Companies) offered local service. There was limited discussion relating to separating distribution from service, the loop from the switch. The problem was that the technology did not yet support the idea, or so said the Bell Labs executives at that time. However, people at ARPA (Advanced Research Project Agency), the pioneering organization that built the original Internet, disagreed with the views of the RBOC executives.

The problem with the conceptualization and realization of broadband is that it gets tied up with the political and business agendas of the espousers.

McGarty has discussed the issue of world view and the interpretation of Kuhn's analysis of paradigms, naming specific examples.[158] It can be argued that the issue of broadband

[158] McGarty, Harvard, 1990.

is colored by the world view of those proposing it. The architecture of any network is an embodiment of that world view. Thus broadband must be looked at through clear lenses.

6.1.2 Current Examples

The following is a list of towns and municipalities who are already affecting networks of the type we discuss in this section. The list is quite extensive, there are at this time over 200 such efforts out of almost 55,000 town and municipalities in the US. That is a 0.5% penetration.

State	*Towns*
Alabama	Lincoln, Opp, Foley, Scottsboro
Alaska	Angoon, Kake, Kiana, Kotlik
Arkansas	Conway, Lockesburg, Paragould
California	Anaheim, Alameda, Burbank, Los Angeles, Palo Alto, San Bruno, Santa Rosa
Colorado	Center, Copper Mountain, Longmont
Florida	Gainesville, Key West, Lakeland, Leesburg, Newberry, Ocala, Valparaiso
Georgia	LaGrange, Fairburn, Marietta, Newnan, Thomasville
Iowa	Akron, Algona, Alta, Bancroft, Cedar Falls, Coon Rapids, Danbury, Dayton, Denison, Grundy Center, Harlan, Hartley, Hawarden, Hull, Independence, Indianola, Lake View, Laurens, Lenox, Manilla, Manning, Mount Pleasant, Muscatine, New London, Orange City, Primghar, Rock Rapids, Sac City, Sanborn, Sibley, Spencer, Tipton, Wall Lake, Waterloo, Westwood
Kansas	Altamont, Baxter, Cawker, Columbus, Courtland
Kentucky	Bardstown, Barbourville, Bowling Green, Frankfort, Glasgow, Williamstown
Maryland	Easton
Massachusetts	**Braintree, Chicopee, Holyoke, Shrewsbury, Westfield**
Michigan	Clearwater, Coldwater, Crystal Falls, Hillsdale, Holland, Lowell, Negaunee, Norway, Wyandotte
Minnesota	Bagley, Coleraine, Elbow Lake, Fosston, Jackson, Marble, Westbrook, Windom
Missouri	Newburg, Springfield, Unionville
Nebraska	Lincoln
North Carolina	Morganton
New Hampshire	Keane
Ohio	Archbold, Butler County, Celina, Cuyahoga Falls, Hamilton, Lebanon, Niles, Wadsworth
Oregon	Cascade Locks, Eugene, Lexington, Lincoln County Public Utility District, Springfield
Pennsylvania	New Wilmington, Pitcairn
South Dakota	Beresford
Virginia	Blacksburg, Leesburg, Lynchburg
Washington	North Bonneville, Sumas, Tacoma
West Virginia	Phillipi
Wisconsin	Oconto Falls, Two Creeks
Wyoming	Lusk, Bailroil

The conclusion that can be drawn from this list is that there is a significant interest in this opportunity as well as a growing experience base in effecting such utility services.

6.1.3 Comparisons

Let us begin by first comparing and contrasting the more classic utilities with broadband utility systems. This table compares several of the key characteristics of service already provided by municipalities.

Characteristic	*Water, Sewer, Gas, Electric*	*Broadband*
Penetration	Generally 100% although people can have wells and septic systems	Will depend upon market. It is not assumed to be general utility
Alternatives	Separate homeowner systems such as well and septic	DSL and CATV represent alternatives Dial up may be just satisfactory
Competition	Generally none	CATV and ILEC
Monopoly Status	De facto	Must be lobbied.
Regulation	May be state PUC	May be state PUC
Costs	Project based	Project based
Financing	Municipal bonds, project or general obligation	Municipal bonds
Operations	Local, outsourced	Local, outsourced
Interconnection	Certain open interconnect, certain bid	Open interconnect

The table clearly shows that broadband access, as a utility service, it very comparable to public utility services already being provided by the local municipalities. Thus the extension into this new service area, albeit without the background provision of services itself, is very akin to what the town or municipality is already providing.

6.2 Market Factors

The FCC in its June 2002 Report on Broadband reached the following observations and conclusions:

1. Subscribership to high-speed services increased by 33% during the second half of 2001, to a total of 12.8 million lines (or wireless channels) in service. The rate of growth during the first half of 2001 was 36%.

2. High-speed lines in service over coaxial cable systems (cable modem service) increased 36% during the second half of 2001, to about 7.1 million lines. High-speed ADSL lines in service increased 47%, to about 3.9 million lines.

3. Reported high-speed connections to end-user customers by means of satellite or fixed wireless technologies increased by 9% during the second half of 2001, and reported fiber optic connections to end-user customer premises increased by 8%. These technologies, together, accounted for about 0.7 million high-speed connections at the end of 2001.

4. Subscribership to the subset of high-speed services that are described as advanced services (i.e., delivering to subscribers transmission speeds in excess of 200 kbps in each direction) increased by 25% during the second half of 2001, to a total of 7.4 million lines (or wireless channels) in service. Advanced services lines provided by means of ADSL technology increased by 37%, and advanced services lines provided over coaxial cable systems increased by 32%.

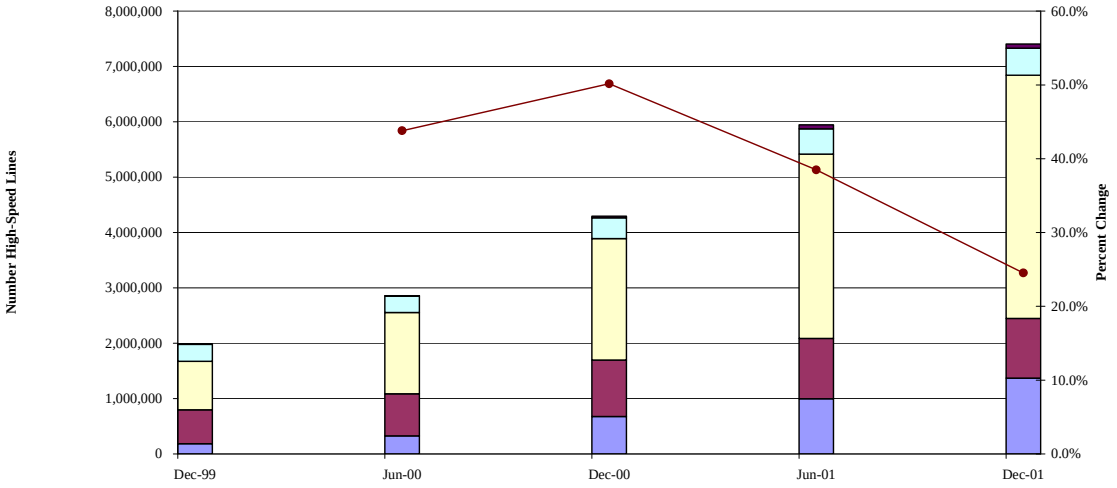
5. As of December 31, 2001, there were about 11 million residential and small business subscribers to high-speed services. By contrast, there were approximately 7.8 million such subscribers six months earlier, and about 5.2 million a year earlier.

6. Of the 11 million high-speed lines in service to residential and small business subscribers at the end of December 2001, FCC estimates that about 5.8 million lines provide advanced services.

7. Among entities that reported facilities-based ADSL high-speed lines in service as of December 31, 2001, about 97% of such lines were reported by incumbent local exchange carriers (ILECs). ILECs claimed a smaller share, about 83%, of high-speed lines delivered over other traditional wireline facilities. When all technologies are considered, ILECs provided about 38% of high-speed connections to end-user customers.

8. Providers of high-speed services over coaxial cable systems report serving subscribers in 49 states and the District of Columbia. Providers of high-speed ADSL services report serving subscribers in 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands, as do providers who use wireline technologies other than ADSL, or who use optical carrier (i.e., fiber), satellite, or fixed wireless technologies in the last few feet to the subscriber's premises.

The following chart shows the growth of access lines across various high-speed technologies, as well as average percentage growth of high-speed connectivity in the United States.



	Dec-99	Jun-00	Dec-00	Jun-01	Dec-01
Satellite or Fixed Wireless	7,816	3,649	26,906	73,476	75,341
Fiber	307,315	301,143	376,197	455,549	486,483
Coaxial Cable	877,465	1,469,130	2,193,609	3,329,976	4,394,778
Other Wireline	609,909	758,594	1,021,291	1,088,066	1,078,597
ADSL	185,950	326,816	675,366	998,883	1,369,143
Percent Change		43.8%	50.2%	38.5%	24.5%

The Commission's data collection program gathers from providers' information about the number of high-speed lines in service in individual states, in total and by technology deployed in the last few feet to the subscriber's premises. Relatively large numbers of total high-speed lines in service are associated with the more populous states. The most populous state, California, has the largest reported number of high-speed lines. The second, third, and fourth largest numbers of high-speed lines are reported for New York, Florida, and Texas, which are the third, fourth, and second most populous states, respectively.

Reporting entities estimate the percentage of their high-speed lines in service that connect to residential and small business end-user customers (as opposed to connecting to medium and large business, institutional, or government end-user customers). These percentages allow FCC to derive approximate numbers of residential and small-business high-speed lines in service by state.

FCC analysis indicates that nearly 98% of the country's population lives in the 79% of zip codes where a provider reports having at least one high-speed service subscriber. Moreover, numerous competing providers report serving high-speed subscribers in the major population centers of the country. See the map that follows

States vary widely with respect to the percentage of zip codes in the state in which no high-speed lines are reported to be in service.

High population density has a positive association with reports that high-speed subscribers are present, and low population density has an inverse association. For example, as of December 31, 2001, high-speed subscribers are reported to be present in 98% of the most densely populated zip codes and in 43% of zip codes with the lowest

population densities. However, the comparable figure for the least dense zip codes was 28% a year earlier.

High median family income also has a positive association with reports that high-speed subscribers are present. In the top one-tenth of zip codes ranked by median family income, high-speed subscribers are reported in 97% of zip codes. By contrast, high-speed subscribers are reported in 63% of zip codes with the lowest median family income, compared to 55% a year earlier.

The following is a summary by State:

State	*Residential & Small Business*	*Other*	*Total*
Alabama	121,074	17,905	138,979
Alaska	44,559	5,718	50,277
Arizona	233,214	18,495	251,709
Arkansas	62,900	3,637	66,537
California	1,685,476	355,800	2,041,276
Colorado	156,709	20,710	177,419
Connecticut	180,616	10,641	191,257
Delaware	24,197	2,404	26,601
Florida	776,704	134,557	911,261
Georgia	335,428	84,778	420,206
Idaho	13,288	5,157	18,445
Illinois	329,721	92,985	422,706
Indiana	99,837	23,867	123,704
Iowa	77,859	4,165	82,024
Kansas	120,375	5,588	125,963
Kentucky	47,060	20,810	67,870
Louisiana	148,039	16,721	164,760
Maine	46,955	2,568	49,523
Maryland	227,097	33,537	260,634
Massachusetts	447,030	58,789	505,819
Michigan	387,308	46,550	433,858
Minnesota	180,371	19,485	199,856
Mississippi	28,559	7,027	35,586
Missouri	164,774	17,020	181,794
Montana	11,676	1,361	13,037
Nebraska	69,171	2,280	71,451
Nevada	92,525	17,325	109,850
New Hampshire	62,967	8,233	71,200
New Jersey	522,979	67,213	590,192
New Mexico	28,119	3,821	31,940
New York	1,029,106	170,053	1,199,159
North Carolina	310,439	47,467	357,906
North Dakota	5,116	966	6,082
Ohio	371,141	65,625	436,766
Oklahoma	104,835	10,096	114,931
Oregon	131,279	26,769	158,048
Pennsylvania	318,833	57,606	376,439
Rhode Island	60,202	4,091	64,293
South Carolina	115,343	19,822	135,165
South Dakota	8,361	1,224	9,585
Tennessee	202,393	35,008	237,401
Texas	748,785	91,880	840,665
Utah	64,354	8,623	72,977
Vermont	20,354	1,441	21,795
Virginia	256,813	35,959	292,772
Washington	294,078	41,589	335,667
West Virginia	31,160	1,688	32,848
Wisconsin	159,328	23,067	182,395
Wyoming	6,845	1,011	7,856

State	*Residential & Small Business*	*Other*	*Total*
Total	11,005,396	1,787,416	12,792,812

6.3 Industry Factors for Failure and Success

In the past year, there has been a groundswell change in the telecommunications market. It has been in a downward spiral and appears to have disappeared from the view of most investors. The FCC is data presented above reflects two alarming facts: (i) less than only 107.0% of American households has high-speed services, and (ii) there has been a dramatic decline in the growth of high-speed services in the United States. The DSL model has failed to bring high capacity connectivity pervasively into homes and businesses. Cable companies have been resistant in these tumultuous markets in making the required upgrades and buildouts to their cable plants to support high speed Internet access and broadband services. Sparsely populated areas in the nation have seen the lowest penetration of broadband due to the high costs of infrastructure buildout and ongoing network/customer maintenance and support.

The current situation raises the question for any municipality which is, why should we as a town get into a business that clearly has had catastrophic consequences for those who were much more capable. The question is not one of whether broadband is good; there seems to be a general consensus that it is. It is a question of successful execution in a market that has had colossal losses.

In our perspective, the causes of the current problems in the telecommunications market in the US are:

6.3.1 Overcapacity on backbone

There is a dramatic oversupply of backbone fiber. This results in only 2-3% of effective capacity in use, and less if one uses more advanced DWDM (Dense Wavelength Division Multiplexing) technology. This overcapacity has lead to price wars that has resulted in continuous losses. This overcapacity was a result of many factors, two being the most significant.

First, there was the unfounded optimism resulting from the anticipated growth in Internet services. What was clear from the start, however, was that if you gave every person in the United States a 56 Kbps modem, and had them on line simultaneously, then this would account for approximately 16.8×10^{12} bps or 16,800 Gigabits per second (Gbps) of capacity. This could be provided by only 16-160 strands of fiber!

McGarty, in a 1990 Harvard section, stated:

"Fiber has revolutionized the data networks in the United States. A single strand of fiber can transmit 10^{12} bits per second of data. If we allocate each home, 100 million residences, with 100 Kbps of full time data, that is 10^{13} bits per second if everyone in the US is talking simultaneously in this high speed data fashion. That is the capacity of just a

single strand of fiber. A typical bundle of fiber has 25 to 50 strands and these are connected to other such bundles. The current fiber network is structured like past voice networks, and generally does not take advantage of the bandwidth of the fiber. Albeit the technology is not yet totally operationally capable, the world view of the system designers is one that is to use fiber as copper. Use it for one voice circuit after another."

So in 1990, it was clearly known that a single bundle would suffice for usage, which was extraordinary. However, the dream for infinite capacity was based on having broadband access to the home. This concept would not want 56 Kbps or 100 Kbps, but Gpbs per home! However, this depended on the "last mile" infrastructure; the connectivity between the local hub or Central Office to the residential or commercial premises.

Second, as stated above, the last mile was the key factor. A twisted pair of copper could, even in 1990, provide ISDN speeds of up to 1.5 Mbps. In Europe, ISDN provides 2 Mbps capacity; Europe uses ISDN while the US does not. The last mile was destined to be a competition between the local telecom company and cable provider. There were many fiber-to-the-home (FTTH) trials, but with the 1996 Telecommunications Act, the RBOCs stopped them totally. They did not want to invest in a distribution capability that they would then have to sell at wholesale (i.e., unbundle) to competitors. Thus the RBOCs actually left millions of miles of stranded FTTH trials un-used.

6.3.2 Excess Debt

The carriers used high yield debt, in place of equity, to finance capital expenditures for infrastructure buildouts. The amount of such debt exceeded $1 trillion dollars. Most of it has been defaulted on.[159] This problem became symptomatic starting in 1998 when telecom companies started to wilt under the weight of their balance sheet obligations. Companies like Winstar had over $1 billion in high yield debt on their road to bankruptcy. The other new carriers were also amassing high yield debt at a rapid rate. This debt was effectually equity financing since these companies, in an exit scenario, were not generating sufficient cash flow to provide returns to stockholders over and above any returns to bondholders.

Who created this excess debt fiasco and why? The answer is to look at the people involved in creating and raising such forms of financings. The high yield debt of the 1990's was the junk bonds of the 1980s; Drexel Burnham and all. There was no fundamental change in the debt, just increased risks and much higher numbers involved. In the 1980s, junk bonds were use to fund LBOs (Leveraged Buy Outs). In the 1990s, high yield debt was essentially used to replace equity, with no corresponding SEC (Securities Exchange Commission) oversight, leading to significant lack of transparency as well as accountability.

[159] Most interesting is that the SEC has no control over high yield debt. The rules that apply to equity do not apply to companies using the 144A type financing. For all purposes this type of financing is the equivalent to equity, and publicly at that.

6.3.3 Excess Vendor Financing

After 1996, telecom companies raised almost $500 billion in vendor financing, which was subordinated in seniority to high yield debt. Lucent, Nortel, Siemens, Alcatel, Cisco, and others provided vendor financing at rates that were very high but concomitant with risk. This form of financing was typically secondary to other debt, generally the high yield borrowing. Clearly, the payback potential on vendor financing was diminished to begin with.

6.3.4 Regulatory Confusion

The 1996 Telecom Act created an artifact of a new paradigm for telecommunications regulation. However, the FCC has been without exception a failure in its regulatory management. The 1996 Act mandated competition. The key to competition was two simple elements: (i) access to the local unbundled loop and (ii) elimination of interconnection fees, also called access fees, resulting in a bill-and-keep environment. To date, neither of these key elements has been deployed. In fact, the FCC is generally opposed to these two elements for the same reasons as the ILECs (Incumbent Local Exchange Carriers) are, almost word for word. Thus, without any form of parity in interconnection and access, there will remain a non-competitive environment.

6.3.5 Inexperienced Management

This has been and in many ways continues to be a major problem. WorldCom was managed by good sales and marketing people but clearly missed on the regulatory and financial front. MCI, the carrier part of WorldCom, was initially a law firm with a telephone company attached.[160] That, at many levels, was its key to success. The battlefield is, was, and most likely will always be Washington D.C. to gain a sustainable competitive advantage. After the 1996 Telecom Act and during the infamous Internet bubble, startup telecom companies sprung up like wild weed everywhere; not many of them are around today, with more going out of existence on a regular basis. It is estimated that after 1996, over $4 trillion of private equity money went into telecom and Internet services companies; about $1 trillion of it has disappeared.

6.3.6 Pricing Suicide

Pricing has been a major problem with telecommunications survival. Companies have taken any and all steps to get revenue at the cost of losing billions of dollars. The most recent example is that of Internet transit pricing. Long haul carrier companies such as Genuity and UUNet, have reduced prices almost 90% over the first six months of 2002 and have seen revenue reduce, gross margins become more negative than the revenue,

[160] See Coll for an excellent discussion of MCI as a survivor and growing company.

and losses eat up their remaining cash at a perilous rate.[161] The impact has been a 10:1 reduction in market capitalization in the same six-month period.

During the same period, however, the RBOCs have raised their prices 15% on average, for an annualized rate of 30%, and have seen increased reductions in their operating costs. In addition, the RBOCs have regained customers lost to the CLECs due to CLEC bankruptcy. The conclusion is simple; where there is total market competition, certain new entrants will price below costs to gain market share at any cost. Similarly, in a competitive market, cash-rich players will reduce prices to squeeze cash-strapped players out of the market. Where a monopoly or oligopoly exists, pricing declines will likely be minimal.

6.3.7 Monopolistic Practices

The RBOCs have been brilliant in their ability to continue to affect a monopolistic market. The political lobbying power of the RBOCs is legendary and the cash thrown by them at litigation to protect their turf seems to come from a bottomless bucket.

There are two key monopolistic practices of the RBOCs which create barriers to entry to any competitor. They are:

> ***Access and Interconnection Fees:*** These are the fees charged by the RBOCs to interconnect to their network. McGarty has argued for over fourteen years that access fees must be eliminated for any type of communications competitiveness. The initial focus was on eliminating access in the wireless market. A wireless company, McGarty argued, was just another local phone company. A customer buys access from the local provider to a meet point. This service is for calls in and out. Thus the subscriber does not pay a different amount for the ability to receive than from the ability to call. Thus if one calls an RBOC customer, the RBOC should not be paid again for what the RBOC customer has already bought and vice versa. McGarty then goes on to demonstrate that the economics of access create predatory pricing in line with the violations under Sherman and Clayton antitrust laws.
>
> ***Unbundled Network Elements (UNEs):*** The simplest of the UNEs is the unbundled local loop. For telco based broadband competitors, having ready access to a loop is essential. As we are aware, COVAD, Northpoint, and others failed because the RBOCs delayed in loop provisioning. CLECs failed because of loop provisioning and price. For example, an RBOC charges $14.00 per month for a loop, plus co-location space and facilities for say $4.00, for a total of $18.00. They sell services for $19.00! Thus a new entrant could not compete on price. Yet the RBOCs say that the prices they are forced to sell are only 40% of what their costs are. If one follows that logic, then their costs are $45.00 on loop alone and that they must be loosing $26.00 due to loop costs. In fact, if one were to price all

[161] At the time this section was being prepared Genuity had defaulted on their debt but was yet to declare bankruptcy. They were going though more than $300 million a quarter in cash!

UNEs at the alleged RBOC cost , (assuming that they are at 60% discounts from their costs,), then their plant costs for a single phone line would exceed $1,000!

Clearly, based on the above discussion, the use of municipal broadband eliminates the UNE problem. It, however, does not eliminate the access fee problem. This is a legal issue. Access fees are barriers to entry, anti competitive devices used by RBOCs, theoretical constructs supported by academics on the RBOC dole, and ultimately the elements which create economic distortions via a penalty paid directly by the customer to the monopolist to support the monopoly.

6.3.8 Litigation Excess

The ILECs/RBOCs have been litigating in excess to prevent the CLECs and the DSL companies from becoming real competitors. Some of the initial cases are:

1. AT&T CORPORATION, *et al* ., PETITIONERS *v* . IOWA UTILITIES BOARD *et al* .;
2. AT&T CORPORATION, *et al* ., PETITIONERS *v* . CALIFORNIA *et al* .
3. MCI TELECOMMUNICATIONS CORPORATION, PETITIONER *v* . IOWA UTILITIES BOARD *et al.;*
4. MCI TELECOMMUNICATIONS CORPORATION, PETITIONER *v* . CALIFORNIA *et al* .
5. ASSOCIATION FOR LOCAL TELECOMMUNICATIONS SERVICES, *et al.* , PETITIONERS *v* . IOWA UTILITIES BOARD *et al.*
6. FEDERAL COMMUNICATIONS COMMISSION *and* UNITED STATES, PETITIONERS *v* . IOWA UTILITIES BOARD *et al.;*
7. FEDERAL COMMUNICATIONS COMMISSION *and* UNITED STATES, PETITIONERS *v* . CALIFORNIA *et al* .
8. AMERITECH CORPORATION, *et al* ., PETITIONERS *v* . FEDERAL COMMUNICATIONS COMMISSION *et al* .
9. GTE MIDWEST, INCORPORATED, PETITIONER *v* . FEDERAL COMMUNICATIONS COMMISSION *et al* .
10. U S WEST, INC., PETITIONER *v* . FEDERAL COMMUNICATIONS COMMISSION *et al* .
11. SOUTHERN NEW ENGLAND TELEPHONE COMPANY, *et al.* , PETITIONERS *v* .FEDERAL COMMUNICATIONS COMMISSION *et al* .

Recently, in June 2002, in the case of Trinko v Bell Atlantic, United States Court of Appeals For the Second Circuit, however, what we see is the first of several examples of how customers, not companies, are fighting back with the RBOCs using antitrust laws.

The following analysis considers several of the more recent cases wherein the RBOCs have used litigation to delay the deployment of services, broadband and more standard services. One should remember that the Act was passed in February 1996 and the FCC completed the rule making in September 1996. Thus by January 1997, the RBOCs had aggressively moved to have PUCs take pro RBOC positions. The first was Iowa as shown

below. These five cases start to set the ground work for what the potential legal environment will hold.

6.3.8.1 Iowa Utilities Board v FCC et al, US 8th Circuit Court, July 17, 1997

This was one of the first major rulings. The 8th circuit was asked to vacate the entire FCC First Report and Order, which in essence established the details of the procedures to be followed in the implementation of Sections 251 and 252 of the 1996 Act. It was not that the FCC did a bad job, it was that the RBOCs wanted to generate confusion and delay.

In the ruling the 8th Circuit partially kept and partially rejected the issue of what authority the FCC has over states, generally ruling in the favor of the states. The Court stated that the States and not the FCC have the prime role of rate setting. In fact they severely restricted the FCC's ability.

There was the "pick and choose" rule, whereby the FCC stated that CLECs could pick and choose elements of interconnection agreements previously agreed to by other carriers to implement their own interconnection agreement. This would give CLECs an advantage. The 8th Circuit denied this.

However, it then addressed the issues regarding unbundling. This is the UNE issue. The UNE issue as we have stated was at the heart of broadband. It was the reason broadband failed. As to unbundling the 8th Circuit stated:

1. Unbundling of Operations Support Systems software and databases is approved. This allows for a seamless integration.

2. The FCC determination of allowing interconnection to the ILEC at any "technically feasible" point is acceptable.

3. Denied the FCC's interpretation that any element that must be unbundled and which is needed must be unbundled.

4. Upheld the FCCs interpretation of the "necessary" and "impairment" interpretations. "Necessary" means that it was necessary for the CLEC and impair meant that it would impair the CLECs service.

5. Denied the rule requiring unbundling and affiliated combining. The Court decided that the ILEC did not have to do the combining, that the CLEC would be both able and required to combine UNEs. This meant that the CLEC had to reassemble parts that were under the control of the ILEC. This lead to impossible situations.

6. Upheld the provision of allowing CLECs to purchased finished services. Generally this was and is not a competitive issue.

7. Upheld the unbundling rules in general. The RBOCs tried to stop this via referral to intellectual property rights and Constitutional Takings clauses in the Fifth amendment. The Court did not agree with these positions.

6.3.8.2 AT&T et al v Iowa Utilities Board, US Supreme Court, January 1999

The Supreme Court, Justice Scalia delivering, in addressing the above case f the 8th Circuits, found as follows:

1. Reversed the 8th Circuit in stating that Federal Law permits the FCC to have jurisdiction over the Act and its implementation.[162]

2. Reversed the 8th Circuits denial of "pick and choose" because it was clearly stated in the law. This is interesting since the 8th Circuit tried in many ways to remove this FCC interpretation.

3. Approved all unbundled access rules except Rule 319 (also 47 USC 51.319, FCC 96-325, First Report and Order), which is the necessary and impair clause. From the First R&O we find the FCC stating:

"275. The Department of Justice and Comptel reject the BOCs' argument that the general obligation imposed by section 251(c)(3) is limited by consideration of whether the failure to provide access to an element would impair a carrier's ability to offer a service. They argue that the term "impair" does not mean "prevent," and that we should interpret this standard to mean that a carrier's ability to provide a service is impaired if obtaining an element from a third party is more costly than obtaining that same element from the incumbent. They also dispute the incumbent LECs' argument that the "impair" language in this standard means that new entrants cannot exclusively use unbundled elements to provide the same or similar retail services that an incumbent offers. They argue that, if similarity is enough to prevent the use of unbundled elements, then section 251(c)(3) would be nullified. They further contend that, under the BOCs' theory, incumbents could prevent new entry through the use of unbundled elements by offering unbundled loops, switching, and other elements as retail services."

The Court vacated the rule 319, which had necessary and impair. The Courts reasoning was simply that necessary and impair were in eye of the beholder, and in this case the beholder was the CLEC not the FCC. It remanded the rule back to the FCC.

6.3.8.3 Verizon et al v FCC, US Supreme Court May 13, 2002

In this case, the Court ruled as follows

[162] See Chevron v NRDC, 467 US 837. The case involved EPA regulations. The Court ruled that the EPA, and Federal Agencies in general, have great latitude in interpreting the law and in fact may have the right to change their interpretation.

1. Affirmed that the FCC can set rates on a forward-looking basis. They also rejected the need for factoring in historical costs.[163]

2. Affirmed the TELRIC forward- looking cost basis for setting the rates.[164] [165]

3. Reversed 8th Circuit in requiring that ILECs combine UNEs into a single UNE at request of CLEC since ILECs have capability and control process, whereas the CLECs are helpless in the effort and may be hindered by the ILEC.

4. Takings argument was rejected.

This was in many ways a reversal for the RBOCs.

6.3.8.4 US Telecom Association (USTA) v FCC, Bell Atlantic as Intervenor, US Court Appeals, District of Columbia, May 24, 2002

This extremely poor and seemingly prejudiced opinion rejects the FCC re-do of the necessary and impair issues in 319 as described above. The DC Court totally rejected the FCC's efforts. It set unbundling back severely.

The DC Circuit Court focused on DSL services. The DSL companies, all bankrupt by the time of the ruling due to ILEC anticompetitive actions, has continued to block this effort. The DC Court, totally oblivious to this fact, actually states:

"The Line Sharing Order Petitioners primarily attack the Line Sharing Order on the ground that the Commission, in ordering unbundling of the high frequency spectrum of copper loop so as to enable CLECs to provide DSL services, completely failed to consider the relevance of competition in broadband services coming from cable (and to a lesser extent satellite). ***We agree."***

There is no competition. In fact the ILECs or RBOCs have slowly rolled out limited DSL knowing that in the long run they want separate monopolized fiber exempt from any Act provisions. This accomplished, with the help of the DC Court and their ilk, one can foresee slow broadband at extortionary rates. The DC Court goes on to say:

"In sum, nothing in the Act appears a license to the Commission to inflict on the economy the sort of costs noted by Justice Breyer under conditions where it had no reason to think

[163] See Smyth v Ames, 169 US 466. The case involves railroads and rate setting across state lines. The Court ruled that it was reasonable for Nebraska to set railroad rates and that a state had that authority.

[164] TELRIC, is Total Element Long Range Incremental Costs. It is a method to determine costs that are: (i) forward looking, (ii) least cost, (iii) long run, (iv) incremental, and (v) include a return on invested capital. However, like all models the input determines the output. Thus, albeit a methodology, it is not based irrefutably and consistently based on facts. It is not reproducible.

[165] See Duquesne v Barasch, 488 US 299. In this case the Court ruled that a state could set rates and in so doing did not violate the takings clause of the Constitution.

doing so would bring on a significant enhancement of competition. The Commission's naked disregard of the competitive context risks exactly that result. Accordingly, the Line Sharing Order must be vacated and remanded. Obviously any order unbundling the high frequency portion of the loop should also not be tainted by the sort of error identified in our discussion of the Local Competition Order and identified by petitioners here as well."

In fact the FCC did regard the competition, the Court has not look at the stock market and see the impact.

6.3.8.5 Trinko v Bell Atlantic, US Court of Appeals, 2nd Circuit, June 2002

Trinko is a law firm in New York. It tried to get some telecommunications service from a CLEC, in this case AT&T. The CLEC failed to deliver based upon Verizon's refusal to deal. The result was that the law firm sued Verizon on two grounds; violation of the 1996 Act and antitrust violations. The 2nd Circuit dismissed the 1996 Act action based on not having standing. It agreed to the antitrust action.

The 2nd Court starts its discussion on the antitrust claim as follows:

"Generally, a plaintiff can establish that a defendant violates section 2 of the Sherman Act by proving two elements "(1) the possession of monopoly power in the relevant market; and (2) the willful acquisition or maintenance of that power, as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident." Volvo N. Am. Corp., 857 F.2d at 73 (citations omitted); accord Top Mkts., Inc. v. Quality Mkts., Inc., 142 F.3d 90, 97 (2d Cir. 1998)."

The 2nd Court structures the claim as follows:

"Similarly, as a result of the alleged monopoly scheme, the plaintiff in this case had a similar set of choices: (1) stay with AT&T and receive inferior local service; or (2) switch to Bell Atlantic. While the second choice would hurt AT&T as a competitor, the first choice directly injures the plaintiff as a consumer. In this case, the plaintiff made the first choice and suffered the requisite antitrust injury."

The 2nd Court then stated:

"It is unlikely that allowing antitrust suits would substantially disrupt the regulatory proceedings mandated by the Telecommunications Act. In discussing the impact such suits would have on the regulatory process, it is useful to discuss separately suits seeking damages and suits for injunctive relief. Awarding damages for the willful maintenance of monopoly power would not substantially interfere with the regulatory scheme envisioned by the Telecommunications Act. In contrast, injunctive relief in this area may have ramifications that require particular judicial restraint."

However the 2nd Court ruled that the suit and claim survived based on antitrust grounds. This will open up a whole new avenue for litigation against the unbundling rules. It will also further delay broadband.

The litigation by the RBOCs against the FCC and all competitors is akin to slaveholders suing the Federal Government in 1866 for passage of the 13th Amendment eliminating slavery, under the "takings" clause of the Constitution. The RBOCs were and to a great degree are still the monopolists in all markets. They set prices, control who gets what segments, lobby the government to their advantage, and use the courts to protect their monopoly position. All of this is done in spite of the 1996 Act and the antitrust laws.

6.3.9 The RBOC Strategies to Broadband

Verizon has aggressively staked out its position vis-à-vis broadband with a section written by John Thorne, Senior Vice President and Deputy General Counsel, Verizon.[166] The section outlines what the RBOC, namely Verizon, intends to do to delay broadband until it is in its sole best interest.

Mr. Thorne begins the section with:

"Computers make us rich. Computer networks make us richer. Very fast computer networks will make us richer still, if and when they finally get built – which will happen when the federal government steps aside and unleashes competition in the industry that now has the technology in hand to build them"

We can readily deconstruct this rather compelling statement from a corporate officer, a lawyer, and a representative of the Verizon position. Clearly, Verizon believes that having anyone else in the market is anti-competitive. The need is to take any and all restrictions and regulation off of them and then they will, single handedly, resolve the problem. As a result, they will get very, very rich. In turn, their sole intent is "to make us richer still".

He goes on to state:

"Unfettered competition delivers the most when markets are young, and when technology is evolving quickly. This is evidently true in broadband markets today. Most of the market is completely up for grabs, because 90-plus percent of the technology that will ultimately be used hasn't yet been built, 90-plus percent of the capital hasn't yet been committed, and 90-plus percent of the customers aren't yet being served. And because broadband digital services will ultimately absorb and displace the old, analog voice and video, it is equally true that no player in the market today has any assurance of winning any given

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[166] See :

http://newscenter.verizon.com/policy/broadband/primer_c.pdf?PROACTIVE_ID=cecfc9cbc9cdcdcec9c5cecfcfcfc5cecfc7cdc8c7c7cacfcec5cf

share of the digital market ahead. Everything is up for grabs, because an extraordinary transformation in technology has overtaken all the old certainties.

In circumstances like these, regulators should have the wisdom and the courage to stand by and do nothing. For the most part, they have chosen to do just the opposite. Telecom regulation today reaches further, and more intrusively, than ever before. And the effects are now being felt across the economic landscape. The third wave of the IT boom – the broadband wave – has not materialized…"

This is a veiled threat. Verizon is clearly saying that they are not building broadband despite DSL efforts. DSL is the poor man's broadband. Verizon will not build broadband until it has been deregulated. Then and only then will it create more wealth for itself at the cost to the consumer.

The UNE issue is clearly an element of their strategy to delay and divert. As Thorne states:

"Rather than make unbundling the direct stepping stone to deregulation, as Congress intended, the FCC has instead transformed it into a mountain of new regulation. The Commission has invented far too many "unbundled network elements," and it has contrived to price them much too cheaply. It has done this ostensibly for the benefit of small competitors that lack both the resources and the technical expertise to build their own networks. But the upshot has been a tangle of regulation that has simultaneously discouraged new investment by both incumbent carriers and by competitors that have the finances and technical ability to build out new broadband networks and develop facilities-based competition. This is not simply the conclusion of chronically over-regulated incumbents. A unanimous U.S. Supreme Court reached that conclusion in a major January 1999 ruling. As did a unanimous Eighth Circuit Court of Appeals, in a key, follow-up decision in July 2000. That latter ruling is itself now headed back to the Supreme Court for further review."

As shown above, the Supreme Court has overthrown this issue. However the DC Appeals Court has brought it back into the fray.

"Collocation rules allow competitors to squat on the incumbent LECs' real estate, for the ostensible purpose of interconnecting their equipment with unbundled network elements in the incumbents' central office. The competitors supply network equipment, but are not required to have an office of their own. The "UNE Platform" rules push things a step beyond that – competitors do not have to supply any network equipment, either."

The answer to Thorne's concern is simply to create neutral meet points where Verizon and any competitor for any service can meet. Thus, the "squat" is not necessary. The meet point we propose is that of the head end of the municipal networks.

"The Commission has even managed to endorse a scheme under which incumbent carriers end up paying others – and paying them billions of dollars – to interconnect with

and use the incumbents' own networks. This scheme travels under the innocuous alias of "reciprocal compensation." The 1996 Act required carriers to "establish reciprocal compensation arrangements for the transport and termination of telecommunications." The original idea was simple: local carrier A would have to pay local carrier B to "terminate" traffic originating on A's network and terminating on B's."

This is the access and interconnection issue. Having a "bill and keep" approach would eliminate mutual compensation and the significant transactions costs related thereto. Only when Verizon saw that to be the case did it start to move in that direction. He further states:

"For ordinary voice traffic, this would mostly be a wash. But for tens of millions of dial-up Internet users, the call always originates on their home phone line; the Internet itself never originates calls or phones you back. Moreover, Internet users often stay on line for hours at a time – much longer than typical voice callers."

Thus again we see a tendency to not do broadband.

Thorne then goes on to attack the cable companies. This is really a feint attack, since in reality he and Verizon ultimately want total deregulation.

"There is, as a result, sharply different regulation of high-speed data services provided over phone lines and over coaxial cable. Telephone companies have to unbundle the portion of the spectrum used for broadband and do so at below-cost pricing. Cable companies do not. Telephone companies have to permit their competitors to collocate equipment to make it easier to use the unbundled spectrum. Cable companies do not. Telephone companies have to offer for resale their retail broadband transmission services at a federally mandated wholesale discount. Cable companies do not. Telephone companies have been forced to provide their broadband services through separate affiliates as a condition to gaining regulatory approval of recent mergers. Cable companies have not. Telephone companies have to pay in to the universal service regime when they provide broadband access. Cable companies do not. And telephone companies are almost completely locked-out of the multi-billion dollar (and rapidly expanding) Internet backbone market. Cable companies are not."

This is a gross misstatement of facts. Towns or local cable boards regulate Cable companies. They do not have a monopoly. At any time, the franchise can be removed. Cable is a franchise business and towns get franchise fees. They provide universal services to towns, the franchising authority.

He then goes on to discuss the Internet:

"The Internet backbone is currently the least competitive part of the broadband market, owned and controlled by a few companies. The Bell Companies have sufficient incentive and capital to play an important role in developing the next generation Internet backbone, but have been kept out of the game. The economies of backbone networks

depend on picking up and dropping off traffic at all major nodes nationwide – missing even one creates a serious competitive disadvantage. Section 271 approval, however, occurs on a state-by-state basis. A Bell Company, therefore, cannot become a meaningful competitor in the backbone market until it obtains its last approval to provide long-distance voice and data services in the last state where it serves as the incumbent local phone company."

The fact is that the Internet backbone is ruthlessly competitive. The biggest players are UUNet, Genuity, Sprint, AT&T, Cable and Wireless, and many more.[167]

His final statement is another sophistry of the highest form:

"Yet, if prior monopoly status were sufficient, unbundling and TELRIC regulation would equally apply to cable companies, which are, in fact, current monopolists in the market for multi-channel video. The incumbent phone companies, however, have no "prior monopoly" in the broadband market – there is no "prior" market here at all; the market is brand new. The disparate regulatory regimes the Commission has adopted will shape the development of that market, by inefficiently shifting investment in new products and services from the heavily regulated technologies to the unregulated technologies. By picking winners and losers in this nascent market, the Commission ultimately harms consumers.

Thus, the Commission has again placed competitors ahead of competition. By extending to broadband services the entire panoply of unbundling regulation, along with the attendant regulation of price, collocation, operations support systems, and competition in Internet backbone markets, the Commission has labored to boost a host of small firms that do little more than resell the facilities of phone companies. But resale adds little in the way of new value, and the unbundling rules themselves directly inhibit the provision of functional service. It takes a lot of delicate adjustment to overlay a torrent of data on top of a trickle of voice on a mile-long strand of copper. The high-tech business of pulling together high-speed networks has been taken over completely by fractious regulators."

This remark falsely states that cable is a monopoly whereas it is a franchise. It can be replaced or overbuilt at any time. His goal is to get Verizon's loop free from the FCC; then Verizon would unbundle any and all UNEs that any other competitor wants. If Verizon is allowed to do that, it will mean the end of any competition, any alternatives to access, and the beginning of the control of the network as it was before 1982 and the breakup of AT&T.

6.3.10 Key Strategies for Municipalities

Given the above machinations by the RBOCs, it appears that the only viable way to provide local open access is via municipal networks. For any municipality to participate in the telecommunications infrastructure market, they must be aware of how not to fall

[167] See McGarty, Transit, January 2002 for details.

into the traps detailed above. We have suggested in the following table a brief summary of strategies that will be key to any successful implementation of broadband by local government.

Element	*Current Players Strategy*	*Municipal Broadband Strategy*
Overcapacity	• Assumed Internet demand • Assumed local broadband access	• Develop and implement improved metrics for measuring local broadband demand and growth thereof. Make broadband available ubiquitously to proactively spur local economic development • Compete with DSL and CATV • Market truly broadband services ahead of other players
Debt	• Use high yield debt as if it were equity • Assumed unbounded growth in stock market	• Use of municipal project bonds or alternate forms of municipal debt • Possible Federal Government underwriting, subsidization or grants • Low tax-exempt interest on debt
Vendor Financing	• Assumed continued vendor financing • Acquired financing at very high rates	• All capital plant bought via funds from bonds • RFP process to identify lowest-cost highest-quality vendors
Regulatory Confusion	• 1996 Telecom Act was poorly interpreted by FCC • Courts have continually reinterpreted Act FCC takes its lead from major RBOC incumbents and frequently ignores pressure from any new entrant FCC populated by former RBOC executives	• Power of state to act. • Independence of FCC and PUC.
Management	• Management was selected based on ability to raise money and promote stock. • Management commonly lacks operational and technical expertise	• Leverage existing skill sets (e.g. power utilities) • RFP process to attract and identify highest quality management companies
Pricing	• Due to proliferation of entrants, irrational pricing to capture market share at great operating loss	• As dominant player, can control pricing to ensure that assets generate sufficient revenues to pay bonds • No economies of scale locally for infrastructure plant
Monopolistic Practices	• RBOCs have practiced two blocking monopolistic and antitrust practices; access fees and unbundling of network elements.	• Create de facto monopoly for local broadband infrastructure • Requires significant political positioning
Litigation	• RBOCs have continued to litigate against entrants and FCC causing a poorly defined playing field. • Customers are now suing RBOCs using antitrust legislation. • Certain Courts, such as District Federal Court rule exclusively in favor of RBOCs and against FCC	• States typically provides local government Constitutional Authority to proliferate broadband practices • Need for strong lobbying

6.4 Regulatory Issues

There are regulatory and economic issues that have seen significant discussion in the literature regarding the implementation of municipal networks and services of any kind. Carlson states the following:

"Municipally-owned utilities perform cost-efficiently relative to regulated private firms due to the efficiency-distorting effects of regulation. This phenomenon has been noted in the electric industry and is also present in the cable television industry. Private electric utilities have, until very recently, been governed by rate-of-return regulation. Cable operators have been controlled by municipal franchise regulation and federal price regulation, and have also been granted deregulation. These four methods of dealing with the problem of monopoly all produce inefficiencies in private utility provision."

Carlson further goes on to state:

"Recent years have shown that deregulation is an undesirable solution to the monopoly problem. Congress deregulated the cable industry from 1986 to 1992. This six-year experiment revealed the monopolistic nature of the cable market. During this period, cable rates increased at triple the rate of inflation. The economic rents enjoyed by the cable industry during the period of deregulation indicate that the industry is a prime candidate for regulation. The popular discontent with cable deregulation was such that the 1992 Cable Act which re-regulated cable was the only bill enacted during the Bush Administration over the President's veto. The Telecommunications Act of 1996 mandates deregulation of the cable industry by March 31, 1999. This statutory repeal date is now being challenged by the FCC and by members of Congress due to the failure of technology to produce effective competition in the market for video programming distribution."

Carlson further goes on to recount the municipalization of networks"

"The Northeast and Midwest have long been centers of collective action against investor-owned electric utilities. Public power systems continue to be especially concentrated in Massachusetts, Vermont, Ohio, Indiana, Kansas, Nebraska, Iowa, and Minnesota. Many of these states were also centers of the Grange movement in the 1870's, when farmers collectivized to counter the abuses of the railroad industry."

There are multiple regulatory issues of concern here. They revolve primarily around the FCC and the state PUC.

6.4.1 FCC

The FCC has been authorized by Congress to oversee the Telecommunications Act of 1996. As has been shown herein, the FCC has had a difficult task due to litigation and the various Courts attempting to interpret the law for themselves.

However, Federal law broadly permits local governments to provide utilities on a competitive basis. Yet, there has been frequent litigation brought by private companies against public entities on the grounds of violations of due process, equal protection, antitrust laws and the First Amendment. Municipalities have been granted significant room to effect such infrastructure and services by the courts. and therefore, the litigation threat in a Federal Court from establishing an overbuilt broadband network may exist but is both a cost of doing business and is manageable.

The Telecommunications Act of 1996 ("the Act") was passed with the intent of creating a pro-competitive telecommunications policy that would allow all potential competitors, including public utilities, to enter local cable and telephone markets. Most importantly, the intent was to allow for the deployment of broadband types services. This was a major thrust of the Clinton Administration and had been a key effort of the then Vice President Gore.[168]

Congress passed the Act with huge majorities in both houses, signaling a compromise among all the major lobbying interests. The RBOCs and other incumbent local exchange carriers, however, resisted the proposal to open their markets to competition, and demanded concessions from Congress before they would consent to the legislation. Congress proposed a quid pro quo in order to facilitate passage of the statute. The *quid* that Congress granted in return for the *quo* of local competition was that the ILECs would receive the right to operate under substantially less regulation, the right to enter into vast new geographic and product markets (including long distance, equipment manufacturing, and cable television), and the right to form strategic partnerships and other business relationships that had been previously foreclosed to them.

As Carlson states:

"On Capitol Hill, the ILECs submitted to laws that opened local communications markets to all potential competitors. The ILECs wanted to secure Congressional approval of their entry into other product markets, and so they needed to give Congress an unconditional promise to open their local markets to competition. The ILECs thus submitted to very broad pro-competitive language in the Telecommunications Act. Through the Act's passage, the ILECs obtained federal approval of their entry into other lucrative markets.

Congress recognized that the ILECs could poison the compromise once the Act had passed. The legislators anticipated the legal barriers that the ILECs might erect at the state level in order to restrain competition. Congress therefore endowed the FCC with broad authority--and compelled its exercise--to preempt state and local laws that restrict competition."

We have previously demonstrated that the ILECs, especially referring to the Thorne Manifesto, vies deregulation as a right that the incumbent monopolists are due under this

[168] See McGarty, 1990, Harvard, which discusses the NREN, a structure developed to become the Internet.

Act. Carlson states this conclusion fairly clearly in his section. The statement that the FCC had broad authority to avoid poisoning at the state level was very prescient and true. All one has to do is look at the record of litigation we have already presented. Yet the fact is true each time the case reaches the Supreme Court the FCCs authority as ultimate arbiter is upheld.

Specifically, all one has to do is read Section 253(a) of the Act which provides:

No State or local statute or regulation, or other State or local legal requirement, may prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service.

Subsection (d) continues:

If, after notice and an opportunity for public comment, the Commission determines that a State or local government has permitted or imposed any statute, regulation, or legal requirement that violates subsection (a) or (b), the Commission shall preempt the enforcement of such statute, regulation, or legal requirement to the extent necessary to correct such violation or inconsistency.

Congress provided additional strength to the above provisions by mandating its enforcement and by protecting *any entity* seeking to provide telecommunications services. The provision applies to any laws that have the *effect* of prohibiting competition. Whether the phrase *any entity* covers municipally-owned utilities is presently a focus of debate.

Despite the fact that the FCC recently ruled that the phrase in the Act does not directly extend to municipally-owned utilities, the Act suggests that Congress did intend for municipally-owned electric utilities to be covered by the Act's preemption provision. This result was reached by a state court. The appeal of the FCC's ruling to determine the scope of the preemption language is pending before the D.C. Circuit.

6.4.2 States and the PUC

States have diverged in their willingness to permit municipalities to construct broadband networks. Three states have expressly authorized municipalities to own and operate telecommunications utilities. Six states have passed, or are considering, legislation to prohibit municipalities from providing telecommunications services. Other states are governed by general rules--Dillon's Rule--that hold municipalities to affirmative grants of power. These states in effect have prohibited municipalities from providing telecommunications services by withholding express permission to provide these services. This section of the article will suggest why some states have empowered municipalities to provide telecommunications services, while others have sought to restrict their authority. Furthermore, it will distinguish between the two restrictions on municipal authority under state law--anti-competitive statutes and Dillon's Rule. A conclusion is reached that the first set of restrictions on municipal autonomy - the passage

of anti-competitive legislation--is preempted by the Telecommunications Act of 1996. However, the second set of restrictions--the absence of express authority in Dillon's Rule states--constitutes a fundamental tenet of state sovereignty, and is beyond the preemptive scope of the Telecommunications Act of 1996.

The question of whether the preemption provision of the Telecommunications Act covers municipally-owned utilities will largely determine the ability of municipalities to create broadband networks.

There are some states that place very rigid controls over what a municipality can do, this has been characterized generally by what is called the Dillon Rule. Carlson defines Dillon's rule as follows:

"Dillon's Rule is a judicially-enforced rule that has been incorporated into some state constitutions, and that is codified into law in other states. First proposed in 1868 by John Dillon, Chief Judge of the Iowa Supreme Court, Dillon's Rule provides:

[A] municipal corporation possesses and can exercise the following powers and no others: First, those granted in express words; second, those necessarily implied or necessarily incident to the powers expressly granted; third, those absolutely essential to the declared objects and purposes of the corporation--not simply convenient, but indispensable . . ."

Carlson then summarizes the states that permit, deny and otherwise, municipal networks. This is summarized in the following Table.

State Permitted	*State Denied*	*Follows Dillon's Rule*
Iowa Georgia Minnesota	Missouri Nevada Tennessee Texas Virginia	Pennsylvania South Carolina

Carlson finally states:

"Recent history shows that private cable operators have not provided cost effective service. Neither municipal franchise regulation, deregulation, nor price cap regulation are satisfactory solutions to the problem of monopoly. Where public regulation and private monopoly fail, perhaps Milton Friedman's "third evil" of public monopoly is the option that yields the most effective solution. As noted above, public ownership has been a cost- effective solution in the electric power industry. Today, municipalization has re-emerged as the best form of ownership of the information highway."

Now, in the Commonwealth of Massachusetts Constitution, Article LXXXIX, Section 7 is a refinement of the Dillon rule. Specifically it states:

"Section 7. Limitations on Local Powers. - Nothing in this article shall be deemed to grant to any city or town the power to (1) regulate elections other than those prescribed by sections three and four; (2) to levy, assess and collect taxes; (3) to borrow money or pledge the credit of the city or town; (4) to dispose of park land; (5) to enact private or civil law governing civil relationships except as an incident to an exercise of an independent municipal power; or (6) to define and provide for the punishment of a felony or to impose imprisonment as a punishment for any violation of law; provided, however, that the foregoing enumerated powers may be granted by the general court in conformity with the constitution and with the powers reserved to the general court by section eight; nor shall the provisions of this article be deemed to diminish the powers of the judicial department of the commonwealth."

Thus, this typical example requires Legislature approval; in Massachusetts the Legislature is called the general court.

6.4.3 Antitrust Issues

The senior author has argued that effective competition in the local exchange market can only be achieved by the timely unbundling of the ILEC as well as the existing CMRS, the cellular carriers, as well as of the new CMRS.[169] In addition the unbundling should be done at fair and equitable prices. Furthermore we have argued that zero cost access was also an essential element in this overall process. We have developed these arguments based upon three elements; fundamental changes in the technological and operational environment, the application of the Telecommunications Act, and the direct application of the existing antitrust laws.

In many ways this is no longer an FCC or State PUC issue but has been raised to the civil and possibly criminal level of Clayton and Sherman respectively. The latter issue is one of blatant sustained anti-competitive behavior in the local exchange market. Recent evidence brought before the FCC and the State Commissions clearly indicate that there is more than just grounds for investigation.

This section argues further, that the regulatory and administrative law process is rant with delays and inefficiencies. Further, we argue that although the antitrust laws are vehicles for appropriate remedies we should not expect the Federal Government to act on these issues. Thus, it is argued that the civil application of these laws may be the most used and most efficient vehicle for the true development of a truly competitive local, exchange market. Many authors have argued against the antitrust laws but these arguments have been based on much less market power and control that is evident in this case.[170]

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[169] See McGarty TPRC papers.

[170] See the works by Bork and Posner. We generally agree with Posner that economic analysis is the key to determining how to best apply the law in these cases. In fact, we argue that the Posner approach is most likely to be the basis for many of the briefs developed in subsequent litigation.

The essence of antitrust law is to promote competition and not competitors. To do so in telecommunications one must recognize several significant principles. First is the loss of scale. As we have argued, technology is driving scale out of telecommunications. All costs are marginal costs and all average costs approach margin in a precipitous fashion. Second, disaggregation allow for marginal pricing in all elements of the business. Capital plant has been marginalized as a result of technology and operations costs are marginalized as a result of the restructuring of industry. Third, commoditization is the driving factor in telecommunications. A connection is just a connection and differentiation is driven to the periphery of the network. Fourth, prices is cost based, and this means that such artifacts of Rawlsian economics as the Baumol-Willig theorem have no place in a competitive environment, and the only maximization allowed is consumer welfare.

These four conclusions drive our analysis along antitrust grounds.

1. Telecommunications, especially at the local exchange level, has and still is a monopoly.

2. The 1996 Act took away any last vestige of antitrust protection from the ILECs, namely the RBOCs.

3. The main issue is interconnection and the secondary issue is unbundling.

4. Interconnection is dominated by tying arrangements which are directed at the elimination or thwarting of any competition as well as the competitors.

Thus, the conclusion is quite clear. Implementation of the 1996 Act will require aggressive prosecution of the antitrust laws. This prosecution will most likely be done by the new incumbents and not by the Government since such acts on the Governments side have become a conflict between all three branches of the Government.

The following Table presents a summary of the antitrust cases and their application to the telecommunications market.

Case	***Cite***	***Decision***	***Relationship***
United States v. Loew's, Inc.	466 U.S. at 13-14 citing 371 U.S. 38 (1962)	Court held that Loew's violated § 1 Sherman because of block booking despite having only 8% or market share but Court ruled that "requisite economic power is presumed when tying product is patented or copyrighted".	Any patent protection by the RBOC is putatively proof. The extension to this is the RBOCs ability via the standards setting body or even via the regulatory bodies to establish de factor "patent" rights by their presences in the market as the participant controlling the definition of interfaces.

Case	*Cite*	*Decision*	*Relationship*
United States v. Jerrold Electronics Corp.	466 U.S. at 23, aff'd per curiam, 365 U.S. 567 (1961)	Issue of two separate products. Court focused on three elements: 4. Firms other than Jerrold sold the products separately. 5. Jerrold priced the product separately. 6. Jerrold's packages were customized suggesting separate products.	The issue is the separability of such products as ILEC interconnection and airtime. Also airtime as merely the provision of connections and not bundled with other separable products.
United States v. Fortner Enterprises (Fortner I)	394 U.S. 495 (1969)	Reiterated Northern Pacific. Namely; ...a total monopoly is not essential, rather the key is whether some buyers can be forced to "accept a tying arrangement that would prevent free competition for their patronage in the market for the tied product"	This is the case with ILEC and the airtime issue. The tying applies to the bundled CMRS opportunity as well as the bundling into the pricing algorithms used by the PUCs. The clear way to eliminate this ruling is to go to Bill and Keep.
United States Steel Corp. v. Fortner Enterprises (Fortner II)	429 U.S. 610 (1977)	US Steel credit company had insufficient market power. The Court concluded that a tying arrangement existence is insufficient unless the entire deal makes consumer worse off than they would be in a competitive market.	The issue is the consumer welfare and this is driven by clearing the market with the most efficient use of capital by the most efficient producer of the overall product. Clearly, in the case of interconnection, be it for local service or interconnect, the consumer is better off with a lower price, which has been shown via the IEC competition to be a direct result of competition.
United States Shoe Corp. v. United States	258 U.S. 451 (1922)	The Court ruled that "while the clauses enjoined do not contain specific agreements not to use the machinery of a competitor of the lessor the practical effect of these drastic provisions is to prevent such use."	Clearly the specific enjoining of usage is not required only the effect thereto. The application herein relates to the specific use of tandem offices that may be a back door into increasing access fees.
Unger v. Dunkin' Donuts of America, Inc.	531 F.2d 211) 3d Cir. 1971)	Court held that the seller's power could be inferred from: 4. coercion. 5. resolute enforcement of a policy to "influence" buyers to take both products. 6. widespread purchase of both products by buyers.	Clearly there is a form of coercion as argued supra and there is significant influence. There is no widespread purchase of both other than is the small segment of competitors. We have demonstrated these elements in this section.
Times Picayune Publishing Co. v. United States	345 U.S. 594 (1953)	Clayton was only to commodities. Government evoked § 1 of Sherman. However although in § 3 of Clayton either "monopolistic position" or restraint of significant volume of trade was required, in Sherman both were required.	The issue is whether the products are products or services. If ruled services still have protection but a sharper issue to prove. Clearly the issue here is services.

Case	*Cite*	*Decision*	*Relationship*
Siegal v. Chicken Delight, Inc.	448 F.2d 43 (9th Cir. 1971), cert. denied, 405 U.S. 955 (1972)	Court found against Chicken by stating that if it had been secret recipe than it would have been acceptable but that defendant could have provided specifications for materials and the Plaintiff could have achieved the same results. Court ruled that three elements must be shown: 4. the scheme in question has two distinct items and provides that one may not be obtained without the other. 5. the tying product posses sufficient economic power to appreciably restrain competition in the tied product area. 6. a "not insubstantial" amount of commerce is affected.	Two distinct have been proven supra, economic power id evident via the monopoly control, and commerce is telecommunications which is per se "not insubstantial".
Northern Pacific Railway Co. v. United States	356 U.S. 1 (1958)	Court condemned the freedom of choice for consumers. Court held could show monopolistic control by simply showing "sufficient economic power to impose an appreciable restraint on free competition of the tied product". Court held the per se rule by stating: "tying arrangements serve hardly any purpose beyond the suppression of competition..."	Argue that "per se" rule can be applied directly. This is applicable to all elements of these arguments.
Kentucky Fried Chicken Corp. v. Diversified Packaging Corp.	549 F.2d 368 (5th Cir. 1977)	Court upheld Kentucky because there was no real coercion. Kentucky had approved other suppliers.	Not allowed to choose other suppliers thus a violation and Kentucky does not apply. This also applies since the monopolist controls the market.
Jefferson Parish Hospital District No. 2 v. Hyde	466 U.S. 2 (1984)	Set out five elements for successful tying: 6. must effect more than de minimis amount of interstate traffic. 7. tie is not express and coercion to buy the tyed product is evident. 8. two products must be separate. 9. defendant must have economic power. 10. no valid business reason for tying. Court in Jefferson ruled that Jefferson had only 30% of market power and thus did not force "customer" to buy product. Court stated, dicta, that: "to force a purchaser to do something that he would not do in a competitive market" was condemned.	Have proved all elements supra. Also this extends the per se rule to this violation. This case has been discussed extensively in the body of the section.

Case	*Cite*	*Decision*	*Relationship*
International Sale Co. v. United States	332 U.S. 392 (1947)	Defendant may insist upon a tied sale when the quality of the tied product affects the operation of the tying product. Tying arrangement is not justified when the defendant can set quality standards for the tied product.	No issue of quality changes can be made in the issue of interconnection. Specifically, with the establishment of standards there is now a set of open and definable interfaces and performances and certifications that these interfaces must comply with. Thus any grounds from this case do not apply.
International Business Machines v. United States	298 U.S. 131 (1936)	When the tied sale is not accompanied by escape clause for the buyer who finds a better price then the tying arrangement can be used to price discriminate.	No escape clause allowed is one option to consider an antitrust case. We extend this to cover the inability to interconnect as a per se barrier to entry since it automatically precludes any competitor to enter the market in any efficient manner.
Henry v. A.B. Dick	224 U.S. 1 (1912)	Allowed defendant to force users of patented duplicating to use its section.	This cases may have some benefit t o the ILEC but we believe that it is irrelevant since the defendant in this case had no monopoly position and it could be shown that there was some justification for the tying. Again, in the interconnection world there is a clear precedent for separation and the elimination of the tying arrangement.
Eastman Kodak Co. v. Image Technical Services, Inc.	112 S.Ct. 2072 (1992)	Court reaffirmed the view that products are separate when there is sufficient consumer demand to justify firms providing one without the other.	This extends the per se rule and reads onto the cases presented in this section Moreover, the issue of bundling is at the heart of the current debate regarding interconnection. The ILEC is forcing companies to interconnect at the access tandem levels and will not allow them to select their own interconnect. They are bundling transport and switching and pricing it a factor of ten to twenty times their Long Run Average Costs. .

6.5 Services and Network Architecture

6.5.1 Services

The town, with suitably outsourced advisors, contractors and vendors, can facilitate establishment of open-access local broadband communications infrastructure and services available to homes and businesses in the Town through innovative financial, technological and business processes.

By developing an open-access broadband infrastructure, the Town can unbundled the network and provide wholesale network access to service providers including Internet Service Providers (ISPs), Internet Access Providers (IAPs), cable companies, content providers and data hosting businesses. This assures a level playing field and creates a competitive environment which in turn will likely manifest in low prices, high quality of service, and a diversity of broadband products and services to customers.

The system may provide, at a minimum, the following general services:

***Voice*:** The system may provide full switched toll grade quality voice service. The voice quality may be telephone toll grade or better and there may be no delays in speech that

are perceptible to the user. The user may interface with the system by a standard method or means typically being an RJ-11 standard telephone jack employing their own standard telephone in the case of a residential user. The voice user is not expected to change any of their infrastructure interfaces. The "normal" telephone connection may be provided by means of the local interface unit, the LIU. The LIU may be compatible with any and all normal accepted telephone interfaces. The system must also provide all typical custom calling and CLAS features as expected in normal deliver of a competitive wire based telecommunications service.

***Low Speed Data*:** The system may be able to provide data at the rates of 56 to 1,500 Kbps on a transparent basis and have this data stream integrated into the overall network fabric. The system may handle all data protocols necessary in a transparent fashion. The network may allow local access to value added networks from the local access point. The low speed data may be provided for over a standard voice circuit from the users premises as if there were no special requirement. There may be toll grade or better quality. The system may also be capable of support all Group 3 fax services.

***Medium Speed Data*:** The network may be able to handle medium speed data ranging from 1.5 to 45 Mbps. The interfaces for such data may be value added network local nodes. Medium speed data may be provided for over a standard circuit from the users premises as if there were no special requirement. These may be toll grade or better quality.

High Speed Data: Data rates at and in excess of 45 Mbps may also be provided on an as needed basis and a dedicated basis. The data rates may be between 45 Mbps and a maximum of 2.5 Gbps. Also it may be required to provide access to such high-speed data services as Fast Ethernet and FDDI at 100 Mbps. This may require both physical layer interfaces and the data link and network layers as specified in the particular protocol. The system must also support multiple layer protocols including TCP/IP. Also the data must be point-to-point, point-to-multipoint, and multipoint-to-multipoint.

Video: The network may be able to provide the user with access to analog and digitized video services. This may also enable the provisioning of interactive video services. The video services may enable a system with a minimum of 150 video channels of remote programming, ten channels of local off-air programming, and 20 channels of locally generated programming. The interactive video may allow for ten channels of pay per view at a minimum, and interactive channels for local information selection. Video must also support such tiered services as basic, premium, pay per view, and interactive. The inputs to the system are from such sources as off-air, local generated, satellite, and other sources. Sources may be analog or digital, encrypted or not.

6.5.2 Technical Alternatives

There are multiple network designs that can be used to deploy local fiber broadband services via fiber to the home (FTTH). The factors that control what speeds are provided are the technology components that are installed at the end points of the fiber network;

the residence/business and the service provider's Point of Presence (PoP), which may be the head end, local hub or Central Office (CO). The main forms of FTTH architecture are the following:

(i) "Home Run" systems: a separate fiber or fiber pair runs all the way from each home/business to the PoP. In this design, there is no sharing of fiber; therefore, this offers the ultimate performance with the most flexibility. Independent providers can deploy technology of their choice with minimal compatibility and interoperability issues. In addition, the end-point equipment attached to each fiber can be independently upgraded. However, the costs of installation of this design are usually prohibitively high and is overkill in terms of performance capabilities.

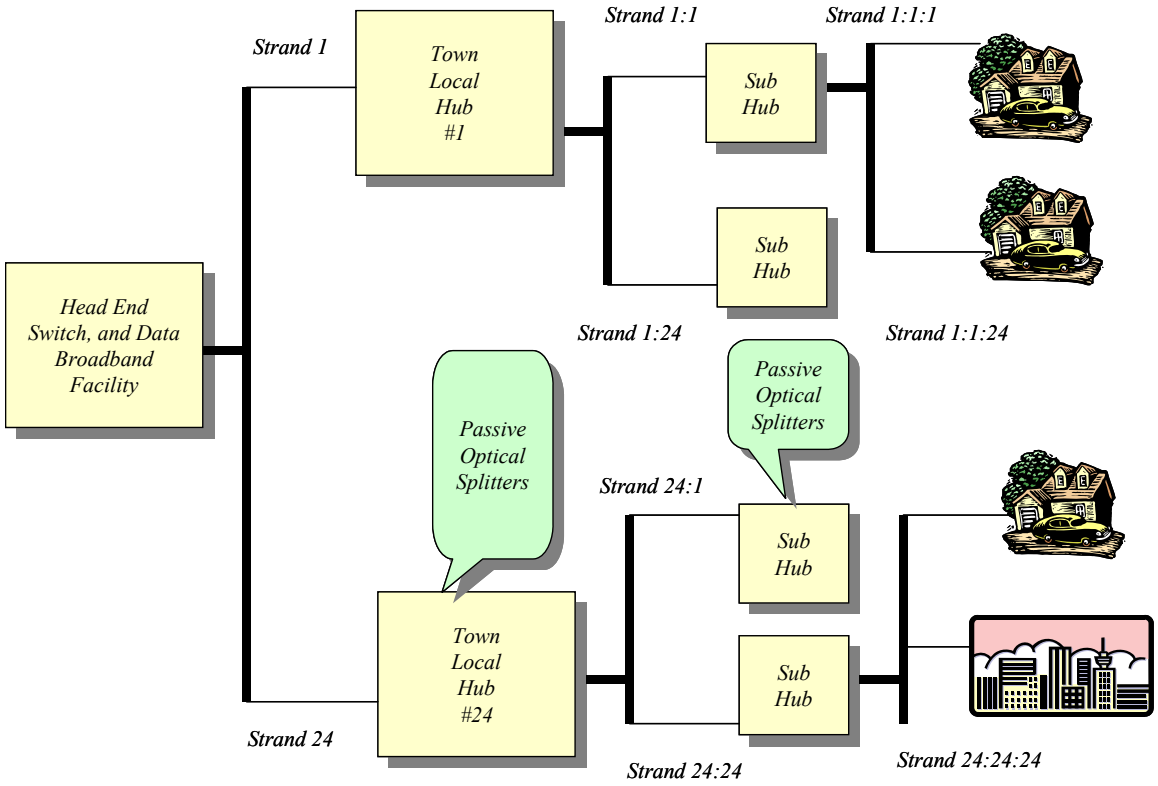
(ii) Passive Optical Network (PON) or "Passive Star": a single fiber or fiber pair runs from the head end to a passive optical splitter that is located at a local hub (also called a remote terminal or just "remote"). Single strands of fiber then run to a group of homes or individual homes or businesses. The optical splitters are quite compact and simple. The absence of active electronics in the field and the simplicity of design yield lower life cycle costs. In addition, the passive nature of the optical splitters avoids the need to have power systems at the remotes, thus increasing the reliability of the entire system. In addition, overall maintenance costs are reduced. The disadvantage of this design is that terminal and head end equipment may have to be simultaneously upgraded to ensure compatibility and interoperability.

(iii) FTTH with Fully Active Elements or "Active Star": in this architecture, fiber runs from the head end to one or more stages of remote terminals at which the signals are switched among fibers that then feed individual premises. Ethernet switches are typically used at the remotes. The primary disadvantage of this design is the need to have robust power systems and material real estate at the remote terminals; this generally yields a much more expensive system in the long run compared to the PON architecture.

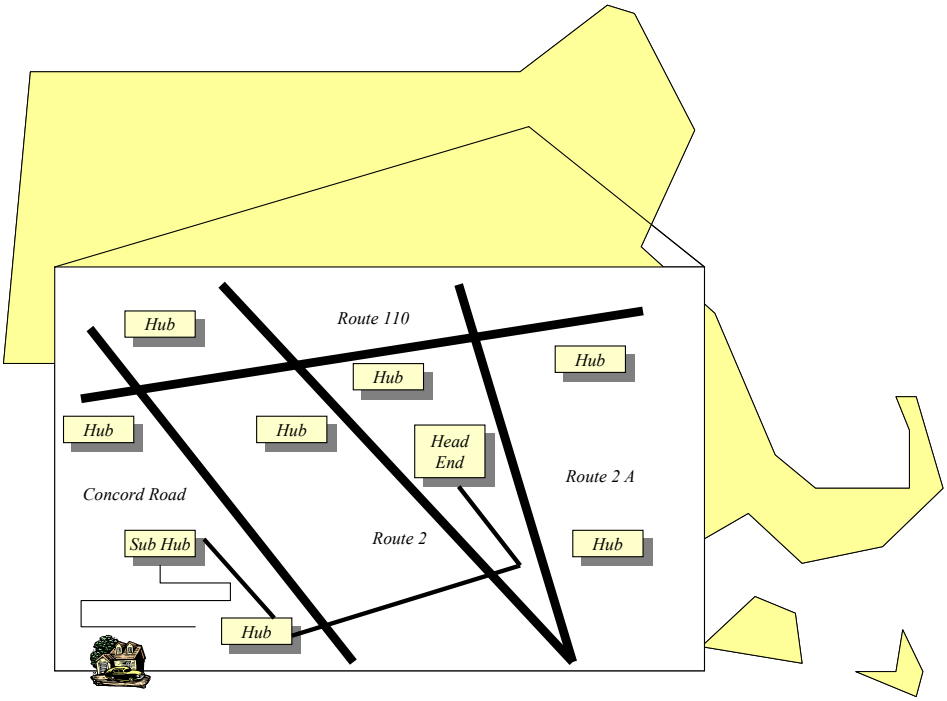
6.5.3 System Architecture

The proposed model for implementation herein is a passive optical network, PON. As mentioned before, the PON approach affords the lowest costs for installation as well as long-term operations and maintenance.

The typical PON architecture is shown below.



A typical town layout, using Acton, Massachusetts, is shown below:



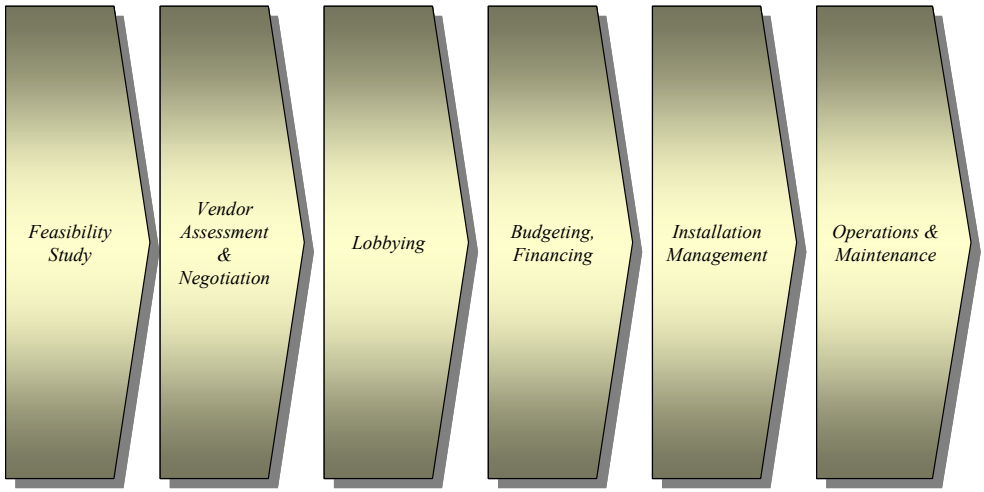
6.5.4 Network Costs

The modeling of the costs associated with the deployment of such services is generally well understood. It consists of the local plant, the customer interconnect, and a hub facility to support the services interconnection. This section presents some of the modeling assumptions and conclusions.
The following table presents the details of the approximate network capital costs.

Capital Costs	***Assumptions***	***Results***
• Fiber Installation, New Trenching: $40,000 per mile • Fiber Installation, Existing Conduits: $10,000 per mile	50%-50% split between new trenching and existing conduits	$25,000 per mile
Fiber Cost: $1,000 per mile per strand	2 strands per segment (1 pair)	$2,000 per mile
Optical equipment and buried installations: $4,500 per mile	PON architecture	$4,500 per mile
FTTH drop and installations: $750 per home	• Home has 150 foot frontage, or 40 homes per mile • 25% penetration of homes, or 10 homes per mile	$7,500 per mile
TOTAL		**$40,000 per mile**
TOTAL per Home	10 homes per mile penetrated	**$4,000 per home**

6.5.5 Implementation and Execution

The actual implementation of this system is portrayed in the following figure. There are six major steps:



1. Feasibility Study: This effort is a detailed feasibility study of the market, the costs to deploy, and the ability of the town on a project basis to pay back the bond.

2. Vendor Assessment and Negotiations: This is extensive negotiations, potentially in an RFP process, with the possible vendors to seek the best terms for the purchase of the equipment and the subsequent maintenance support. It must be remembered that most vendors make their money on the ongoing maintenance and spare agreements. These must be carefully negotiated because they may become a significant factor in latter years of operations.

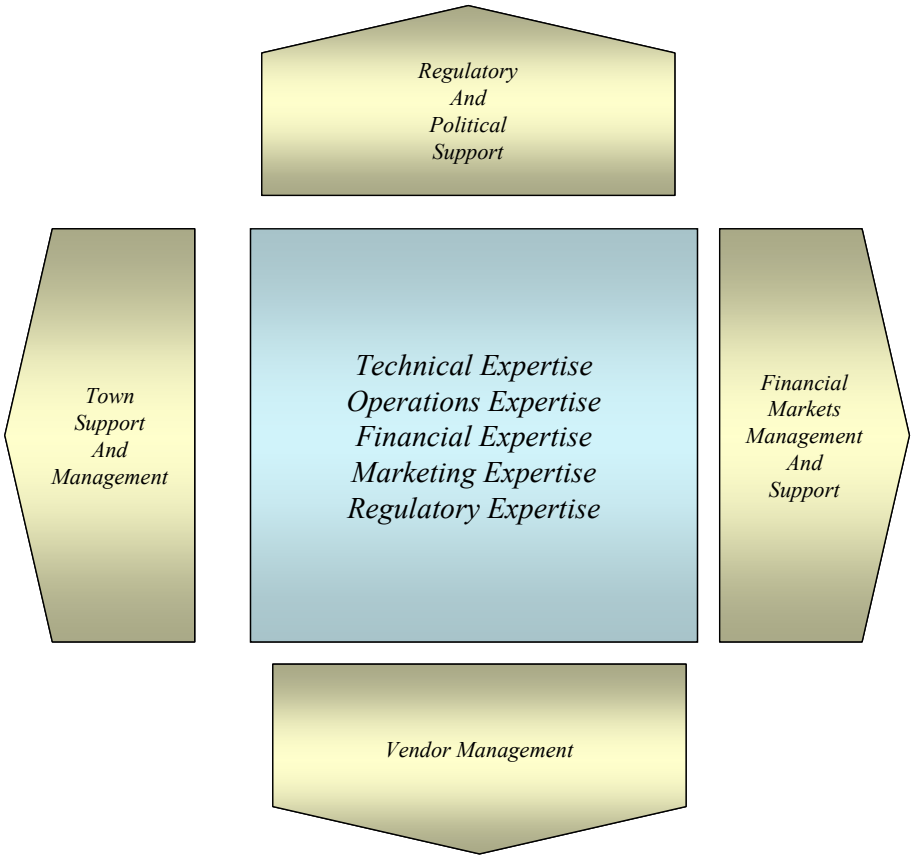
3. Lobbying Support: Lobbying support is critical. It is a process of dealing with the state and federal government, legislative and executive, FCC and PUC and others as required. It may not be that costly on a scale basis but is a significant factor.

4. Budgeting and Financing: This has two components: (i) development of a detailed budget for the project, and (ii) bond financing proposal: this effort is the first step in meeting and selecting underwriters of the bonds. This is a critical stage since what is presented and the selection of a quality underwriter will determine not only the terms of the bond but the very success of the offering. This is This is followed by the bond road show. It requires the underwriter the town and the support staff.

5. Installation Management: This is a general management function that requires significant experience in deploying fiber networks and infrastructure.

6. Operations and Maintenance: This is the ongoing operations and maintenance of the network and support of third party vendor interfaces.

The following depicts the internal expertise and the external interfaces required in the successful deployment of such a system. Clearly the external areas of regulatory and town management are highly interconnected and are a natural extension of what a town does. The areas of vendor management and bond management are extensions of town functions but possibly on a larger scale.



6.5.6 Competition

The competition and their strategies are depicted in the following table.

Company	Comments	General Business Position
RBOC (e.g. Verizon)	• Slow migration in region • Has very weakened financial position • Limited IP infrastructure	• Monopolist
CATV (e.g. AT&T Broadband)	• Not building capital plant out • Has weak IP capabilities	• Serious financial problems • Lacks strategy for deployment
DSL (e.g. COVAD)	• Focuses on corporate customers and ISP's	• Initial entry still limited. • Limited network • Coming out of Bankruptcy • Business model does not allow cost-effective service to residential customers
CLEC (e.g.)	• Difficult business environment, even for basic services	• May not have access to capital for required buildout

6.5.7 Benefits of a Municipal Broadband Network

Building an open-access local broadband infrastructure provides a Town with numerous benefits that easily compensates for the costs of the project. It is becoming increasing evident that Towns in suburban and rural areas are deriving much more than the most apparent benefits of publicly owned broadband infrastructure such as the addition of jobs and tax revenue; in fact, there is an overall better quality of life to be gained as indicated in the following points.

1. Ubiquitous Coverage: As indicated before, the current business economic climate will not permit private enterprise to establish and operate broadband networks, especially in sparsely populated areas. A mission-driven project by a Town to bring broadband to its citizens appears to be the only solution to the quandary.

2. Efficiency: A Town may be able to leverage existing fiber strands installed by a municipally owned power utility, as well as corresponding telecommunications systems and facilities like backup power equipment, network monitoring systems, remote terminals and associated real estate. In addition, the Town may be able to utilize expensive Rights of Way owned by municipally owned utilities as well as tap into their existing telecom personnel for expertise.

3. Enhanced Services: Through unbundling of its broadband network to service providers, the Town could spur a diversity of value-added products including Voice over IP, flexible bandwidth, digital cable, video on demand, streaming media, etc.

4. Economic Development: A broadband network could act as a magnet to businesses. A common concern for both new-age as well as traditional businesses is the presence of a reliable high-speed communications system.

5. A Community Asset: A local pervasive broadband system operating profitably could improve the tax base and be a real asset to the Town. It could also favorably change the property taxes in the area as well as improve the credit standing of the Town so that cost of borrowing is reduced.

6. Competition: It is a common fact that a Town, by operating its own broadband network, can favorably influence the pricing as well as quality of communications service provided by private operators to its citizens.

7. Lower Life Cycle Costs: By installing an open-access fiber broadband system that is marginally over-engineered, the need for future upgrades and installations can be minimized. In addition, street-diggings can be avoided as well since fiber cables have a life span of 20 years.

8. Improved Government IT Integration and E-Government: Government data systems could be better integrated and business/technical processes standardized. E-government

services such as tax collection, payroll, utility services and billing could be offered online in a broadband environment.

9. Security: The need for an integrated high-speed communications infrastructure at both a national and a local level has taken on new meaning after September 11th, 2001. No local government can ignore the importance of having a reliable broadband communications network connecting hospitals, schools, businesses and broadcast companies to provide notification and rapid response in the event of emergencies.

6.6 Conclusions

It is clear from this analysis that a municipal broadband network is very viable. In fact, it may be the only way certain areas will be able to get such broadband facilities. If a town views the existence to broadband as both a social imperative as well as an essential element to retain and attract businesses, then the ability of the town to implement this service will be critical.

This section has made several observations on where the market is going, what the opportunities are, what the needs are, and several ways to best meet the needs. What is clear is that there is a clear and unambiguous need for some entity to provide broadband services to municipalities. The provider must be able to do so in a fully open network fashion.

It is also clear that the ILECs, as Verizon has shown in the Thorne Manifesto, that the ILECs have a strategic interest in broadband if and only if they can recreate their own monopoly and have full deregulation on pricing. This should be totally unacceptable to any rational person.

The cable companies are clearly struggling for market share and they have limited abilities in today's financial markets to remedy and expand their networks.

Thus the opportunity is here and now for a municipal network build-out. Clearly the opportunity is as follows:

1. Establish a consortium, region by regions, of municipalities who want to build networks.

2. Prepare Feasibility Studies to ensure that there is a viable market.

3. Use municipal tax-exempt bond financing, especially with today's rates, to secure very cost effective financing of the projects.

4. Use experienced third party management and contractors for the build and subsequent operations.

5. Provide a single point of presence, the meet point, for the provisioning of a broad set of services,

This strategy is readily reproducible in many municipalities and many markets.

7 CURRENT TELECOMMUNICATIONS LEGAL ISSUES

7.1 Introduction

The telecommunications industry is wrapped in a complex fabric of legislation and litigation. It is a combination of administrative, tort, constitutional, and criminal law. It is woven from the fabric of 19th century monopoly thought and 21st century technology. This section address the key issues from a legal perspective as regards to the evolution of the technology and legal implications as well as drivers. Unlike any other industry, telecommunications is a legal industry. As had been said about Bill McGowan, when he was at MCI, the predecessor of Worldcom, MCI was a law firm which ran a telephone network. In fact today the industry is a law firm running a telephone industry, but one trying to get into the 21st century.

We begin this section with a brief overview of the 1996 Telecom Act. Then we commence to address the recent legislation and litigation which currently flows within this business. The Telecom Act of 1996 is just one of many stepping off points for the telecom industry. The MFJ of 1982 was even more so. The Telecom Act did not change the industry, it introduced more law, more complexity, and more litigation. It was in one sense liberalizing and in another constraining. We attempt in this section to outline all of these elements.

This section starts with the 1996 Telecommunications Act. It then discusses several of the Acts issues in some detail. Then it frames the antitrust issues relating to the Act. The Act expressly removes antitrust protection from the monopoly telephone carriers, the RBOCs or ILECs, whichever term is used. Then we discuss the issues relating to recent litigation on the issue of privacy. This issue is critical since it represents an clear and present threat to individual privacy and shows the true nature of the RBOCs in terms of their relationship to their customers. Then we discuss recent litigation regarding municipalities and proposed changes by the RBOCs to prevent municipalities from exercising their constitutional rights.

The picture which emerges from this analysis is that for the consumer litigation rather and legislation may be the only option. As has been discussed elsewhere by the author[171], the RBOC themselves have severe internal problems and their approach is to attack everyone, even the consumer, to achieve a hegemony for control. The recommendation is that the only option being litigation, it must be exercised fully.

7.2 The 1996 Act

The Telecommunications Act of 1996 has provided for the open competition in the Local Exchange Carrier markets. There are several factors that make this new competitive

[171] See McGarty, The Imminent Collapse of the Telecommunications Industry, August, 202.

environment dramatically different from that of the Inter Exchange Carrier markets in which AT&T and MCI and others found themselves in 1984. Specifically, there is a technological change wherein the issue of economic scale has been eliminated, namely there are de minimis entry barriers from an economic perspective. The barrier to entry is the issue of Interconnection, which simply stated is the need to connect from one new LEC entrant to the existing monopoly LEC player, specifically the RBOC. Thus there exist many new and significant legal issues relating to the implementation of such fair and equitable interconnection. The FCC in its role as Administrative Agency has taken steps effective August 8, 1996 to promulgate rules of behavior.[172] The alternatives available if such rule fail to provide for a competitive framework are the antitrust laws. This new area for antitrust law is one that rejoins many of the issues that were thought to be left behind at the time of the AT&T divestiture.

The Act as amended in 1996 has removed antitrust protection from the telecommunications industry.[173] In light of that fact, it is necessary to reexamine the implications of the many arrangements that have been customary practice, and view those arrangements in the light that all other similar arrangements can be viewed in all other industries. From an historical perspective, the Antitrust laws have been used to manage the gross misconduct of larger entities in existing competitive markets. In the case of local exchange telecommunications, however, there is a sharp distinction. Namely, the existing entities are the only player in the market and thus have essentially full monopoly control. The 1996 Act in Sections 251 and Sections 252 provide a vehicle that allows new entrants into the market so that a competitive environment may evolve. The issues however focus around the approaches taken in the new Act and how they may be interpreted.

Reed Hundt, the Chairman of the FCC and former practicing antitrust attorney, recently remarked about the relationship between interconnection and antitrust law:[174]

"When cases like Standard Oil and Alcoa were decided, our economy ran on oil and metal. Our economy now runs on impulses of digital bits transmitted via fiber, wire or the ether. It is high time that the communications industry (so vital to our country) operate under the same pro- competitive policy as every other industry in the U.S. And -- despite the intricacies of our legal culture, which has at least given an interesting and rewarding life to the lawyers in this room – I am confident that this will happen and happen quickly."

It is clear that with the 8th Circuit Court intervening on the behalf of the monopolists and the Supreme Court has recently upheld this. Hundt's point is very significant in that the Courts have addressed monopolies I oil and transportation when they were the key

[172]See FCC First Report and Order on the Implementation of the Local Competition Provisions in the Telecommunications Act of 1996. These relate expressly to Sections 251 and 252 of the Act.

[173]See Section 601 of the Act.

[174]See Hundt, October, 1996.

elements of our society, whereas the Courts are seeming to take a strong pro-monopoly position when telecommunications is at the center of our growing economy.[175]

There seems to be no question but that Congress had the intent to create competition in the Local Exchange markets. The wording of the Act and its reflection in the Commission's attempt to clarify certain issues leads directly to that belief. However, it has been seen that the Incumbent LECs, namely the RBOCs, have a strong and vested interest in delaying or prolonging that effort. The track record of companies such as NYNEX are clear in their continued attempts to delay the entry of companies such as MFS and Teleport ,especially through the process of state regulatory delay. The Commission has the set of certain authorities in the new Act to facilitate this process and create a more competitive environment but the States retain certain controls and interests.

Furthermore, telecommunications has, as a result of the Act, become potentially a more competitive environment. Despite the intention to allow competition, the industry also has certain existing structures and interlocking relationships that permit the incumbents to retain significant share by blocking the entrance of new players. This section focuses on the local exchange market in which the local exchange carrier, "LEC", is the principal player. Twelve years ago the interexchange market was opened up to full competition. The result is an network that allows for strong competition with even stronger competitors. The local exchange market is closed. This section provides an overview framework for this market, the technological change agents that make it dramatically different from other markets, and the re-application of antitrust law from the perspective of maximizing the public welfare, independent of the individual competitors.

There are several significant changes that are also occurring in the delivery of these types of products that will allow for the dramatic entry of new competitors. These will also be explored. Specifically, technology allows for disaggregation of functions in the delivery of the product. Technology also allows these functions or product elements to be delivered at marginal prices since the inherent scale in the industry is disappearing. Namely the scale economies of copper wire and large switches is now being replaced by the scale-less technology of wireless and ATM or frame relay switching.

The main objectives of this section are to discuss the following issues:

ix. *What is the competitive environment that a new local exchange carrier faces in the market with the structures imposed by the modifications to the Act.*

x. *How can the Incumbent Local Exchange Carriers ("I-LEC"), namely the RBOCs, exercise their current monopolistic control to delimit new entrants and how can the new Local Exchange Carriers compete. Specifically, is there a viable competitive dynamic in this market under the new law.*

[175]Posner, see Posner references, has developed a significant theory of justice based upon the economic structure of utility and justice. I believe that one can take a Posnerian position that states that the monopoly should be totally abandoned and that there are clear economic structures in place that can handles these changes. The Courts on the other hand seem to be taking a mid-nineteenth century position which reflects pr-Sherman doctrines.

xi. What is the role of the Commercial Mobile Radio Service ("CMRS") and Competitive Local Exchange Carriers ("C-LECs"), and how are they integrated into the telecommunications environment.

xii. What are the unbundled elements that the I-LEC and the CMRS can provided to a the C-LEC in this competitive market.

xiii. What is the current Administrative and Federal law as regards this competitive environment and what is the impact on antitrust law as applied to this area.

xiv. How are the un-bundled elements and interconnection and access currently provided and is the means and methods of the current provision a "tying arrangement" created by the incumbents as a means to eliminate any competition and is such action an antitrust violation?

xv. How should these unbundled elements and interconnection be priced and what is the relative pricing of these elements within the I-LEC and to the C-LEC. Namely, is predatory pricing an issue of concern hereby the I-LEC against the C-LEC and the CMRS.

xvi. Where is the point of regulatory control and where is the point of antitrust control in this market? Namely, does the Department of Justice Antitrust Division have any role to play or should this be disputed as civil proceeding amongst and between the competing parties. More specifically, is there an over-riding Federal concern[176].

7.3 Regulatory Framework

The regulatory framework has changed dramatically with the passing of the 1996 Act. The Act recognizes that the I-LECs, the incumbent LEC, namely the RBOCs, have had monopoly control, and that for competition to exist, the I-LECs must unbundle, interconnect, co-locate and provide other similar services. Failure to provide such services would result in the FCC refusing to allow the I-LECs to enter certain markets, such as long distance services and manufacturing.

The 1934 Act codified a monopoly around the AT&T structure. The first major crack occurred in the Modified Final Judgment and the separation of Interexchange Services. This allowed new entrants into the IEC business and thus permitted the rapid growth of Sprint, MCI, LDDS (now WorldCom), and others. In 1996 the IEC business is

[176]The concern is that this is almost a trillion dollar industry representing over 20% of the GDP and the DoJ has spent a great deal of focus on the Microsoft antitrust issues despite the fact that there is a clear and present danger that the incumbent carriers, namely the RBOCs, have maintained a monopoly hold on this dominant part of our economy. The DoJ under the current administration has almost a totally laissez fair approach to regulating this industry and in fact in even enforcing the law.

approaching a competitive market with prices generally reflecting commodity pricing with the market share distribution being that of a competitive market.[177]

The view also taken by Congress and the Commission is that there are two elements that are drivers for the rapid introduction for competition; technological innovation and price reduction. The Congress in the new Act has stated in many places that there is a need for technological innovation and that this can best be achieved via a competitive environment. The case of long distance has been a clear case where this has been proven to be the case.

There were previous arguments support monopoly in the case of a telecommunications environment, especially from Alfred Kahn who noted[178]

"We have already alluded to the technological explosion in communications after World War II,...The case for a national telecommunications network monopoly has the following aspects ... Aggregate investment costs can be minimized.. if the planning for the installation and expansion is done with an eye for the total system....Since any one of the 5 million billion possible connections that the system must stand ready to make at any point in time may be performed over a variety of routes....justifies the interconnection...completely dependent on its own resources alone."[179]

This argument for interconnection, combined with transport and control (namely horizontal integration) was valid in 1970. It however is not valid today. They are separable functions and scale economies are in the hands of the CPE manufacturers not the network providers. In effect, there exists no monopoly in interconnect as a result of these technology changes. This is a dramatic change from 1971 and Kahn's analysis.

Historically, a more chilling argument trying to eliminate competition on the local loop was given by an AT&T executive. Consider what was written by a Bell System polemicist in 1977 at the 100th anniversary of the Bell System at MIT. The author was John R. Pierce, Executive Director at Bell Labs, who stated:

" Why shouldn't anyone connect any old thing to the telephone network? Careless interconnection can have several bothersome consequences. Accidental connection of electric power to telephone lines can certainly startle and might conceivable injure and

[177]Economists will still argue whether the IEC business is competitive or a cartel. The measure of cartel like behavior is generally driven by the distribution of market share. Porter has shown that in a purely competitive commodity market the markets shares are 40%, 30%, 20%, and 10% going to all others. This case at hand is one wherein the AT&T share is about 60%, MCI at 20% and all others at 20%. Thus the argument may not be complete for full competition but is has gone a far distance in ten years.

[178]See Kahn, (II, p 127).

[179] It should be noted that Kahn was the father of airline deregulation, less than a smashing success. He has recently taken the pro-monopoly position that there should be highly delimited interconnection to the incumbents, thus allowing them continuing monopoly control. Kahn has little understanding of the technological changes and thus his view is that of a 19th century monopoly regulator rather than that of 21st century market liberator. See A. Kahn, Telecom Deregulation: The Abominable TELRIC-BS, see www.connective.com/events/manhattaninstitute/.

kill telephone maintenance men and can wreak havoc with telephone equipment. Milder problems include electrically imbalanced telephone lines and dialing wrong and false numbers, which ties up telephone equipment. An acute Soviet observer remarked: "In the United States, man is exploited by man. With us it is just the other way around." Exploitation is a universal feature of society, but universals have their particulars. The exploitation of the telephone service and companies is little different from the exploitation of the mineral resources, gullible investors, or slaves.[180]

The readers should note that this was written nine years after the Carterfone decision and five years before the announced divestiture. Pierce had a world view of an unsegmentable telephone network. This section has the view of a highly segmentable communications system. The world view of the architecture has taken us from "slavery" of Pierce to the freedom of the distributed computer networks of today. Kuhn has described technologists as Pierce as the "Old Guard", defenders of the status quo. They defend the old paradigms and are generally in controlling positions for long periods of time.

7.3.1 Legal Framework

The 1996 Act introduced the first glint of competition in the local exchange market. The Act thus amended the 1934 Act and took steps to eliminate the MFJ. The new Act allowed for entrants into the strongly monopolistic local exchange market. It must be noted that the LEC business is dramatically more complex than the IEC or long distance business. Long distance requires transport, simple switching and interconnection to a local carrier. All IECs pay the same rate to the I-LECs and thus they all have the “water” raised the same amount so that there is no inherent competitive advantage. However this is not the case in LEC competition. The new LEC must build out a plant and interconnect. It is this action of interconnection or accessing the incumbent LEC that is the issue for any antitrust concern. This is the point at which the existing monopolist can create a barrier to entry to any competitor. The new law mandates competition but the Administrative interpretation of that law can be weak and delayed. Both weakness and delay can eliminate any competitor no matter how well the words of the law are phrased.

Regulatory delay has been the strong card of any I-LEC in dealing with new entrants. The new entrant is much less capitalized than the RBOC and thus by dealing with the regulatory bodies the new entrant is weakened, has its financial resources reduced and ultimately is placed in a strongly disadvantageous position. We argue in this section that the vehicle for effective competition in this new market is via the antitrust laws and not only by the Administrative process.

The legal framework that we shall pose are legal requirements posed in Sherman, Clayton and the FTC Act. These laws are at the heart of the Federal jurisdiction in controlling competition and ensuring that monopoly players would not have dominant control. Unlike the breakup of long distance telephony, the LEC market is a significantly greater monopoly. This monopoly is controlled by the RBOCs predominantly and thus they have

[180]See .de Sola Pool Ed, Pierce, Social Impact of the Telephone, 1977, pp 192-194.

dramatic power to control the rate of introduction of new LEC competitors, called the C-LECs. Evidence over the past fifteen years has shown that the RBOCs have taken all steps possible to delay, deter, and in any other way avoid the introduction of new competitors.

Thus the analysis of this section is only that will be confined to a reading of the law and its interpretation to such factors as predatory pricing, tying arrangements, barriers to entry, and other specific actions that an I-LEC may take to ensure its survival.

7.3.2 The Opportunity and the Paradigm Change

The opportunity is that of new and significant competition in the local exchange market. The paradigm shift is one from a product which has significant scale in production to one that has de minimis scale. The author has shown elsewhere that the average capital per subscriber and the marginal capital per subscriber are equal at low percent penetrations of any market. In addition, due to the scalability of the technology, the plant can be arbitrarily expanded at capital per subscriber can be kept and the minimal scale level.[181] In addition, the author has shown, that the scale in operations costs can also be attained by outsourcing. The direct implication is that any new entrant can see costs at full scale in a short period of time. Thus if there were a fully open market, new competitors can compete as efficiently as the existing large companies, and in fact may be much more competitive in a shorter period of time.

There are two major trends in the process of allowing and enhancing disaggregation of networks. They are the development of a distributed processing environment and the loss of scale in infrastructure. We shall discuss each of these in some detail since they will be at the heart of our understanding of the new disaggregated networks.

7.3.3 The Act

The 1996 Telecommunications Act, the Act, became law on February 8, 1996. The law mandated that the FCC in its role as Administrative agency establish the appropriate renderings of the law into administrative procedures in the Code of Federal Regulations, and thus amending the current CFR. The FCC took this mandate and on August 8, 1996, six months after the law was effective, issued a set of administrative rulings regarding the implementation of several key elements of the law. Specifically the FCC ruled on the issues of interconnection and unbundling of the plant. The issues still before the FCC are access and universal service.

The following is a list of the key portions of the 1996 Act. Each is a Section and each will be reviewed and rendered into administrative code by the FCC. The total number of sections are significant and they cover telephony, satellites, cable and broadcast. We shall not deal with satellites, cable and broadcast in this section.

[181] See the papers by the author as referenced.

Section	*Topic*	*Issue*
SEC 251	***INTERCONNECTION***	This section deals with interconnection and unbundling of the local exchange carrier. It proposes that such a set of procedures be established and that such procedures reflect a maximally competitive environment for the local exchange business.
SEC 252	***PROCEDURES FOR NEGOTIATION, ARBITRATION, AND APPROVAL OF AGREEMENTS***	This section details processes, procedures and remedies for the failure to effectively provide for the provisions under 251.
SEC 253	***REMOVAL OF BARRIERS TO ENTRY***	This section broadly requires the removal of any and all barriers to entry in the market. This section is a classic antitrust statement of competition in the local market.
SEC 254	***UNIVERSAL SERVICE***	This section details the universal services provision.
SEC 601	***APPLICABILITY OF CONSENT DECREES AND OTHER LAW***	Eliminates Clayton exemption from Antitrust laws for all of the RBOCs.

7.3.4 The FCC First Report and Order

On August 8, 1996 the FCC issued a report and Order, the First, on 251 and 252. They detailed in almost 800 pages the interpretation of the law as a result of the Notice of Public Rulemaking process. There were approximately a dozen law suits filed, mostly by the RBOCs objecting to this R&O. The RBOCs clearly feared local competition of any form and their filings attacked the FCC and the suits are filed in every District Court available.

7.3.5 Interconnect

Section 251 is the key section in establishing competitive local exchange access. The key elements of Section 251 state the following:

"(a) ***GENERAL DUTY OF TELECOMMUNICATIONS CARRIERS****- Each telecommunications carrier has the duty (1) to interconnect directly or indirectly with the facilities and equipment of other telecommunications carriers; and (2) not to install network features, functions, or capabilities that do not comply with the guidelines and standards.....*

(b) ***OBLIGATIONS OF ALL LOCAL EXCHANGE CARRIERS****- Each local exchange carrier has the following duties: (1) RESALE- The duty not to prohibit, and not to impose unreasonable or discriminatory conditions or limitations on, the resale of its telecommunications services. (2) NUMBER PORTABILITY- The duty to provide, to the extent technically feasible, number portability in accordance with requirements prescribed by the Commission. (3) DIALING PARITY- The duty to provide dialing parity to competing providers of telephone exchange service and telephone toll service, and the duty to permit all such providers to have nondiscriminatory access to telephone numbers, operator services, directory assistance, and directory listing, with no unreasonable dialing delays. (4) ACCESS TO RIGHTS-OF-WAY- The duty to afford access to the poles, ducts, conduits, and rights-of-way of such carrier to competing providers of telecommunications services on rates, terms, and conditions that are consistent with section 224. (5) RECIPROCAL COMPENSATION- The duty to establish*

reciprocal compensation arrangements for the transport and termination of telecommunications.

(c) ***ADDITIONAL OBLIGATIONS OF INCUMBENT LOCAL EXCHANGE CARRIERS****- In addition to the duties contained in subsection (b), each incumbent local exchange carrier has the following duties: (1) DUTY TO NEGOTIATE- The duty to negotiate in good faith in accordance with section 252 the particular terms and conditions of agreements to fulfill the duties described in paragraphs (1) through (5) of subsection (b) and this subsection. The requesting telecommunications carrier also has the duty to negotiate in good faith the terms and conditions of such agreements. (2) INTERCONNECTION- The duty to provide, for the facilities and equipment of any requesting telecommunications carrier, interconnection with the local exchange carrier's network..... (3) UNBUNDLED ACCESS- The duty to provide, to any requesting telecommunications carrier for the provision of a telecommunications service, nondiscriminatory access to network elements on an unbundled basis at any technically feasible point..... (4) RESALE- The duty-- (A) to offer for resale at wholesale rates any telecommunications service that the carrier provides at retail to subscribers who are not telecommunications carriers; and (B) not to prohibit, and not to impose unreasonable or discriminatory conditions ..... (6) COLLOCATION- The duty to provide, on rates, terms, and conditions that are just, reasonable, and nondiscriminatory, ...*

(d) ***IMPLEMENTATION****-..... (3) PRESERVATION OF STATE ACCESS REGULATIONS- In prescribing and enforcing regulations to implement the requirements of this section, the Commission shall not preclude the enforcement of any regulation, order, or policy of a State commission that-- (A) establishes access and interconnection obligations of local exchange carriers; (B) is consistent with the requirements of this section; and (C) does not substantially prevent implementation of the requirements of this section and the purposes of this part."*

7.3.6 Universal Service

Universal service has been in effect de facto since the Kingsbury decision of 1913.[182]This implicitly allowed AT&T to retain its monopoly subject to the agreement to provide, ultimately, universal service. The universal service would mean that there would be access to all people to telephone services and that for poor people that service would be subsidized. The state PUCs then followed up on this and embodied this in state regulatory requirements. In effect, AT&T and the BOCs were transferring wealth fro the "rich" to those who could not pay for such services, either because of their income or because the costs to provide services to that individual would be prohibitive. This was then an enforced payment, established and managed by the BOCs, for the purpose of collecting moneys from the haves for redistribution by the BOCs to what was perceived as the have nots. Needless to say this is per se taxation. From a Constitutional perspective such rights inure solely to the states and the Federal governments and under the Commerce Clause it is highly problematic that any independent third party has any right

[182]See Weinhaus, p. 9.

to tax especially as regards to interstate commerce. Needless to say there has never been a challenge here.

The Universal services fund was and still is a taxation by the BOCs to redistribute income.[183] It also is a pool of funds to be used by them as a vehicle to bar competition. The universal services issue however goes to the heart of the interconnection issue. The RBOCs have used this ruse as a means to control competition in two ways. First, in interexchange access they have charged an access fee disproportionately higher than costs since it was then used as a basis for universal services. This was the taxation issue. Second, they have used a unilateral fee for any other interconnect player. Thus cellular companies, arguable providing local services, pay for initiating ad terminating calls. This has been changed by the new Act.

The Act has mandated a separate Universal Services fund to be managed by the Government, and thus the Governments powers to tax are valid and this is a legal act in contrast to the arguably illegal actions of the RBOCs in the pursuit of taxation. Second, the Act mandates balanced interconnection.

To better understand where the legal applications will be addressed we first present an overview of the major theories behind the applications of the antitrust laws. This will be important since these theoretical basis are not only applied to antitrust law but also to the enactment of the administrative regulations in the application of the Telecommunications Act. The litigation of any case in this area will require an understanding of the philosophical framework underlying its application.

Universal Services is the mandate to provide services by any carrier to any person not individually financially able to obtain the service in the area in which the inhabit.[184] Namely the low income and rural customers. The universal services provisions are as follows:

" (b) UNIVERSAL SERVICE PRINCIPLES- The Joint Board and the Commission shall base policies for the preservation and advancement of universal service on the following principles: (1) ***QUALITY AND RATES.....****-(2)* ***ACCESS TO ADVANCED SERVICES****- ..... (3)* ***ACCESS IN RURAL AND HIGH COST AREAS****- ..... (4)* ***EQUITABLE AND NONDISCRIMINATORY CONTRIBUTIONS****.....*

(c) DEFINITION (1) IN GENERAL- Universal service is an evolving level of telecommunications services that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services..... such telecommunications services; (A) are essential to

[183]This is a Rawlsian approach to justice, ensuring that the least amongst us in the society has equal benefit to society asses. Baumol has taken this principle and applied it to monopolies supplanting the individual with the monopolist. The Baumol-Willing theorem takes the utilitarian approach and uses it as a basis for demanding the continuation of access. What Baumol does it create a Rawlsian universal service for the monopolist.

[184]See McGarty, October, 1996.

education, public health, or public safety; (B) have, through the operation of market choices by customers, been subscribed to by a substantial majority of residential customers; (C) are being deployed in public telecommunications networks by telecommunications carriers; and (D) are consistent with the public interest, convenience, and necessity....."

Universal service has been in effect de facto since the Kingsbury decision of 1913.[185]This implicitly allowed AT&T to retain its monopoly subject to the agreement to provide, ultimately, universal service. The universal service would mean that there would be access to all people to telephone services and that for poor people that service would be subsidized. The state PUCs then followed up on this and embodied this in state regulatory requirements. In effect, AT&T and the BOCs were transferring wealth fro the "rich" to those who could not pay for such services, either because of their income or because the costs to provide services to that individual would be prohibitive. This was then an enforced payment, established and managed by the BOCs, for the purpose of collecting moneys from the haves for redistribution by the BOCs to what was perceived as the have nots. Needless to say this is per se taxation. From a Constitutional perspective such rights inure solely to the states and the Federal governments and under the Commerce Clause it is highly problematic that any independent third party has any right to tax especially as regards to interstate commerce. Needless to say there has never been a challenge her.

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The Act has mandated a separate Universal Services fund to be managed by the Government, and thus the Governments powers to tax are valid and this is a legal act in contrast to the arguably illegal actions of the RBOCs in the pursuit of taxation. Second, the Act mandates balanced interconnection.

7.3.7 Code Changes of the First R&O

The First Report and Order ("R&O") by the FCC mandated certain changes to interconnection. These changes are as follows:[186]

[185]See Weinhaus, p. 9.

[186]The following are U.S.C. 47.

"§ 51.305 Interconnection.

(a) An incumbent LEC shall provide, for the facilities and equipment of any requesting telecommunications carrier, interconnection with the incumbent LEC's network: (1) for the transmission and routing of telephone exchange traffic, exchange access traffic, or both; (2) at any technically feasible point within the incumbent LEC's network.....; and (5) on terms and conditions that are just, reasonable, and nondiscriminatory.....

(b) A carrier that requests interconnection solely for the purpose of originating or terminating its interexchange traffic on an incumbent LEC's network and not for the purpose of providing to others telephone exchange service, exchange access service, or both, is not entitled to receive interconnection.....

(c) Previous successful interconnection at a particular point in a network, using particular facilities, constitutes substantial evidence that interconnection is technically .....

(d) Previous successful interconnection at a particular point in a network at a particular level of quality constitutes substantial evidence.....

(e) An incumbent LEC that denies a request for interconnection at a particular point must prove to the state commission that interconnection at that point is not technically feasible.

(f) If technically feasible, an incumbent LEC shall provide two-way trunking upon request. "

The above mandates that the I-LEC interconnect itself to any purveyor of services that may become a competitor. This is the first time that the FCC has mandated such a requirement.

The following are the rules for interconnection pricing. There are several factors that are key. First is the reciprocal nature of the rules, second the method and means at which the prices for interconnect are to be determined, and third the bill and keep, or zero access fee, option.

"§ 51.701 Scope of transport and termination pricing rules.

(a) The provisions of this subpart apply to reciprocal compensation for transport and termination of local telecommunications traffic between LECs and other telecommunications carriers.

(b) Local telecommunications traffic. For purposes of this subpart, local telecommunications traffic means: (1) telecommunications traffic between a LEC and a telecommunications carrier other than a CMRS provider that originates and terminates within a local service area established by the state commission; or (2)

telecommunications traffic between a LEC and a CMRS provider that, at the beginning of the call, originates and terminates within the same Major Trading Area.....

(c) Transport. For purposes of this subpart, transport is the transmission and any necessary tandem switching of local telecommunications traffic .... from the interconnection point between the two carriers to the terminating carrier's end office switch that directly serves the called party, or equivalent facility provided by a carrier other than an incumbent LEC.

(d) Termination. For purposes of this subpart, termination is the switching of local telecommunications traffic at the terminating carrier's end office switch, or equivalent facility, and delivery of such traffic to the called party's premises.

(e) Reciprocal compensation. For purposes of this subpart, a reciprocal compensation arrangement between two carriers is one in which each of the two carriers receives compensation from the other carrier for the transport and termination on each carrier's network facilities of local telecommunications traffic that originates on the network facilities of the other carrier.

§ 51.703 Reciprocal compensation obligation of LECs.

(a) Each LEC shall establish reciprocal compensation arrangements for transport and termination of local telecommunications traffic with any requesting telecommunications carrier.

(b) A LEC may not assess charges on any other telecommunications carrier for local telecommunications traffic that originates on the LEC's network.

§ 51.705 Incumbent LECs' rates for transport and termination.

(a) An incumbent LEC's rates for transport and termination of local telecommunications traffic shall be established, at the election of the state commission, on the basis of: (1) the forward-looking economic costs of such offerings.....; (2) default proxy.....; or (3) a bill-and-keep arrangements.....

(b) In cases where both carriers in a reciprocal compensation arrangement are incumbent LECs, state commissions shall establish the rates of the smaller carrier on the basis of the larger carrier's forward-looking costs.....

§ 51.707 Default proxies for incumbent LECs' transport and termination rates.

(a) A state commission may determine that the cost information available to it with respect to transport and termination of local telecommunications traffic does not support the adoption of a rate or rates for an incumbent LEC that are consistent with the requirements.....

(b) If a state commission establishes rates for transport and termination of local telecommunications traffic on the basis of default proxies, such rates must meet the following requirements.....

§ 51.709 Rate structure for transport and termination.

(a) In state proceedings, a state commission shall establish rates for the transport and termination of local telecommunications traffic that are structured consistently with the manner that carriers incur those costs.....

(b) The rate of a carrier providing transmission facilities dedicated to the transmission of traffic between two carriers' networks shall recover only the costs of the proportion of that trunk capacity used by an interconnecting carrier to send traffic that will terminate on the providing carrier's network. Such proportions may be measured during peak periods.

§ 51.711 Symmetrical reciprocal compensation.

(a) Rates for transport and termination of local telecommunications traffic shall be .....

(b) A state commission may establish asymmetrical rates for transport and termination of local telecommunications traffic only if the carrier other than the incumbent LEC (or the smaller of two incumbent LECs) proves to the state commission on the basis of a cost study.....

(c) Pending further proceedings before the Commission, a state commission shall establish the rates that licensees in the Paging and Radiotelephone Service .....

§ 51.713 Bill-and-keep arrangements for reciprocal compensation.

(a) For purposes of this subpart, bill-and-keep arrangements are those in which neither of the two interconnecting carriers charges the other for the termination of local telecommunications traffic that originates on the other carrier's network.

(b) A state commission may impose bill-and-keep arrangements if the state commission determines that the amount of local telecommunications traffic from one network to the other is roughly balanced with the amount of local telecommunications traffic flowing in the opposite direction, and is expected to remain so.....

(c) Nothing in this section precludes a state commission from presuming that the amount of local telecommunications traffic from one network to the other is roughly balanced with the amount of local telecommunications traffic flowing in the opposite direction and is expected to remain so, unless a party rebuts such a presumption."

The bill and keep approach is the approach that is the most economically efficient approach, is allowed by the law, and allows fore the ,most effective means to establish competition in the market. In the remainder of this section we shall focus on this issue.

7.4 ILEC Litigation to Stall

7.4.1 Litigation Excess

The ILECs/RBOCs have been litigating in excess to prevent the CLECs and the DSL companies from becoming real competitors. Some of the initial cases are:

AT&T CORPORATION, *et al* ., PETITIONERS *v* . IOWA UTILITIES BOARD *et al* .;
AT&T CORPORATION, *et al* ., PETITIONERS *v* . CALIFORNIA *et al* .
MCI TELECOMMUNICATIONS CORPORATION, PETITIONER *v* . IOWA UTILITIES BOARD *et al.;*
MCI TELECOMMUNICATIONS CORPORATION, PETITIONER *v* . CALIFORNIA *et al* .
ASSOCIATION FOR LOCAL TELECOMMUNICATIONS SERVICES, *et al.* , PETITIONERS *v* . IOWA UTILITIES BOARD *et al.*
FEDERAL COMMUNICATIONS COMMISSION *and* UNITED STATES, PETITIONERS *v* . IOWA UTILITIES BOARD *et al.;*
FEDERAL COMMUNICATIONS COMMISSION *and* UNITED STATES, PETITIONERS *v* . CALIFORNIA *et al* .
AMERITECH CORPORATION, *et al* ., PETITIONERS *v* . FEDERAL COMMUNICATIONS COMMISSION *et al* .
GTE MIDWEST, INCORPORATED, PETITIONER *v* . FEDERAL COMMUNICATIONS COMMISSION *et al* .
U S WEST, INC., PETITIONER *v* . FEDERAL COMMUNICATIONS COMMISSION *et al* .
SOUTHERN NEW ENGLAND TELEPHONE COMPANY, *et al.* , PETITIONERS *v* .FEDERAL COMMUNICATIONS COMMISSION *et al* .

Recently, in June 2002, in the case of Trinko v Bell Atlantic, United States Court of Appeals For the Second Circuit, however, what we see is the first of several examples of how customers, not companies, are fighting back with the RBOCs using antitrust laws.

The following analysis considers several of the more recent cases wherein the RBOCs have used litigation to delay the deployment of services, broadband and more standard services. One should remember that the Act was passed in February 1996 and the FCC completed the rule making in September 1996. Thus by January 1997, the RBOCs had aggressively moved to have PUCs take pro RBOC positions. The first was Iowa as shown below. These five cases start to set the ground work for what the potential legal environment will hold.

7.4.1.1 Iowa Utilities Board v FCC et al, US 8th Circuit Court, July 17, 1997

This was one of the first major rulings. The 8th circuit was asked to vacate the entire FCC First Report and Order, which in essence established the details of the procedures to be followed in the implementation of Sections 251 and 252 of the 1996 Act. It was not that the FCC did a bad job, it was that the RBOCs wanted to generate confusion and delay.

In the ruling the 8th Circuit partially kept and partially rejected the issue of what authority the FCC has over states, generally ruling in the favor of the states. The Court stated that the States and not the FCC have the prime role of rate setting. In fact they severely restricted the FCC's ability.

There was the "pick and choose" rule, whereby the FCC stated that CLECs could pick and choose elements of interconnection agreements previously agreed to by other carriers to implement their own interconnection agreement. This would give CLECs an advantage. The 8th Circuit denied this.

However, it then addressed the issues regarding unbundling. This is the UNE issue. The UNE issue as we have stated was at the heart of broadband. It was the reason broadband failed. As to unbundling the 8th Circuit stated:

8. Unbundling of Operations Support Systems software and databases is approved. This allows for a seamless integration.

9. The FCC determination of allowing interconnection to the ILEC at any "technically feasible" point is acceptable.

10. Denied the FCC's interpretation that any element that must be unbundled and which is needed must be unbundled.

11. Upheld the FCCs interpretation of the "necessary" and "impairment" interpretations. "Necessary" means that it was necessary for the CLEC and impair meant that it would impair the CLECs service.

12. Denied the rule requiring unbundling and affiliated combining. The Court decided that the ILEC did not have to do the combining, that the CLEC would be both able and required to combine UNEs. This meant that the CLEC had to reassemble parts that were under the control of the ILEC. This lead to impossible situations.

13. Upheld the provision of allowing CLECs to purchased finished services. Generally this was and is not a competitive issue.

14. Upheld the unbundling rules in general. The RBOCs tried to stop this via referral to intellectual property rights and Constitutional Takings clauses in the Fifth amendment. The Court did not agree with these positions.

7.4.1.2 AT&T et al v Iowa Utilities Board, US Supreme Court, January 1999

The Supreme Court, Justice Scalia delivering, in addressing the above case for the 8th Circuit, found as follows:

4. Reversed the 8th Circuit in stating that Federal Law permits the FCC to have jurisdiction over the Act and its implementation.[187]

5. Reversed the 8th Circuits denial of "pick and choose" because it was clearly stated in the law. This is interesting since the 8th Circuit tried in many ways to remove this FCC interpretation.

6. Approved all unbundled access rules except Rule 319 (also 47 USC 51.319, FCC 96-325, First Report and Order), which is the necessary and impair clause. From the First R&O we find the FCC stating:

"275. The Department of Justice and Comptel reject the BOCs' argument that the general obligation imposed by section 251(c)(3) is limited by consideration of whether the failure to provide access to an element would impair a carrier's ability to offer a service. They argue that the term "impair" does not mean "prevent," and that we should interpret this standard to mean that a carrier's ability to provide a service is impaired if obtaining an element from a third party is more costly than obtaining that same element from the incumbent. They also dispute the incumbent LECs' argument that the "impair" language in this standard means that new entrants cannot exclusively use unbundled elements to provide the same or similar retail services that an incumbent offers. They argue that, if similarity is enough to prevent the use of unbundled elements, then section 251(c)(3) would be nullified. They further contend that, under the BOCs' theory, incumbents could prevent new entry through the use of unbundled elements by offering unbundled loops, switching, and other elements as retail services."

The Court vacated the rule 319, which had necessary and impair. The Courts reasoning was simply that necessary and impair were in eye of the beholder, and in this case the beholder was the CLEC not the FCC. It remanded the rule back to the FCC.

7.4.1.3 Verizon et al v FCC, US Supreme Court May 13, 2002

In this case, the Court ruled as follows

5. Affirmed that the FCC can set rates on a forward-looking basis. They also rejected the need for factoring in historical costs.[188]

6. Affirmed the TELRIC forward- looking cost basis for setting the rates.[189] [190]

[187] See Chevron v NRDC, 467 US 837. The case involved EPA regulations. The Court ruled that the EPA, and Federal Agencies in general, have great latitude in interpreting the law and in fact may have the right to change their interpretation.

[188] See Smyth v Ames, 169 US 466. The case involves railroads and rate setting across state lines. The Court ruled that it was reasonable for Nebraska to set railroad rates and that a state had that authority.

7. Reversed 8th Circuit in requiring that ILECs combine UNEs into a single UNE at request of CLEC since ILECs have capability and control process, whereas the CLECs are helpless in the effort and may be hindered by the ILEC.

8. Takings argument was rejected.

This was in many ways a reversal for the RBOCs.

7.4.1.4 US Telecom Association (USTA) v FCC, Bell Atlantic as Intervenor, US Court Appeals, District of Columbia, May 24, 2002

This extremely poor and seemingly prejudiced opinion rejects the FCC re-do of the necessary and impair issues in 319 as described above. The DC Court totally rejected the FCC's efforts. It set unbundling back severely.

The DC Circuit Court focused on DSL services. The DSL companies, all bankrupt by the time of the ruling due to ILEC anticompetitive actions, has continued to block this effort. The DC Court, totally oblivious to this fact, actually states:

"The Line Sharing Order Petitioners primarily attack the Line Sharing Order on the ground that the Commission, in ordering unbundling of the high frequency spectrum of copper loop so as to enable CLECs to provide DSL services, completely failed to consider the relevance of competition in broadband services coming from cable (and to a lesser extent satellite). ***We agree."***

There is no competition. In fact the ILECs or RBOCs have slowly rolled out limited DSL knowing that in the long run they want separate monopolized fiber exempt from any Act provisions. This accomplished, with the help of the DC Court and their ilk, one can foresee slow broadband at extortionary rates. The DC Court goes on to say:

"In sum, nothing in the Act appears a license to the Commission to inflict on the economy the sort of costs noted by Justice Breyer under conditions where it had no reason to think doing so would bring on a significant enhancement of competition. The Commission's naked disregard of the competitive context risks exactly that result. Accordingly, the Line Sharing Order must be vacated and remanded. Obviously any order unbundling the high frequency portion of the loop should also not be tainted by the sort of error identified in our discussion of the Local Competition Order and identified by petitioners here as well."

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189 TELRIC, is Total Element Long Range Incremental Costs. It is a method to determine costs that are: (i) forward looking, (ii) least cost, (iii) long run, (iv) incremental, and (v) include a return on invested capital. However, like all models the input determines the output. Thus, albeit a methodology, it is not based irrefutably and consistently based on facts. It is not reproducible.

190 See Duquesne v Barasch, 488 US 299. In this case the Court ruled that a state could set rates and in so doing did not violate the takings clause of the Constitution.

In fact the FCC did regard the competition, the Court has not look at the stock market and see the impact.

7.4.2 The RBOC Strategies to Broadband

Verizon has aggressively staked out its position vis-à-vis broadband with a section written by John Thorne, Senior Vice President and Deputy General Counsel, Verizon.[191] The section outlines what the RBOC, namely Verizon, intends to do to delay broadband until it is in its sole best interest.

Mr. Thorne begins the section with:

"Computers make us rich. Computer networks make us richer. Very fast computer networks will make us richer still, if and when they finally get built – which will happen when the federal government steps aside and unleashes competition in the industry that now has the technology in hand to build them"

We can readily deconstruct this rather compelling statement from a corporate officer, a lawyer, and a representative of the Verizon position. Clearly, Verizon believes that having anyone else in the market is anti-competitive. The need is to take any and all restrictions and regulation off of them and then they will, single handedly, resolve the problem. As a result, they will get very, very rich. In turn, their sole intent is "to make us richer still".

He goes on to state:

"Unfettered competition delivers the most when markets are young, and when technology is evolving quickly. This is evidently true in broadband markets today. Most of the market is completely up for grabs, because 90-plus percent of the technology that will ultimately be used hasn't yet been built, 90-plus percent of the capital hasn't yet been committed, and 90-plus percent of the customers aren't yet being served. And because broadband digital services will ultimately absorb and displace the old, analog voice and video, it is equally true that no player in the market today has any assurance of winning any given share of the digital market ahead. Everything is up for grabs, because an extraordinary transformation in technology has overtaken all the old certainties.

In circumstances like these, regulators should have the wisdom and the courage to stand by and do nothing. For the most part, they have chosen to do just the opposite. Telecom regulation today reaches further, and more intrusively, than ever before. And the effects are now being felt across the economic landscape. The third wave of the IT boom – the broadband wave – has not materialized…"

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[191] See :

http://newscenter.verizon.com/policy/broadband/primer_c.pdf?PROACTIVE_ID=cecfc9cbc9cdcdcec9c5cecfcfcfc5cecfc7cdc8c7c7cacfcec5cf

This is a veiled threat. Verizon is clearly saying that they are not building broadband despite DSL efforts. DSL is the poor man's broadband. Verizon will not build broadband until it has been deregulated. Then and only then will it create more wealth for itself at the cost to the consumer.

The UNE issue is clearly an element of their strategy to delay and divert. As Thorne states:

"Rather than make unbundling the direct stepping stone to deregulation, as Congress intended, the FCC has instead transformed it into a mountain of new regulation. The Commission has invented far too many "unbundled network elements," and it has contrived to price them much too cheaply. It has done this ostensibly for the benefit of small competitors that lack both the resources and the technical expertise to build their own networks. But the upshot has been a tangle of regulation that has simultaneously discouraged new investment by both incumbent carriers and by competitors that have the finances and technical ability to build out new broadband networks and develop facilities-based competition. This is not simply the conclusion of chronically over-regulated incumbents. A unanimous U.S. Supreme Court reached that conclusion in a major January 1999 ruling. As did a unanimous Eighth Circuit Court of Appeals, in a key, follow-up decision in July 2000. That latter ruling is itself now headed back to the Supreme Court for further review."

As shown above, the Supreme Court has overthrown this issue. However the DC Appeals Court has brought it back into the fray.

"Collocation rules allow competitors to squat on the incumbent LECs' real estate, for the ostensible purpose of interconnecting their equipment with unbundled network elements in the incumbents' central office. The competitors supply network equipment, but are not required to have an office of their own. The "UNE Platform" rules push things a step beyond that – competitors do not have to supply any network equipment, either."

The answer to Thorne's concern is simply to create neutral meet points where Verizon and any competitor for any service can meet. Thus, the "squat" is not necessary. The meet point we propose is that of the head end of the municipal networks.

"The Commission has even managed to endorse a scheme under which incumbent carriers end up paying others – and paying them billions of dollars – to interconnect with and use the incumbents' own networks. This scheme travels under the innocuous alias of "reciprocal compensation." The 1996 Act required carriers to "establish reciprocal compensation arrangements for the transport and termination of telecommunications." The original idea was simple: local carrier A would have to pay local carrier B to "terminate" traffic originating on A's network and terminating on B's."

This is the access and interconnection issue. Having a "bill and keep" approach would eliminate mutual compensation and the significant transactions costs related thereto. Only

when Verizon saw that to be the case did it start to move in that direction. He further states:

"For ordinary voice traffic, this would mostly be a wash. But for tens of millions of dial-up Internet users, the call always originates on their home phone line; the Internet itself never originates calls or phones you back. Moreover, Internet users often stay on line for hours at a time – much longer than typical voice callers."

Thus again we see a tendency to not do broadband.

Thorne then goes on to attack the cable companies. This is really a feint attack, since in reality he and Verizon ultimately want total deregulation.

"There is, as a result, sharply different regulation of high-speed data services provided over phone lines and over coaxial cable. Telephone companies have to unbundle the portion of the spectrum used for broadband and do so at below-cost pricing. Cable companies do not. Telephone companies have to permit their competitors to collocate equipment to make it easier to use the unbundled spectrum. Cable companies do not. Telephone companies have to offer for resale their retail broadband transmission services at a federally mandated wholesale discount. Cable companies do not. Telephone companies have been forced to provide their broadband services through separate affiliates as a condition to gaining regulatory approval of recent mergers. Cable companies have not. Telephone companies have to pay in to the universal service regime when they provide broadband access. Cable companies do not. And telephone companies are almost completely locked-out of the multi-billion dollar (and rapidly expanding) Internet backbone market. Cable companies are not."

This is a gross misstatement of facts. Towns or local cable boards regulate Cable companies. They do not have a monopoly. At any time, the franchise can be removed. Cable is a franchise business and towns get franchise fees. They provide universal services to towns, the franchising authority.

He then goes on to discuss the Internet:

"The Internet backbone is currently the least competitive part of the broadband market, owned and controlled by a few companies. The Bell Companies have sufficient incentive and capital to play an important role in developing the next generation Internet backbone, but have been kept out of the game. The economies of backbone networks depend on picking up and dropping off traffic at all major nodes nationwide – missing even one creates a serious competitive disadvantage. Section 271 approval, however, occurs on a state-by-state basis. A Bell Company, therefore, cannot become a meaningful competitor in the backbone market until it obtains its last approval to provide long-distance voice and data services in the last state where it serves as the incumbent local phone company."

The fact is that the Internet backbone is ruthlessly competitive. The biggest players are UUNet, Genuity, Sprint, AT&T, Cable and Wireless, and many more.[192]

His final statement is another sophistry of the highest form:

"Yet, if prior monopoly status were sufficient, unbundling and TELRIC regulation would equally apply to cable companies, which are, in fact, current monopolists in the market for multi-channel video. The incumbent phone companies, however, have no "prior monopoly" in the broadband market – there is no "prior" market here at all; the market is brand new. The disparate regulatory regimes the Commission has adopted will shape the development of that market, by inefficiently shifting investment in new products and services from the heavily regulated technologies to the unregulated technologies. By picking winners and losers in this nascent market, the Commission ultimately harms consumers.

Thus, the Commission has again placed competitors ahead of competition. By extending to broadband services the entire panoply of unbundling regulation, along with the attendant regulation of price, collocation, operations support systems, and competition in Internet backbone markets, the Commission has labored to boost a host of small firms that do little more than resell the facilities of phone companies. But resale adds little in the way of new value, and the unbundling rules themselves directly inhibit the provision of functional service. It takes a lot of delicate adjustment to overlay a torrent of data on top of a trickle of voice on a mile-long strand of copper. The high-tech business of pulling together high-speed networks has been taken over completely by fractious regulators."

This remark falsely states that cable is a monopoly whereas it is a franchise. It can be replaced or overbuilt at any time. His goal is to get Verizon's loop free from the FCC; then Verizon would unbundle any and all UNEs that any other competitor wants. If Verizon is allowed to do that, it will mean the end of any competition, any alternatives to access, and the beginning of the control of the network as it was before 1982 and the breakup of AT&T.

7.5 Antitrust Litigation

It has been argued that effective competition in the local exchange market can only be achieved by the timely unbundling of the ILEC as well as the existing CMRS, the cellular carriers, as well as of the new CMRS.[193] In addition the unbundling should be done at fair and equitable prices. Furthermore we have argued that zero cost access was also an essential element in this overall process. We have developed these arguments based upon three elements; fundamental changes in the technological and operational environment, the application of the Telecommunications Act, and the direct application of the existing antitrust laws.

[192] See McGarty, Transit, January 2002 for details.

[193] See McGarty TPRC papers.

In many ways this is no longer an FCC or State PUC issue but has been raised to the civil and possibly criminal level of Clayton and Sherman respectively. The latter issue is one of blatant sustained anti-competitive behavior in the local exchange market. Recent evidence brought before the FCC and the State Commissions clearly indicate that there is more than just grounds for investigation.

This section argues further, that the regulatory and administrative law process is rant with delays and inefficiencies. Further, we argue that although the antitrust laws are vehicles for appropriate remedies we should not expect the Federal Government to act on these issues. Thus, it is argued that the civil application of these laws may be the most used and most efficient vehicle for the true development of a truly competitive local, exchange market. Many authors have argued against the antitrust laws but these arguments have been based on much less market power and control that is evident in this case.[194]

The essence of antitrust law is to promote competition and not competitors. To do so in telecommunications one must recognize several significant principles. First is the loss of scale. As we have argued, technology is driving scale out of telecommunications. All costs are marginal costs and all average costs approach margin in a precipitous fashion. Second, disaggregation allow for marginal pricing in all elements of the business. Capital plant has been marginalized as a result of technology and operations costs are marginalized as a result of the restructuring of industry. Third, commoditization is the driving factor in telecommunications. A connection is just a connection and differentiation is driven to the periphery of the network. Fourth, prices is cost based, and this means that such artifacts of Rawlsian economics as the Baumol-Willig theorem have no place in a competitive environment, and the only maximization allowed is consumer welfare.

These four conclusions drive our analysis along antitrust grounds.

5. Telecommunications, especially at the local exchange level, has and still is a monopoly.

6. The 1996 Act took away any last vestige of antitrust protection from the ILECs, namely the RBOCs.

7. The main issue is interconnection and the secondary issue is unbundling.

8. Interconnection is dominated by tying arrangements which are directed at the elimination or thwarting of any competition as well as the competitors.

Thus, the conclusion is quite clear. Implementation of the 1996 Act will require aggressive prosecution of the antitrust laws. This prosecution will most likely be done by

[194]See the works by Bork and Posner. We generally agree with Posner that economic analysis is the key to determining how to best apply the law in these cases. In fact, we argue that the Posner approach is most likely to be the basis for many of the briefs developed in subsequent litigation.

the new incumbents and not by the Government since such acts on the Governments side have become a conflict between all three branches of the Government.

The following Table presents a summary of the antitrust cases and their application to the telecommunications market.

Case	***Cite***	***Decision***	***Relationship***
United States v. Loew's, Inc.	466 U.S. at 13-14 citing 371 U.S. 38 (1962)	Court held that Loew's violated § 1 Sherman because of block booking despite having only 8% or market share but Court ruled that "requisite economic power is presumed when tying product is patented or copyrighted".	Any patent protection by the RBOC is putatively proof. The extension to this is the RBOCs ability via the standards setting body or even via the regulatory bodies to establish de factor "patent" rights by their presences in the market as the participant controlling the definition of interfaces.
United States v. Jerrold Electronics Corp.	466 U.S. at 23, aff'd per curiam, 365 U.S. 567 (1961)	Issue of two separate products. Court focused on three elements: 7. Firms other than Jerrold sold the products separately. 8. Jerrold priced the product separately. 9. Jerrold's packages were customized suggesting separate products.	The issue is the separability of such products as ILEC interconnection and airtime. Also airtime as merely the provision of connections and not bundled with other separable products.
United States v. Fortner Enterprises (Fortner I)	394 U.S. 495 (1969)	Reiterated Northern Pacific. Namely; ...a total monopoly is not essential, rather the key is whether some buyers can be forced to "accept a tying arrangement that would prevent free competition for their patronage in the market for the tied product"	This is the case with ILEC and the airtime issue. The tying applies to the bundled CMRS opportunity as well as the bundling into the pricing algorithms used by the PUCs. The clear way to eliminate this ruling is to go to Bill and Keep.
United States Steel Corp. v. Fortner Enterprises (Fortner II)	429 U.S. 610 (1977)	US Steel credit company had insufficient market power. The Court concluded that a tying arrangement existence is insufficient unless the entire deal makes consumer worse off than they would be in a competitive market.	The issue is the consumer welfare and this is driven by clearing the market with the most efficient use of capital by the most efficient producer of the overall product. Clearly, in the case of interconnection, be it for local service or interconnect, the consumer is better off with a lower price, which has been shown via the IEC competition to be a direct result of competition.
United States Shoe Corp. v. United States	258 U.S. 451 (1922)	The Court ruled that "while the clauses enjoined do not contain specific agreements not to use the machinery of a competitor of the lessor the practical effect of these drastic provisions is to prevent such use."	Clearly the specific enjoining of usage is not required only the effect thereto. The application herein relates to the specific use of tandem offices that may be a back door into increasing access fees.
Unger v. Dunkin' Donuts of America, Inc.	531 F.2d 211) 3d Cir. 1971)	Court held that the seller's power could be inferred from: 7. coercion. 8. resolute enforcement of a policy to "influence" buyers to take both products. 9. widespread purchase of both products by buyers.	Clearly there is a form of coercion as argued supra and there is significant influence. There is no widespread purchase of both other than is the small segment of competitors. We have demonstrated these elements in this section.

Case	*Cite*	*Decision*	*Relationship*
Times Picayune Publishing Co. v. United States	345 U.S. 594 (1953)	Clayton was only to commodities. Government evoked § 1 of Sherman. However although in § 3 of Clayton either "monopolistic position" or restraint of significant volume of trade was required, in Sherman both were required.	The issue is whether the products are products or services. If ruled services still have protection but a sharper issue to prove. Clearly the issue here is services.
Siegal v. Chicken Delight, Inc.	448 F.2d 43 (9th Cir. 1971), cert. denied, 405 U.S. 955 (1972)	Court found against Chicken by stating that if it had been secret recipe than it would have been acceptable but that defendant could have provided specifications for materials and the Plaintiff could have achieved the same results. Court ruled that three elements must be shown: 7. the scheme in question has two distinct items and provides that one may not be obtained without the other. 8. the tying product posses sufficient economic power to appreciably restrain competition in the tied product area. 9. a "not insubstantial" amount of commerce is affected.	Two distinct have been proven supra, economic power id evident via the monopoly control, and commerce is telecommunications which is per se "not insubstantial".
Northern Pacific Railway Co. v. United States	356 U.S. 1 (1958)	Court condemned the freedom of choice for consumers. Court held could show monopolistic control by simply showing "sufficient economic power to impose an appreciable restraint on free competition of the tied product". Court held the per se rule by stating: "tying arrangements serve hardly any purpose beyond the suppression of competition..."	Argue that "per se" rule can be applied directly. This is applicable to all elements of these arguments.
Kentucky Fried Chicken Corp. v. Diversified Packaging Corp.	549 F.2d 368 (5th Cir. 1977)	Court upheld Kentucky because there was no real coercion. Kentucky had approved other suppliers.	Not allowed to choose other suppliers thus a violation and Kentucky does not apply. This also applies since the monopolist controls the market.

Case	*Cite*	*Decision*	*Relationship*
Jefferson Parish Hospital District No. 2 v. Hyde	466 U.S. 2 (1984)	Set out five elements for successful tying: 11. must effect more than de minimis amount of interstate traffic. 12. tie is not express and coercion to buy the tyed product is evident. 13. two products must be separate. 14. defendant must have economic power. 15. no valid business reason for tying. Court in Jefferson ruled that Jefferson had only 30% of market power and thus did not force "customer" to buy product. Court stated, dicta, that: "to force a purchaser to do something that he would not do in a competitive market" was condemned.	Have proved all elements supra. Also this extends the per se rule to this violation. This case has been discussed extensively in the body of the section.
International Sale Co. v. United States	332 U.S. 392 (1947)	Defendant may insist upon a tied sale when the quality of the tied product affects the operation of the tying product. Tying arrangement is not justified when the defendant can set quality standards for the tied product.	No issue of quality changes can be made in the issue of interconnection. Specifically, with the establishment of standards there is now a set of open and definable interfaces and performances and certifications that these interfaces must comply with. Thus any grounds from this case do not apply.
International Business Machines v. United States	298 U.S. 131 (1936)	When the tied sale is not accompanied by escape clause for the buyer who finds a better price then the tying arrangement can be used to price discriminate.	No escape clause allowed is one option to consider an antitrust case. We extend this to cover the inability to interconnect as a per se barrier to entry since it automatically precludes any competitor to enter the market in any efficient manner.
Henry v. A.B. Dick	224 U.S. 1 (1912)	Allowed defendant to force users of patented duplicating to use its section.	This cases may have some benefit t o the ILEC but we believe that it is irrelevant since the defendant in this case had no monopoly position and it could be shown that there was some justification for the tying. Again, in the interconnection world there is a clear precedent for separation and the elimination of the tying arrangement.
Eastman Kodak Co. v. Image Technical Services, Inc.	112 S.Ct. 2072 (1992)	Court reaffirmed the view that products are separate when there is sufficient consumer demand to justify firms providing one without the other.	This extends the per se rule and reads onto the cases presented in this section Moreover, the issue of bundling is at the heart of the current debate regarding interconnection. The ILEC is forcing companies to interconnect at the access tandem levels and will not allow them to select their own interconnect. They are bundling transport and switching and pricing it a factor of ten to twenty times their Long Run Average Costs. .

7.5.1 Tying Arrangements

The ability to offer a local exchange service in a competitive manner depends upon any new entrant being able to collect together five elements; user connection, switch interconnection, billing, customer care, and sales. How these are obtained are dependent upon each user. The user connection may be obtained via the unbundled connection capability purchase from the I-LEC, from the deployment of the purveyor's own fiber

network, from air time purchased from a third party, or from a wide variety of means. Namely, as we have already argued, there is a multiplicity of means available for the purveyor and these means may be owned and constructed by the purveyor or they may be provided as products from some other third party. The switch interconnection is the ability to have access to any and all other purveyors to assure universal interconnectivity. We shall focus on this latter element, interconnection, in a later section. In this section we focus on the unbundling of the elements, specifically airtime. This analysis applies to the unbundling of any of the elements as specified in Section 251.

We can now proceed with a detailed analysis of the product offered and how they may be purchased from other players, especially dominant market player, or the monopoly player in the market. At the hear of this analysis is the argument that there are clear and evident tying arrangement present. As we have argued, the following facts are self evident:

viii. Local Exchange services is the product being provide to the customer.

ix. Local Exchange Service can be provided by the agglomeration of such "operational components" or "products" as air time, I-LEC/CMRS interconnection (namely the interconnection between the CMRS switch and the I-LEC switch), I-LEC interconnection which is the direct interconnection to the I-LEC switch no matter what the source of the interconnection, billing, customer service, network management, sales, switching, local interconnection, and other elements as may be required.

x. The competing player in this market may provide the product by delivering several of the "operational components" directly themselves and by obtaining some of the missing operational components from the monopoly Incumbent LEC.

xi. The 1996 Act mandates that the I-LEC unbundle amongst other requirements.

xii. The 1996 Act removes the Antitrust protection from the I-LEC.

xiii. The Incumbent LECs have monopoly control of the Local Exchange market.

xiv. The Incumbent LEC has, through its holding company, directly or through interlocking agreements, overt control over the CMRS which is related to it.

7.5.1.1 Tying Arrangements Defined

To quote from the Court in *Kodak*:[195]

"A tying arrangement is "an agreement by a party to sell one product but only on the condition that the buyer also purchases a different (or tied) product, or at least agrees that he will not purchase that product from any other supplier." Northern Pacific R. Co.

[195]See *Eastman Kodak Company v. Image Technical Services, Inc. et al.* (June 8, 1992).

v. United States, 356 U.S. 1, 5-6 (1958). Such an arrangement violates 1 of the Sherman Act if the seller has "appreciable economic power"' in the tying product market and if the arrangement affects a substantial volume of commerce in the tied market. Fortner Enterprises, Inc. v. United States Steel Corp., 394 U.S. 495, 503 (1969)."

A tying arrangement exists only when a producer of a desired product sells it only t those who also buy a second product from it.[196] Consider the arrangement made by the CMRS. If a local exchange carrier who is not the I-LEC desires to enter the local exchange market by purchasing air time from the CMRS, then the CMRS may tie with the air time such services as network management, customer service, engineering services and other such services. In addition the CMRS generally ties together the interconnection between the switch of the CMRS and the switch of the I-LEC. The latter is a separable set of product offerings and the forced tying arrangement we argue is a per se violation. The Court has ruled in *Jefferson Parish Hospital v. Hyde* that when "forcing" occurs with a company that has "market power" that such is unlawful.

The elements of an illegal tying arrangement have been articulated by the Court in *Jefferson Parish Hospital v. Hyde*. Specifically the elements for a successful claim are:[197]

vi. *the tie must affect more than a de minimis amount of interstate traffic;*

vii. *where the tying arrangement is not express, buyers must in fact have been coerced into buying the tied product as a condition of buying the tying product;*

viii. *the two products must be separate;*

ix. *the defendant must have economic power in the tying market;*

x. *there must not be any valid business justification for the tied sale.*

We shall now go through each of these elements in turn for the case of the I-LEC and CMRS relationship.

7.5.1.2 Interstate Traffic

The issue of interstate traffic is a forgone conclusion in the case of telecommunications. The overall product that is to be sold is local exchange service combined with inter-exchange carrier service. Since the I-LEC is by definition a monopoly player in all markets in which it acts it has the market power and in view of the CMRS it is a duopoly player in an interstate market. The specificity of the interstate issue has been joined and resolved by the Congress and is stated in U.S.C. 47 Section 332.

[196] Areeda & Kaplow, p. 704.

[197] Ross, p. 285.

7.5.1.3 Coercion

The contracts with the CMRS explicitly require the purchase of the tied elements. Namely, if one were to go to any existing CMRS provider the service offered is that of the air time plus the I-LEC interconnection. As we shall argue, these are clearly two separate products and in fact there should be no reason that the CMRS should in any way refuse to connect to the competitive the C-LEC. The refusal is a barrier to entry to the C-LEC. It is argued that that refusal is a *per se* violation.

7.5.1.4 Separate Products

In *Kodak* the Court ruled that products or services are separate when there is sufficient consumer demand to justify firms providing one item without the other.[198] Let us consider the products being offered. For the CMRS they are:

Air Time: This is the provision of access to the cell transport facility allocated on a block of trunk voice channels which can be readily allocatable by the switch software. This allocations is common practice in all MTSO or MSC trunk routing software. The air time is the provision of end to end trunk circuits.

Field Service: These are the costs allocated to the servicing of cells and the switch of the I-CMRS provider.

Network Management: This is the management associated with the provision of the CMRS services.

The CMRS will bundle the interconnection, as follows into this product.

I-LEC Interconnection: This is the connection from the CMRS switch trunk side to the I-LEC line side. There is no functional reason why this cannot be terminated on the C-LEC switch. The reason provided by the I-LEC is that it would allow for IEC access to the C-LEC and thus avoid the payment of access fees.

We bundle these three elements into an airtime fee for service. In addition to these the CMRS provides the following products. It should be noted that the CMRS also provides line item costing and pricing for these demonstrating that they exist and are separable.

Billing: This is the full bill service from tape collection at the switch, issuance of the bill, provisioning of the switch, and collections process.

Customer Service: This is the provision of all incoming customer service calls.

Sales: This is the sales, set, provisioning, collections and other functions.

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[198] Ross, p. 289.

Administration: This is the overhead management of the system in addition to the normal operations of the business. It may not generally have any relation to the delivery of any products provided.

Planning, R&D, Overhead: These are general overheads related to the service that may be related to new services and products that the CMRS may offer but would have no relation to general air time.

7.5.1.5 Economic Power of Incumbent

It is beyond a doubt that the incumbent has economic power. As a duopoly player aligned with the monopolist player this is without a doubt. The cartel formed by the A and B band cellular providers who are for the most part the I-LEC affiliates or agents is prima facie proof of this power.

7.5.1.6 Business Justifications

There are no viable business justifications for the bundling of such services. It can be argued that the 1996 Act recognized that unbundling and other similar requirements are a necessary step for the I-LECs to be allowed entry to the IEC market.

7.5.2 Pricing Arrangements

Prices charged can be used as a barrier to entry and a per se violation of the antitrust laws. The issue of separate products and the prices applied thereto is key to the understanding of the pricing mechanism in the antitrust sense.

7.5.2.1 The Products and The Prices

We have introduced the following set of distinct products that can be provided; Wireless Connection, I-LEC Interconnection, Billing, Customer Service, Sales, and Overhead. The costs are generally presented as fixed costs plus variable costs. We have shown elsewhere that the Wireless Connection, the I-LEC connection, billing, customer service and sales can all be obtained on a marginal basis and that there are thus de minimis fixed costs and thus de minimis scale. Therefore, we have in the case of the CMRS business an Average Total Cost equal to the Average Variable Cost, which is approximately equal to the Marginal Cost.[199]

Specifically, in the referenced papers by the author, values of these costs have been presented. In addition, the author has demonstrated, herein and elsewhere, that the AVC for the Wireless Connection, which we shall call air time although it includes some other variable costs, is less than 20% of the sum of all AVC elements. Sales is over 20% of the sum of all AVC, billing and customer service is about 20% and the remaining costs are overhead and access fees for interconnection.

[199]McGarty, 1993-1994 papers on access. The author derives the detailed costing model for all of these elements.

The questions that we ask are two:

iii. Does the CMRS sell itself air time at a price that is below the AVC?

iv. Does the CMRS sell airtime at a price that is dramatically above AVC?

The counter to these questions are also asked concerning the cost of interconnection to the I-LEC regarding access fees. Specifically:

iii. Does the I-LEC sell itself interconnection at a price that is below the AVC?

iv. Does the I-LEC sell interconnect at a price that is dramatically above AVC?

7.5.2.2 Price Discrimination

Price discrimination exists when a seller provides its product to two buyers in such a fashion that one sale has a different rate of return than the other. Namely, one buyer is discriminated against by being forced to sustain a higher rate of return to the seller than another. As has frequently been noted, in a purely competitive business wherein the good being market is a commodity there should be no price discrimination. Let us consider the issue of air time.

In the ideal world after the PCS licenses, there will be two 800 MHz cellular carriers, six PCS carriers, namely three at 30 MHz bandwidth and three at 10 MHz bandwidth, and an SMR carrier. This is a collection of at least nine providers of air time. We have also argued that air time is a separable product, that it is in essence a commodity, namely there is generally no discernible difference in the market other than price, and thus one would anticipate the evolving of a commodity market that is competitive for airtime.[200]

Let us consider a simple market case. Let us assume that there are two sellers of local exchange service and let us further assume that the service is composed of agglomerating the products of: airtime, interconnect, billing, customer service, and sales. This is a simple case of five products being blended together to deliver the overall product to the customer.

Let us further assume that there are costs related to these products for each provider. Namely:

- A_k = *Airtime for supplier k.*
- I_k = *interconnect for supplier k.*
- B_k = *billing for supplier k.*
- C_k = *customer care for supplier k.*

[200]It should be noted that NextWave, the dominant winner in the C Band PCS auctions proposes to be solely a purveyor of airtime on a wholesale basis.

- S_k = *sales for supplier k.*

Then the supplier have an assumed rate of return of $R_{k.}$ The price to the consumer, P_k is given by:

$$P_k = (A_k + I_k + B_k + C_k + S_k)(1 + R_k)$$

Thus is Supplier 2 is the most efficient supplier and is airtime is priced at commodity rates, then all things being equal the price of Supplier 2 should be lower than the price of supplier 1.

If however, Supplier 1 controls the airtime, and if Supplier one sells itself airtime at a rate that is equal to or above the AVC, but sells Supplier 2 airtime at a rate that is dramatically higher than it sells it to itself, then, although there is no per se violation, there is price discrimination. Namely, the Supplier 1, who perforce of market power due to its duopoly presence, is allowed for the interim to sell airtime at disproportionately higher rates, does so with the intent of controlling the market.

It should also be made clear that Supplier 1 may, if it so chooses, to be a purveyor of air time only and thus reap adequate returns on its investment. It, however, wants to reap larger returns by selling the consumer the bundled product at higher prices even though a competitor Supplier 2 could deliver lower costs on all other elements, except airtime, since Supplier 2 does not have an FCC license.

We can define the situation better as follows. If P is the price, we define E as the excess costs. Then:

$$P_k = (A_k + E_k)(1 + R_k)$$

If Supplier 2 is much more efficient than Supplier 1 in providing all but the air time element, then:

$$E_2 << E_1$$

But the Supplier 1 charges airtime to itself at a dramatically lower rate than it charges Supplier 2. Specifically:

$$A_1 << A_2$$

Then clearly the consumer will be forced to pay the excess charge for airtime, which would accrue to Supplier 1 as excess oligopoly rents.

Recall that Section 2 of *Clayton*, namely the *Robinson Patman Act*, states:

"It shall be unlawful for any person engaged in commerce, in the course of such commerce, either directly or indirectly, to discriminate in price between different

purchasers of commodities of like grade and quality, where either or any of the purchases involved in such discrimination are in commerce, where such commodities are sold for use, consumption, or resale within the United States or any Territory thereof or the District of Columbia or any insular possession or other place under the jurisdiction of the United States, and where the effect of such discrimination may be substantially to lessen competition or tend to create a monopoly in any line of commerce, or to injure, destroy, or prevent competition with any person who either grants or knowingly receives the benefit of such discrimination, or with customers of either of them..."

Recall also that this regulates consistency of prices and not consumer welfare. In this above example, however, consistency of prices, through the aggregation effect, also maximizes consumer welfare. In fact it does not material disadvantage the supplier of airtime who may still reap an adequate return on their air time investment. It does, however, drive from the market the producers of "excess" product elements that can more efficiently be provided by alternative suppliers. It allows for the ultimate commoditization of airtime. We shall return to this later.

7.5.2.3 Predatory Pricing

Predatory pricing generally means that the competitor sells its product at artificially low prices. Generally it is illegal for a firm to sell below cost where the intent its to drive competitors out of the market or to ensure that competitors do not enter the market. Competition should drive prices to the margin and this is what one would expect in a market wherein true competition exists. In the local exchange market we are starting with a monopoly situation and we are seeking to allow new entrants.

We shall focus on two elements in this business from two competitor. The two competitors are the I-LEC and the CMRS. In all markets the CMRS is affiliated with the I-LEC and that affiliation has been allowed to be more closely affirmed under Section 601 of the 1996 Act. In effect, the author has argued elsewhere that the relationship can be viewed within the context of the law of Agency and it can be seen that the Incumbent's CMRS is acting as one and the same with the I-LEC. Thus they are indistinguishable in the market and have pari passu equal power.

From the I-LEC the product that we will concern ourselves with is the switch interconnection product. For the CMRS perspective, the product is airtime.

Predatory pricing has been analyzed by the use of the Areeda-Turner test. Specifically the test states:

iv. *If the Price offered by the competitor to the market is greater than the Average Total Cost then there is no issue of predatory pricing.*

v. *If the Price offered by the competitor to the market is greater than the Average Variable Costs then there is no predation.*

vi. If the Price offered by the competitor to the market is less than the AVC then the price is predatory and it is unlawful.

We now want to consider the two cases. However we must remember that the price of the bundled product, namely LEC service, is the sum of the prices of the separate products that are combined to offer that end product.

7.5.2.4 I-LEC and Access

As we shall demonstrate latter in this section, the I-LEC sells itself interconnection. It also sells interconnection to other parties. First it sells interconnection to the inter-exchange carriers, "IEC's. They pay a significantly higher price than all other entities.

Let us assume that the price that the I-LEC charges the customer is the sum of the price for the interconnection plus all other prices. Namely, the price to the customer is the sum of the two product prices:

$P_C = P_I + P_O$

where P_I is interconnection price and P_O is all other prices. Let us assume that C_I is the cost of interconnection and C_O is the cost of all other elements. We shall assume that these costs are the AVC costs. The question is, can the I-LEC charge the customer for the LEC service a price that reflects a predatory rate, whereby we define a predatory rate as one where:

$P_I << C_I$

How can this be achieved. Quite simply. If the I-LEC charges the IEC a Price for Interconnect as follows:

$P_{I,IEC} >> C_I$

Thus the I-LEC makes up for losses in the local exchange area to ensure a sustainable monopoly position, by charging much higher interconnection prices in the interexchange area. This is a cross-subsidy scheme that ensures that the interexchange market subsidizes the monopoly position of the local exchange market. We have argued elsewhere that the I-LEC charges should reflect the totality of the I-LEC and should not select subsidies, costs from other competitors or any other market pricing distortion. We shall return to this latter.[201] We argue, however, that interconnection is predatory and falls in the collection of Class 3 Areeda-Turner violations.

7.5.2.5 CMRS and Airtime

[201] See McGarty, "Access...", 1994. That section demonstrates the LEC's access AVC and shows that there is Areeda-Turner problems.

The argument on predatory pricing for an I-LEC does not apply to the CMRS. We cannot argue that the bundled offering is priced at below costs. Unlike the I-LEC case where there is a "back-door" subsidy to allow below AVC and allegedly Marginal costs pricing, there is no similar argument here for the CMRS. Notwithstanding that observation, we do argue that the tying arrangements are themselves per se violations.

7.5.3 Corporate Against the ILEC

There are a plethora of antitrust complaint now lodged against the RBOCs. The following is a list

ACTIVE ANTITRUST COMPLAINTS

1. Covad vs. Verizon
2. Covad vs. BellSouth
3. Ntegrity vs. Verizon
4. Cavalier Telephone vs. Verizon
5. ATX (formerly, CoreComm) Counter Claim vs. SBC
6. Law Offices Curtis Trinko vs. Verizon (Class Action)
7. ATX (formerly, CoreComm) Counter Claim vs. Verizon

SETTLED COMPLAINTS

1. CalTech International vs. PacBell - Jury Trial finds for CalTech
2. Covad vs. SBC - Arbitration finds for Covad - Terms of $300 million in various financing
3. Intermedia vs. BellSouth - Undisclosed settlement
4. GlobalNaps vs. Verizon - Undisclosed settlement
5. Goldwasser vs. Ameritech - Consumer standing affirmed on appeal. Pleading deemed insufficient.
6. NOWCommunications vs. BellSouth - Undisclosed settlement

7.5.4 Trinko v Bell Atlantic, US Court of Appeals, 2nd Circuit, June 2002

Trinko is a law firm in New York. It tried to get some telecommunications service from a CLEC, in this case AT&T. The CLEC failed to deliver based upon Verizon's refusal to deal. The result was that the law firm sued Verizon on two grounds; violation of the 1996 Act and antitrust violations. The 2nd Circuit dismissed the 1996 Act action based on not having standing. It agreed to the antitrust action.

The 2nd Court starts its discussion on the antitrust claim as follows:

"Generally, a plaintiff can establish that a defendant violates section 2 of the Sherman Act by proving two elements "(1) the possession of monopoly power in the relevant market; and (2) the willful acquisition or maintenance of that power, as

distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident." Volvo N. Am. Corp., 857 F.2d at 73 (citations omitted); accord Top Mkts., Inc. v. Quality Mkts., Inc., 142 F.3d 90, 97 (2d Cir. 1998)."

The 2nd Court structures the claim as follows:

"Similarly, as a result of the alleged monopoly scheme, the plaintiff in this case had a similar set of choices: (1) stay with AT&T and receive inferior local service; or (2) switch to Bell Atlantic. While the second choice would hurt AT&T as a competitor, the first choice directly injures the plaintiff as a consumer. In this case, the plaintiff made the first choice and suffered the requisite antitrust injury."

The 2nd Court then stated:

"It is unlikely that allowing antitrust suits would substantially disrupt the regulatory proceedings mandated by the Telecommunications Act. In discussing the impact such suits would have on the regulatory process, it is useful to discuss separately suits seeking damages and suits for injunctive relief. Awarding damages for the willful maintenance of monopoly power would not substantially interfere with the regulatory scheme envisioned by the Telecommunications Act. In contrast, injunctive relief in this area may have ramifications that require particular judicial restraint."

However the 2nd Court ruled that the suit and claim survived based on antitrust grounds. This will open up a whole new avenue for litigation against the unbundling rules. It will also further delay broadband.

The litigation by the RBOCs against the FCC and all competitors is akin to slaveholders suing the Federal Government in 1866 for passage of the 13th Amendment eliminating slavery, under the "takings" clause of the Constitution. The RBOCs were and to a great degree are still the monopolists in all markets. They set prices, control who gets what segments, lobby the government to their advantage, and use the courts to protect their monopoly position. All of this is done in spite of the 1996 Act and the antitrust laws.

7.6 Privacy Litigation

7.6.1 The 1996 Act and Privacy

The 1996 Act had a clause, Section 222, which established a customer privacy initiative which the FCC was to implement. The Act specifically stated:

"SEC. 222. PRIVACY OF CUSTOMER INFORMATION.

***(a)** IN GENERAL- Every telecommunications carrier has a duty to protect the confidentiality of proprietary information of, and relating to, other telecommunication carriers, equipment manufacturers, and customers, including telecommunication carriers reselling telecommunications services provided by a telecommunications carrier…*

(c) CONFIDENTIALITY OF CUSTOMER PROPRIETARY NETWORK INFORMATION-

(1) PRIVACY REQUIREMENTS FOR TELECOMMUNICATIONS CARRIERS- Except as required by law or with the approval of the customer, a telecommunications carrier that receives or obtains customer proprietary network information by virtue of its provision of a telecommunications service shall only use, disclose, or permit access to individually identifiable customer proprietary network information in its provision of

(A) the telecommunications service from which such information is derived, or
(B) services necessary to, or used in, the provision of such telecommunications service, including the publishing of directories.

(2) DISCLOSURE ON REQUEST BY CUSTOMERS- A telecommunications carrier shall disclose customer proprietary network information, upon affirmative written request by the customer, to any person designated by the customer.

(3) AGGREGATE CUSTOMER INFORMATION- A telecommunications carrier that receives or obtains customer proprietary network information by virtue of its provision of a telecommunications service may use, disclose, or permit access to aggregate customer information other than for the purposes described in paragraph (1). A local exchange carrier may use, disclose, or permit access to aggregate customer information other than for purposes described in paragraph (1) only if it provides such aggregate information to other carriers or persons on reasonable and nondiscriminatory terms and conditions upon reasonable request therefore.

(d) EXCEPTIONS- Nothing in this section prohibits a telecommunications carrier from using, disclosing, or permitting access to customer proprietary network information obtained from its customers, either directly or indirectly through its agents:

(1) to initiate, render, bill, and collect for telecommunications services;

(2) to protect the rights or property of the carrier, or to protect users of those services and other carriers from fraudulent, abusive, or unlawful use of, or subscription to, such services; or

(3) to provide any inbound telemarketing, referral, or administrative services to the customer for the duration of the call, if such call was initiated by the customer and the customer approves of the use of such information to provide such service."

The wording of the law is quite clear.

7.6.2 US West v FCC

The FCC in its wisdom prepared a Notice of Public Rulemaking that considered Section 222 of the above 1996 Act and prepared the Administrative Code which is part of 47

USC 222. In 1999 US West sued the FCC because the FCC interpreted the law literally. The basis of the suit was simply that US West claimed that the FCC breached US West's First and Fifth Amendment rights, free speech and takings. The basis of the US West claim was that US West collected telephone numbers and data on everyone's call. US West wanted to sell this to anyone as a revenue generator. Thus they wanted to sell anyone's calling record to anyone who paid. The issue of whose property it really was had never been raised. All litigants seem to believe ab initio that the calling numbers were US West property.

The Court stated that the FCC was wrong, that Congress was wrong, and that US West had the right to sell to anyone any information regarding any telephone call made by anyone, privacy notwithstanding.

The 10th Circuit vacated the FCC Privacy order. Their basis was to first amendment violation. The 10th Circuit first states that the CPNI, customer phone number information, regulations restrict speech. They first address restricted speech. Specifically they state:

*"Do the CPNI regulations restrict speech? As a threshold requirement for the application of the First Amendment, the government action must abridge or restrict protected speech. The government argues that the FCC's CPNI regulations do not violate or even infringe upon petitioner's First Amendment rights because they only prohibit it from using CPNI to target customers and do not prevent petitioner from communicating with its customers or limit anything that it might say to them. This view is fundamentally flawed. Effective speech has two components: a speaker and an audience. A restriction on either of these components is a restriction on speech. Cf. Virginia State Bd. of Pharmacy v. Virginia Citizens Consumer Council, Inc., 425 U.S. 748, 756-57 (1976) (noting that the First Amendment protects the communication, whether the speech restriction applies to its source or impinges upon the audience's reciprocal right to receive the communication); Martin v. City of Struthers, 319 U.S. 141, 143 (1943) (noting the First Amendment "embraces the right to distribute literature and necessarily protects the right to receive it"). In other words, a restriction on speech tailored to a particular audience, "targeted speech," cannot be cured simply by the fact that a speaker can speak to a larger indiscriminate audience, "broadcast speech." Perhaps the Supreme Court case of Florida Bar v. Went For It, Inc., 515 U.S. 618 (1995), best illustrates this. ...**Therefore, the existence of alternative channels of communication, such as broadcast speech, does not eliminate the fact that the CPNI regulations restrict speech**."*

Then the 10th Circuit states:

"Privacy considerations of some sort clearly drove the enactment of § 222…The concept of privacy, though, is multi-faceted. Indeed, one can apply the moniker of a privacy interest to several understandings of privacy, such as the right to have sufficient moral freedom to exercise full individual autonomy, the right of an individual to define who he or she is by controlling access to information about him or herself, and the right of an individual to solitude, secrecy, and anonymity… The breadth of the concept of privacy requires us to pay particular attention to attempts by the government to assert privacy as

a substantial state interest….When faced with a constitutional challenge, the government bears the responsibility of building a record adequate to clearly articulate and justify the state interest. "[T]he Central Hudson standard does not permit us to supplant the precise interests put forward by the State with other suppositions." Edenfield v. Fane, 507 U.S. 761, 768 (1993)."

The 10th Circuit then goes on to describe boundaries on privacy:

"The government presents no evidence showing the harm to either privacy or competition is real. Instead, the government relies on speculation that harm to privacy and competition for new services will result if carriers use CPNI. In Edenfield, the Supreme Court struck down a Florida ban on CPA in-person solicitation because the state had presented no evidence anecdotal or empirical that such solicitation created the dangers of "fraud, overreaching, or compromised independence" that the state sought to combat. See 507 U.S. at 771; cf. Florida Bar v. Went For It, Inc., 515 U.S. 618, 626-27 (1995)… The FCC faces the same problem here. While protecting against disclosure of sensitive and potentially embarrassing personal information may be important in the abstract, we have no indication of how it may occur in reality with respect to CPNI. Indeed, we do not even have indication that the disclosure might actually occur. The government presents no evidence regarding how and to whom carriers would disclose CPNI."

They 10th Circuit states that they have no idea as to the fact that disclosure may occur. De facto, release of such CPNI information is disclosure per se! Using the rules laid down in Central Hudson, 447 U.S. at 564-65, the 10th Circuit asks:

a. Does the government have a substantial state interest in regulating speech involving CPNI?
b. Does the Regulation Directly and Materially Advance the State's Interests?
c. Are the CPNI regulations narrowly tailored?

Without addressing the 10th Circuits answers, one must look first at Hudson. Hudson relates to a Gas and Electric company trying to advertise to promote usage during the 1970s energy shortage. The Public Service Commission, PSC, attempted to stop them and the Court ruled they had the right of free speech. There are substantial difference here.

First: There is a property interest in the CPNI. At no point does anyone truly argue who owns these sets of information. It can be argued that the CPNI are not the property of US West but of the customer. There is a wealth of copyright law on this subject. When did title transfer and under what agreement did this become effected. As we show latter, in a Posnerian analysis, see Richard Posner latter, there is a property or economic right. The right is that of the creator, namely the customer. The 1996 Act reaffirms that right, the FCC presented Administrative law requiring release of that right by affirmation by the consumer, and the 10th Circuit rejects it.

Second: Arguendo, if it is speech, whose speech is it? It clearly was an utterance, albeit electronic, of the consumer. The consumer has an expectation of privacy. The Court has in multiple decisions articulate the concept of expectation of privacy. We summarize these cases herein. Given that established expectation, that alone is basis for protection established by the 1996 Act.

Thus the 10th Circuit establishes a precedent of RBOC generated elimination of privacy and property rights that have been developed over the past 100 years. This is an ominous precedent if it is let to stand.

7.6.3 Wiretapping and Privacy Decisions in a Telecommunications World

The following is a summary of some of the key Court decisions on privacy in a telecommunications world. What is clear is that they demonstrate that there is a clear expectation of privacy in many situations. Thus the 10th Circuits decision is of concern.

Olmstead v U.S., 277 U.S. 438, 1928: Justice Taft delivered the decision. Olmstead was a leading conspirator in a bootlegging ring. He moved liquor from Canada to the US. The police put taps on the telephone lines of all the conspirators. The taps were placed outside of the homes and were done without warrants. The information gathered from the taps were used to convict. The Court stated: "The court held the Act of 1874 repugnant to the Fourth and Fifth Amendments. As to the Fourth Amendment, Justice Bradley said [277 U.S. 459] *"Concurring, Mr. Justice Miller and Chief Justice Waite said that they did not think the machinery used to get this evidence amounted to a search and seizure, but they agreed that the Fifth Amendment had been violated. But, in regard to the Fourth Amendment, it is contended that, whatever might have been alleged against the constitutionality of the acts of 1863 and 1867, that of 1874, under which the order in the present case was made, is free from constitutional objection because it does not authorize the search and seizure of books and papers, but only requires the defendant or claimant to produce them. That is so; but it declares that, if he does not produce them, the allegations which it is affirmed they will prove shall be taken as confessed. This is tantamount to compelling their production, for the prosecuting attorney will always be sure to state the evidence expected to be derived from them as strongly as the case will admit of. It is true that certain aggravating incidents of actual search and seizure, such as forcible entry into a man's house and searching amongst his papers, are wanting, and, to this extent, the proceeding under the Act of 1874 is a mitigation of that which was authorized by the former acts; but it accomplishes the substantial object of those acts in forcing from a party evidence against himself. It is our opinion, therefore, that a compulsory production of a man's private papers to establish a criminal charge against him, or to forfeit his property, is within the scope of the Fourth Amendment to the Constitution in all cases in which a search and seizure would be, because it is a material ingredient, and effects the sole object and purpose of search and seizure.""* Olmstead v. United States, 32 one of the two premises underlying the holding that wiretapping was not covered by the Amendment was that there had been no actual physical invasion of the defendant's premises; where there had been an invasion, a technical trespass, electronic surveillance was deemed subject to Fourth Amendment restrictions.

Berger v New York 388 U.S. 41, 1967: Justice Clark delivered the Opinion. Berger was convicted in bribery of a government official. A bar owner had complained that officials from NY State Liquor Board had entered his bar and without cause seized his books. The bar owner said it was in reprisal for failing to pay bribe. On this basis an wire tap was authorized by NY court for 60 days on the office of official. Based on wiretap evidence the warrant was extended. Evidence was obtained on two other bars being shaken down. Defendant stated that this information was not legally obtained since the warrant was for evidence on the first case. Court ruled that this was un-constitutional. The warrant was too broad in scope.

Katz v U.S., 389 U.S. 347, 1967: Justice Stewart delivered the Opinion. The defendant was convicted for a violation of the wagering acts. The FBI recorded his calls without a warrant by attaching a recording device on the outside of a telephone booth. The defendant tried to pose the following two questions: *"A. Whether a public telephone booth is a constitutionally protected area so that evidence obtained by attaching an electronic listening recording device to the top of such a booth is obtained in violation of the right to privacy of the user of the booth. [389 U.S. 350] B. Whether physical penetration of a constitutionally protected area is necessary before a search and seizure can be said to be violative of the Fourth Amendment to the United States Constitution."* The Court rejected this posing. The Court stated: *"The Government stresses the fact that the telephone booth from which the petitioner made his calls was constructed partly of glass, so that he was as visible after he entered it as he would have been if he had remained outside. But what he sought to exclude when he entered the booth was not the intruding eye -- it was the uninvited ear. He did not shed his right to do so simply because he made his calls from a place where he might be seen…. To read the Constitution more narrowly is to ignore the vital role that* the *public telephone has come to play in private communication."* Further; *"What a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection. But what he seeks to preserve as private, even in an area accessible to the public, may be constitutionally protected*." Finally the Court states: "*Wherever a man may be, he is entitled to know that he will remain free from unreasonable searches and seizures. The government agents here ignored "the procedure of antecedent justification . . . that is central to the Fourth Amendment,"{ 24} a procedure that we hold to be a constitutional precondition of the kind of electronic surveillance involved in this case*.." The Fourth Amendment protects people, not places.

7.6.4 Privacy Legal Theory

Privacy legal theory is quite complex.[202] We discuss two extreme cases here and then address the issue in some detail regarding the telephony world. The first is that of Brandeis and relates to the "right to be let alone". We have argued elsewhere that this becomes a right to anonymity, a right to be unknown. The problem is that post 9-11 this

[202] See McGarty, Privacy in the Internet Environment, MIT Working Section, December 2002.

right has been obscured by the demands to ferret out foreign nationals and subversives. One must be careful to balance these with Constitutional rights.

The second is the brief description of Richard Posner, a Federal Appeals Judge and Professor at University of Chicago. His view is that all the world is some form of economic transaction, property and transactions. Each transaction has value and all law is balancing of these transactions.

7.6.4.1 Brandeis

Louis Brandeis was to become one of the most important and influential Supreme Court justices. He was a Harvard Law School Graduate, he practiced law in Boston, and was one of the most insightful crafters of Supreme Court Decisions. He wrote a seminal section on privacy in response to the Boston press' invasion of the privacy of a daughters wedding.

In his section, with Warren his law partner, he begins by saying:[203]

"That the individual shall have full protection in person and in property is a principle as old as the common law; but it has been found necessary from time to time to define anew the exact nature and extent of such protection. Political, social, and economic changes entail the recognition of new rights, and the common law, in its eternal youth, grows to meet the demands of society. Thus, in very early times, the law gave a remedy only for physical interference with life and property, for trespasses vi et armis. *Then the "right to life" served only to protect the subject from battery in its various forms; liberty meant freedom from actual restraint; and the right to property secured to the individual his lands and his cattle. Later, there came a recognition of man's spiritual nature, of his feelings and his intellect. Gradually the scope of these legal rights broadened; and now the right to life has come to mean the right to enjoy life--the right to be let alone, the right to liberty secures the exercise of extensive civil privileges; and the term "property" has grown to comprise every form of possession-- intangible, as well as tangible."*

Brandeis then goes on to describe the specific "privacy" rights and the sources of those rights:

"In every such case the individual is entitled to decide whether that which is his shall be given to the public. No other has the right to publish his productions in any form, without his consent. This right is wholly independent of the material on which, or the means by which, the thought, sentiment, or emotion is expressed. It may exist independently of any corporeal being, as in words spoken, a song sung, a drama acted. ... The right is lost

[203] See Zimmerman, Diane, Requiem for a Heavyweight, A Farewell to Warren and Brandeis's Privacy Tort, p. 295, of Garvey and Schauer, The First Amendment, A Reader, West Publishing, St Paul, 1992. Ms. Zimmerman attempts to refute the claims for Brandeis's theories which had survived for so long. In addition, as is well known, Roe v. Wade is based significantly upon the privacy considerations in the Constitution as is Griswold and many others. Recent Department of Justice actions are a direct threat to such an open Brandeisian "right of privacy" theory.

only when the author himself communicates his production to the public--in other words, publishes it. It is entirely independent of the copyright laws, and their extension into the domain of art. The aim of those statutes is to secure to the author, composer, or artist the entire profits arising from publication; but the common-law protection enables him to control absolutely the act of publication, and in the exercise of his own discretion, to decide whether there shall be any publication at all.[...] *The statutory right is of no value,* unless *there is a publication; the common-law right is lost* as soon as *there is a publication…What is the nature, the basis, of this right to prevent the publication of manuscripts or works of art? It is stated to be the enforcement of a right of property; …A man records in a letter to his son, or in his diary, that he did not dine with his wife on a certain day. No one into whose hands those papers fall could publish them to the world, even if possession of the documents had been obtained rightfully and the prohibition would not be confined to the publication of a copy of the letter itself, or of the diary entry; the restraint extends also to a publication of the contents. What is the thing which is protected? Surely, not the intellectual act of recording the fact that the husband did not dine with his wife, but that fact itself. …The copyright of a series of paintings or etchings would prevent a reproduction of the paintings as pictures; but it would not prevent a publication of a list or even a description of them. Yet in the famous case of* Prince Albert v. Strange *the court held that the common-law rule prohibited not merely the reproduction of the etchings which the plaintiff and Queen Victoria had made for their own pleasure, but also "'the publishing … though not by copy or resemblance, …".*

Brandeis then goes on to describe the following precedents:

" Abernethy v. Hutchinson*, 3 L. J. Ch. 209 (1825), where the plaintiff…sought to restrain the publication in the* Lancet *of unpublished lectures which he had delivered … Lord Eldon doubted whether there could be property in lectures which had not been reduced to writing, but granted the injunction on the ground of breach of confidence…*

… Prince Albert v. Strange*, 1 McN. & G. 25 (1849), Lord Cottenham…recognizing a right of property in the etchings which of itself would justify the issuance of the injunction, stated, after discussing the evidence, that he was bound to assume that the possession of the etchings by the defendant had "its foundation in a breach of trust, confidence, or contract," and that upon such ground also the plaintiff's title to the injunction was fully sustained.*

… Tuck v. Priester*, 19 Q. B. D. 639 (1887), the plaintiffs were owners of a picture, and employed the defendant to make a certain number of copies. He did so, and made also a number of other copies for himself, and offered them for sale … the plaintiffs registered their copyright in the picture, and then brought suit for an injunction and damages. The Lords Justices differed as to the application of the copyright acts to the case, but held unanimously that independently of those acts, the plaintiffs were entitled to an injunction and damages for breach of contract.*

… Pollard v. Photographic Co.*, 40 Ch. Div. 345 (1888), a photographer who had taken a lady's photograph under the ordinary circumstances was restrained from exhibiting it,*

and also from selling copies of it, on the ground that it was a breach of an implied term in the contract, and also that it was a breach of confidence… Justice North interjected in the argument of the plaintiff's counsel the inquiry: "Do you dispute that if the negative likeness were taken on the sly, the person who took it might exhibit copies?" and counsel for the plaintiff answered: "In that case there would be no trust or consideration to support a contract." Later, the defendant's counsel argued that "a person has no property in his own features; short of doing what is libelous or otherwise illegal, there is no restriction on the photographer's using his negative." But the court, while expressly finding a breach of contract and of trust sufficient to justify its interposition, still seems to have felt the necessity of resting the decision also upon a right of property, in order to bring it within the line of those cases which were relied upon as precedents.

Brandeis concludes with the following:

"First. The right to privacy does not prohibit any publication of matter which is of public or general interest….

Second. The right to privacy does not prohibit the communication of any matter, though in its nature private, when the publication is made under circumstances which would render it a privileged communication according to the law of slander and libel….

Third. The law would probably not grant any redress for the invasion of privacy by oral publication in the absence of special damage….

Fourth. The right to privacy ceases upon the publication of the facts by the individual, or with his consent.

Fifth. The truth of the matter published does not afford a defense….

Sixth. The absence of "malice" in the publisher does not afford a defense….

The remedies for an invasion of the right of privacy are also suggested by those administered in the law of defamation, and in the law of literary and artistic property, namely:

An action of tort for damages in all cases. Even in the absence of special damages, substantial compensation could be allowed for injury to feelings as in the action of slander and libel.

An injunction, in perhaps a very limited class of cases."

Brandeis thus initially established the tort type protection that has been discussed herein. Specifically, the discussion by Prosser and the Restatement of Torts discussed by Prosser may be for shadowed by the recommendation by Brandeis.

However, Brandeis deflects inwardly, on the individual and a right to be let alone. It is the reclusive version of privacy. However, it is a version which has developed a body of law over the past one hundred plus years. It is the basis of the torts that allows one to be let alone.

7.6.4.2 Posner

In contrast to Brandeis is the view of Richard Posner. Richard Posner, a prolific Federal Court Judge and faculty member at the University of Chicago, approaches privacy in a purely economic fashion. As he states:

"… the interest I am calling "the face we present to the world". Economics, with a bit of simple game theory… and some help from philosophy, can help us thread this maze, uncover the laws unity, think concretely, about problems often obscured by the "sonorous" talk of "privacy", and incidentally provide a bridge…"[204]

Posner is clearly a jurist who views almost all legal issues in an economic context. All interactions or actions are transactions, the decision to make and compete an action based on some economic measure or value. For example, I decide to rob a bank because in my mind I make money from doing so and the weighted probability of getting caught and the cost to me of doing so is significantly less than what I will get robbing the bank. It is not clear that all thieves think in terms of von Neuman game theorists, in fact I can think of very few people who can or even less who do.

To Posner, there is first and almost only and economic rule a play, a rule in many ways dependent on privacy as a property and with an economic or transactional value applied.

To better understand property and privacy one must consider why Richard Pipes, of Harvard, in his treatise on Property, makes the following statement regarding privacy:

> *"The whole concept of privacy derives from the knowledge that we can withdraw, partly or wholly, into our own space; the ability to isolate oneself is an important aspect of property rights. Where property does not exist, privacy is not respected…which helps explain why the Russian language-the language of a people who through most of their history have no private property in the means of production-has no word for privacy…"*

Pipes is a Soviet and Russian scholar, a Pole, who had escaped the Soviet domination of Poland and Central Europe. He clearly understands the issues of privacy as derivative from but as superior to property. Pipes is one who has seen the flow of German Nazi troops and the counter flow of Russian Soviet forces back and forth across Poland. He understands the essential belief in the sanctity of the individual and in his work clearly and unambiguously states this.

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[204] Posner, Overcoming Law, p. 531.

Posner considers privacy as an element of an economic exchange. Part of that assumption is that privacy has value comparable to property. Pipes takes that even further and states a duality between property and privacy, in fact Pipes can be said to state that privacy is the natural extension to property.

Posner starts his discussion on Privacy in his book, *The Economics of Justice* ("EOJ"), as follows;

> *"Provisionally, privacy means the withholding or concealment of information, particularly personal information…"*

Posner then states:

> *"It is no answer that people have the "right to be let alone" for few people want to be let alone"*

Clearly that statement is at best self serving, since aloneness is not necessarily the same in all cases. I may want as a social animal to interact with people but at the same time I may want to retain the privacy or secrecy of my hobbies or collections.

Posner states regarding privacy as concealment. He argues that people frequently go around selling themselves but conceal items that may not allow them to be presented in the best light. Posner then goes on to say that in buying things, we should have the right to know anything material to the sale about the person selling the product. Thus for example, one may assume Posner demands that the seller of a Pizza if he has AIDS should reveal that to all buyers, or at least the buyer should have the right to ask and the seller the duty to respond truthfully. This is generally not the case.

He talks generally about the concepts of privacy as; (i) secrecy, (ii) seclusion, and (iii) autonomy. Specifically these are defined as:

Secrecy: Secrecy is a form of concealment. Posner states that he feels that what people do today is seek to keep personal information secret for personal gain.[205] In a sense the desire for secrecy is to control others perceptions of one's self.[206] This means to create an alternative persona. This concept of privacy in the Posnerian world is one we shall see again in the Internet world. The ability to create a persona, to mold by withholding and to mold by mis-stating, a new and unique personality. The Internet personas are based on controlling information, but positively and negatively.

[205] Posner, EOJ, p. 271.

[206] Posner, EOJ, p. 233.

Seclusion: In a sense this is a withdrawal from the cares of public life. Posner refers to gregarious seclusion, specifically when someone wants to be let alone to do something of more import, not a desire to separate themselves from society.[207]

Autonomy: Posner defines this as the "being allowed to do what one wants without interference". He further states that it is inappropriate to define privacy as the same thing.

The three types or characterizations of privacy from Posner seem very compelling. As he states in EOJ, the interpretation of Brandeis and the subsequent attempts by the Supreme Court to establish a right of privacy where none exists is to limit privacy to secrecy and seclusion and it should be expanded to be free from governmental interference.[208] This expansive interpretation would seem to be within the Brandeis format but Brandeis in writing his section was responding to an invasive attack by the press, not government. Would Brandeis have responded in a similar fashion in today's world. Thus, in a Posnerian world, the autonomy construct is the broadest and most far reaching.

7.7 Municipalities and the ILECs

The next area of legal warfare will most likely be that of municipal networks. It has been shown elsewhere that the RBOCs are in sever financial shape and thus will not be able to provide financing for local broadband. Their approach is delay and elimination of competitors to ensure that if and when they are ready there will be only one player, and that player is them.

USTA, the US Telephone association is an association of the monopoly telephone companies and their surrogates. They had attempted in the 107th Congress to pass the "***The Government Entity Owned Telecommunications Reform Act of 2001***". The USTA Bill requires:

USTA is supporting federal legislation with the following components:

1. Where private industry provides or has a willingness to provide telecommunications service at a reasonable price, government ownership and operations should be prohibited.

2. Government controlled telecommunications operations should not have access to any subsidies, in the form of tax exemptions (including income, property, gross receipts and excise taxes), tax exempt bond financing, or other subsidies, that are not available to privately owned enterprises. In other words, an evening of the playing field should occur.

3. Government controlled competitive telecommunications operations should be subject to the same regulation as privately owned firms engaged in providing the same service(s).

[207] See Posner, EOJ, p 269. He has extensive discussion on these concepts.

[208] Posner, EOJ, p. 315.

4. Government shall impute to its cost of providing service the cost of taxes and fees consistent with the obligations of private (e.g. non-government) telecommunications carriers.

5. Government shall not use its sovereign powers, such as control of rights of ways or powers of condemnation, to provide an advantage to government controlled competitive telecommunications operations over privately owned concerns. Nor should it delegate its sovereign powers to a competitive privately owned telecom services provider.

6. Government controlled competitive telecommunications operations should not be regulated by the same governmental entity as they are controlled.

7. State statutes that prohibit government controlled competitive telecommunications operations should be upheld.

8. Government inefficiencies should not be masked by taxpayer subsidies.

This is a blatant attempt by the monopolists to prevent municipalities from entering the role of providing broadband services to their communities. Broadband, it has been argued, is a natural public utility which should be open to all service providers and open to all end users. The only natural way to implement this is either a separation of the local plant from the incumbents or the establishment of non-corporate owned plant like a local road. The local roads are naturally municipal investments.

7.8 Conclusions

This section has argued that effective competition in the local exchange market can only be achieved by the timely unbundling of the I-LEC as well as the existing CMRS as well as of the new CMRS. In addition the unbundling should be done at fair and equitable prices. Furthermore we have argued that zero cost access was also an essential element in this overall process. We have developed these arguments based upon three elements; fundamental changes in the technological and operational environment, the application of the new Telecommunications Act, and the direct application of the existing antitrust laws.

In many ways this is no longer an FCC or State PSC issue but has been risen to the civil and possibly criminal level of Clayton and Sherman respectively. The latter issue is one of blatant sustained anti-competitive behavior in the local exchange market. Recent evidence brought before the FCC and the State Commissions clearly indicate that there is more than just grounds for investigation.

This section argues further, that the regulatory and administrative law process is rant with delays and inefficiencies. Further, we argue that although the antitrust laws are vehicles for appropriate remedies we should not expect the Federal Government to act on these issues. Thus, it is argued that the civil application of these laws may be the most used and most efficient vehicle for the true development of a truly competitive local, exchange

market. Many authors have argued against the antitrust laws but these arguments have been based on much less market power and control that is evident in this case.[209]

The essence of antitrust law is promote competition and not competitors. To do so in telecommunications one must recognize several significant principles. First, the loss of scale. Namely as we have argued, technology is driving scale out of telecommunications. All costs are marginal costs and all average costs approach margin in a precipitous fashion. Second, disaggregation allow for marginal pricing in all elements of the business. Capital plant has been marginalized as a result of technology and operations costs are marginalized as a result of the restructuring of industry. Third, commoditization is the driving factor in telecommunications. A connection is just a connection and differentiation is driven to the periphery of the network. Fourth, prices is cost based, and this means that such artifacts of Rawlsian economics as the Baumol-Willig theorem have no place in a competitive environment, and the only maximization allowed is consumer welfare.

These conclusions drive our analysis along antitrust grounds. Telecommunications, especially at the local exchange level has and still is a monopoly. The 1996 Act took away any last vestige of antitrust protection from the I-LECs, namely the RBOCs. The main issue is interconnection and the secondary issue is unbundling. Interconnection is dominated by tying arrangements which are directed at the elimination or thwarting of any competition as well as the competitors. Thus, the conclusion is quite clear. Implementation of the 1996 Act will require aggressive prosecution of the antitrust laws. This prosecution will most likely be done by the consumers, not the new incumbents and not by the Government since such acts on the Governments side have become a conflict between all three branches of the Government.

[209]See the works by Bork and Posner. We generally agree with Posner that economic analysis is the key to determining how to best apply the law in these cases. In fact, we argue that the Posner approach is most likely to be the basis for many of the briefs developed in subsequent litigation.

8 THE HIDDEN COSTS OF BROADBAND

8.1 Introduction

Broadband has been touted as necessary for everything from national competitiveness to national defense. In addition other countries have clearly surpassed the United States in the deployment of broadband. There are clearly many reasons for the slow growth of broadband but one which has received little direct attention is the issue of a franchise. Unlike all other countries, the franchise in the United States is a highly complex and local process.

There are over 35,000 cities and towns in the United States, and each has a separate franchise requirement. In almost all of these cases the franchise must be negotiated and awarded prior to any form of construction. This can mean before any work is commenced even on pre-construction efforts. The franchise itself is a document which allows the operating entity to use the rights of way for the purpose of providing a video programming offering. This simply means providing an offering similar to what one would obtain from broadcast television. The benchmark is broadcast television, which is a key differentiator.

This section is based upon the author's past and current experience in franchising systems.[210] It is in many ways a summary of several cases with the observations being grouped in a summary rather that detailing the issues on a town by town basis. This section reviews the technical and regulatory aspects of current broadband and then reviews the current process of franchising including time and costs factors based upon recent cases. The results presented are summary results.

A recent section in Foreign Affairs by Bleha attempts to explain why the US has low broadband penetration. He argues that the reason is the Bush Administration and that there is no Federal policy to develop broadband. There are two main problems with Bleha's approach, first it assumes that the United States is some form of centrally controlled socialistic government with a central planning group, and second he has no awareness of the facts as they exist in the United States. Leaving apart the socialistic tendencies of the author, let us first address the facts. The reasons why broadband does not work in the United States are simple.

(i) Franchise Process

The Franchise process is required everywhere in the US. Specifically it is required when the provider of broadband is also a provider of video at a fee and where the broadband provider uses the public right of way, no matter how limited. Thus if one were to pull a

[210] The author was from 1980 to 1984 an officer at Warner Cable, subsequently Warner Amex, one of the largest multiple system operators at the time and a predecessor of Time Warner. During that period the author was personally involved in franchising for such cities as Pittsburgh, Boston, Phoenix, Houston, Dallas, Cincinnati, New York, Chicago, Columbus, and others. In addition the author is currently the CEO of Merton an independent fiber based broadband operator in New Hampshire, Vermont and Massachusetts.

single strand of fiber across a town street and then provide a wireless network putatively this require a franchise.

How complex is this franchise process and how costly is it? We have been focusing on towns of about 2,500 to 5,000 households. For a town of that size, of which there are more than 20,000 in the US out of a total of slightly more than 30,000, it takes a team of two people about a year to eighteen months. It requires a law firm, feasibility studies, strand mapping, and ongoing contact with town managers, selectmen, town leaders, and any and all others involved. It is also a competitive process with the incumbent having a hidden seat at the table. The town and the incumbent always try to raise the bar, to keep out the incumbent.

The town's view of this is best exemplified by an article in the January 5, 2005 Nashua Telegraph by reporter Dave Brooks:

"Hanover selectmen were particularly happy to ink this deal because they were also negotiating a new cable-TV franchise agreement with Adelphia. That put them in unique position of being able to play competing cable companies against each other. "Both parties were quite interested about the terms of the other agreement," said McClain, who with great self-control was able to keep herself from chuckling over phone. "We got some public-access equipment money that we probably would not have gotten otherwise." (The sound you hear is town officials throughout New Hampshire writhing in envy)"

The town plays one provider off against the other, assuming that the cost of doing so is negligible. The cost however is real and substantial. For Hanover as an example, the cost was eighteen months of two people plus lawyers plus engineering and marketing teams. It was estimated to be about $500,000, or $200 per household. At 25% penetration this is an added $800 per subscriber. Thus the town's strategy to get "more" is ultimately to the detriment of the customer who is strapped with an added $800. If a FTTH system was about $1,600 per subscriber without any of these costs, Franchising alone is a 50% increase in the costs. Is there any reason why Verizon and SBC are trying to do away with Franchising. It is not the franchise fee but it is the franchise process.

(ii) Franchise Coverage

The second element of hidden costs is the physical coverage requirement of a franchise. Towns in the franchise process demand greater and greater physical coverage despite the legal requirement of a level playing field. In all towns the incumbent has about 75% coverage. The rule is that they will cover areas with "*25 households per mile or greater*". However, the new entrant is often required to provide "100% coverage" or in most case 25% more that the incumbent. This is not negotiable. The cost of this is simple: if fiber costs $1,200 per customer in the higher density part of town, and that is say 66% of the town, then in the remaining 33% of the town there a few if any customers, then the $1,200 per customer becomes $1,800 per customer, or an increase of $600. This is the typical increase.

(iii) Internet Transiting

The connection to the Internet backbone is the next major barrier. The peering of Internet users occurs in the Internet backbone frequently with the Tier 1 Internet carriers such as UUNet (soon to be part of Verizon) and AT&T (soon to be part of SBC). They control the interconnection. In Hanover, NH, for example, to get such a connection one must pay about $400 per Mbps per month. Thus if one is watching 6 hours a day of HDTV on the broadband network using the Internet this would consume 20 Mbps for 25% of the day, or an average of 5 Mbps per month, for a fee of $2,000 per month per HDTV set! This will not work economically. By the way, this is NOT the case in any other country in the world, they all have national Internet exchanges, NIXs, which disintermediate this oligopolistic pricing mechanism.[211] In the US we have institutionalized it with the recent acquisitions by the two dominant RBOCs.

(iv) Litigation and Legislation: Barriers from Incumbents

The incumbents frequently have the advantage of "*the power of the lawyers*". Not the law but the lawyers. It is not uncommon for the incumbent CATV operator to instigate a law suit against a new entrant, such as a municipality, and attempt to bar any form of competition. This is an example of what happened in the Tri Cities case in the Chicago area with Comcast. In addition there is a tremendous push by the incumbents to craft and pass state legislation which would make it near impossible to get into the business if one is anything but the incumbent. The barriers to entry are being legislatively increased with the help of the incumbent and interested legislators.

In conclusion, the facts and history clearly shows that the Towns, via the franchise process and coverage requirements, add as much as $1,400 per subscriber in costs to deploy. The incumbent Internet backbone providers charge excessive pricing for backbone connections, having no relationship to costs. The incumbent broadband providers legislate and litigate against any new entrant. These four elements are clear barriers to entry for any new truly broadband carrier. They do not exist anywhere else but the US. The paucity of lawyers outside the US eliminates the litigation element, the lack of "town control" eliminates the arcane franchise process, and all other countries NIXs have disintermediated the Tier 1 carriers. These barriers will not only remain but will intensify in the US. They are, in my opinion, the real barriers to broadband. We develop this analysis in detail herein.

8.2 Broadband Services and Architectures

We first start with a definition of broadband and then provide a summary of services and service characteristics.

[211] See McGarty, Internet Transiting. In that section we develop a detailed analysis of the Internet connectivity and describe the evolution of the NIX architectures.

8.2.1 Broadband: A Definition

Broadband is many things to many people. One measure of broadband is the penetration of fiber based facilities into municipalities. This measure reflects the recognition that fiber is a real broadband fabric.[212] The same can be said in many ways for a wireless network as well. The current state of broadband is as follows:[213]

Company	Total (000)	Quarter (000)
Comcast	7,408	416
SBC	5,608	504
Time Warner	4,122	209
Verizon	3,904	345
BellSouth	2,349	253
Cox	2,720	149
Charter	1,978	94
Bell Canada	1,936	128
Cablevision	1,441	88
Adelphia	1,396	80
Total Top 10	32,862	2,266
Total North America	43,269	2,942

Let us now define broadband in an expansive fashion. This will not be the manner in which the FCC defines Broadband as anything in excess of 200 Kbps. That definition is in our opinion self serving and is a sop to the incumbent carriers to allow them to feel that what they provide is a broadband offering. It also is a way in which the FCC as a result of the lobbying of the incumbents can workaround the 1996 Telecommunications Act and grant carve outs for continued monopoly control. Our definition is as follows:

First, broadband is defined in a more expansive manner than most regulatory agencies have defined it to date. It is more than DSL and more than cable modems. Broadband is truly data provided in as fast a manner as is possible by having direct fiber connectivity to each user.[214] Broadband is a VLAN technology set employed over a very wide area. This is a very powerful definition, because we have seen that fiber capacity is a never decreasing value, in fact it has been increasing dramatically over the past few years. For a benchmark we mean that the fiber supports at a minimum 100 Mbps or more per user. Moreover, broadband is further defined as an enabler. It is devoid of any content or

[212] See papers by Gillett et al for a summary of the penetration of municipal broadband. The work of this MIT policy group has been focusing on municipals. There may be certain characteristics which allow municipals to grow and be successful but there is always the problem that scale is critical and the municipals have inherently no way to scale at the present time.

[213] See Teresa Mastrangelo, she reports 3M net adds for North American broadband Q1. Broadband now reaches 33% of U.S. households and 51% of Canadians. Mastrangelo created **broad**bandtrends.com, a service of The Windsor Oaks Group.

214 See section by Ismail and Wu on OECD Broadband Internet Access.

service but it is capable of providing an open pathway to facilitate any and all applications.

Second, Municipal may mean many things. It has meant the fact that the network is "owned" by a municipality. It has meant that it "covers" only the municipality. It has also meant that it is provided for the "benefit" of the municipality. For our benchmark, we focus on the coverage characteristic, independent of who may own, operate, or benefit from the network. To date, in the US alone, there are over 400 municipal broadband networks.[215]

In summary, What is broadband? Is it 200 Kbps, more, 1 Mbps, or more, 10 Mbps or more? In our definition, broadband is:

1. 10/100 BT connections to each user at a minimum with a 10+ Gbps backbone locally. It is also growable and scaleable. It would allow direct connection with backbone speeds.

2. An Open network, allowing any user to connect to any other user, at zero marginal cost. It is an outlet or portal.

3. Fully interconnected regionally and ultimately nationally. It is a network which allows local to local interconnection. It is not an island network, allowing only interconnection via proprietary and hierarchical points of entry.

4. An Open network allowing any purveyor of services to connect in any manner and any place to any user. It is a network which creates an electronic open and competitive marketing and distribution channel.

Interconnectivity and opens are key elements as are key factors as is the ability to have an expandable and scaleable network. A mere fifteen years ago there were discussions on bringing TCP/IP up to the speed of DS3 or 45 Mbps network. It was thought at the time that such a high speed would be prohibitive. In fact it has scaled way beyond that. Moreover the same was felt to be true about the scalability of Ethernet, limited to 10 Mbps, but now scaleable to 10 Gbps and beyond.

This then leads us to asking the first of a set of questions.

The ***first*** question we then pose is; *What is the future of municipal broadband and how will that future impact the existing telecommunications providers; Internet, telco and cable purveyors?*

The current mode of evolution of municipal broadband is one driven by the deployment of local networks. By local we mean small self contained networks which have direct end

215 See: http://www.tiaonline.org/media/press_releases/uploads/FTTH04list.pdf for some recent statistics.

user connectivity. Each local network may be considered a closed island of communications capability with a single point of egress to the Internet backbone or some similar third party content provider. The current state of deployment now also begins to consider regional, state, and possible national deployment. This next stage of deployment of these networks will require significant thought and planning to ensure that what is achieved has the capabilities of a truly open broadband network. This will be the only way in which both the economic and social benefits may be achieved.

The ***second*** question we pose in this section is; *What are the goals and concomitant architectural parameters for the successful deployment of interconnectable municipal broadband networks?*

This section addresses broadband from the perspective of the local deployment, first, and then the integratability of those local networks into the existing national and international networks currently in operations. The overriding principle of this analysis is to ensure a fully open and scaleable and integratable network, one that empowers both economic and social development. This calls for a set of overall criteria and a means to allow those criteria to take hold.

Thus the ***third*** question for this section is; *What are the minimum standards for the deployment of municipal broadband networks and how should those standards be set, managed, and updated?*

In the initial development of the Internet, the U.S. Advanced Research Projects Agency, ARPA, set the base for commonality and openness. Following that IETF, the Internet Engineering Task Force, was a brilliant and effective colloquium that provided a truly evolutionary like stands process, what work survived, what did not disappeared. The same paradigm of establishing an agreement in a survival of the fittest mode is called upon for local broadband as well.

The development of infrastructure for municipalities has been shown time over time to be the basis for significant economic development of the municipality as well as enhancing the services available to the members of the community. Infrastructures such as schools, roads, water and sewer, power systems have been typical examples. The current development of broadband communications services, driven by Internet access and related services, is the current example of such a new infrastructure. [216]

The current typical positioning of broadband is that it can do what the telephony and CATV providers can do today but “better, faster, and cheaper”. This is what we call the “double-triple” play; three services (Internet access, telephony, and video) with three elements of improvement (better, faster, cheaper). In fact, as one explores the market and listens to what the users are really saying, they see broadband as having two key

216 For economic development analyses see the papers by Samuelson and Varian, and Gillette, Lehr and Osorio, OTP Section of US Dept of Commerce, September 2002,

characteristics; openness and localism. Neither of these two characteristics relate to the standard services proposed nor do they relate to the characteristics of those services.

8.2.2 Broadband Architectures and Technology Issues

There are three issues we discuss herein that relate to the overall issue of franchising. They are:

Architecture: What is a broadband network and how can users access it. The key point we bring to the fore is that like the Internet any broadband network must be open, and using IP protocols, it must allow the intelligence to reside at the edge of the network. Ultimately any and all broadband fabrics are architected around an IP base.[217]

Wireless: We discuss wireless as both a stand alone option and in comparison and conjunction with fiber. This is possibly an architecture; adjunct but it is key that anything one does with broadband from a regulatory perspective be technologically neutral. That principle of technological neutrality is essential to any success. We show that there are today regimes where each of the current wireless technologies play a role. As time progresses these regimes will change and operators must be able to adapt accordingly.[218]

Content: As the network is technologically neutral and open, the ability to provide any form of content should also. The recent decisions by the FCC to permit IP Voice to be viewed as an information services, yet to be challenged by the DC Federal Court, as it appears all FCC decisions are, we believe that IP Video, for exactly the same reasons should be viewed as an information service. This is a critical difference and if done so then the local control over video goes away. In this context we review IP video.

The architecture for broadband is fundamentally different that that for cable television. It is argued that this fundamental architectural and operational difference sets broadband aside from what the regulators call video services and programming. We provide a high level overview of these difference and focus on the key differentiators.[219]

8.2.2.1 Local Network Interconnection

The BBN can be depicted as below. One end of the BBN, the head end, has an open interface suitable for interconnection to a variety of service providers. The interface is open to any and all, and is not proprietary in any fashion. The other end of the BBN has an interconnection to the home. The interconnection may also be to educational institutions, fire, police, libraries, municipal facilities, and to commercial entities as they may request. The network in-between the two interconnecting points is an optical fiber

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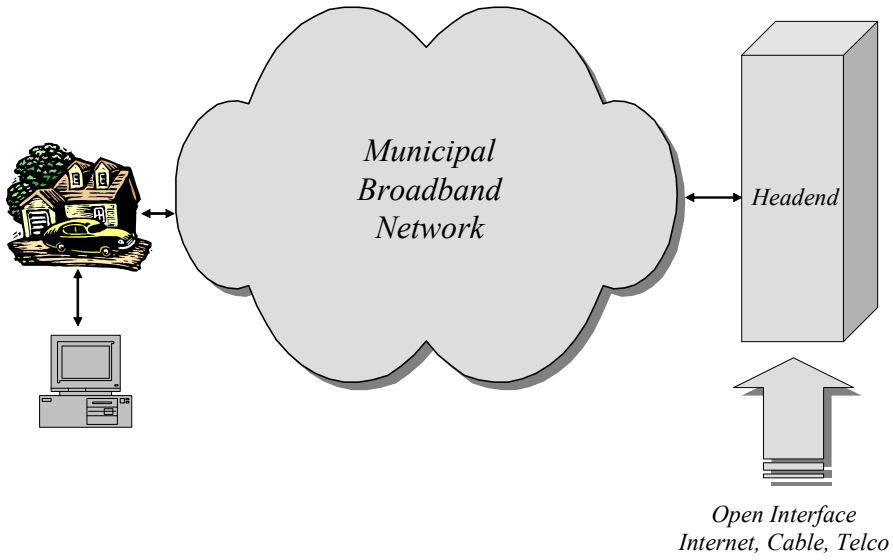
[217] See McGarty section on Architectures, 1990 Harvard and 1993 for Internet at Harvard conference.

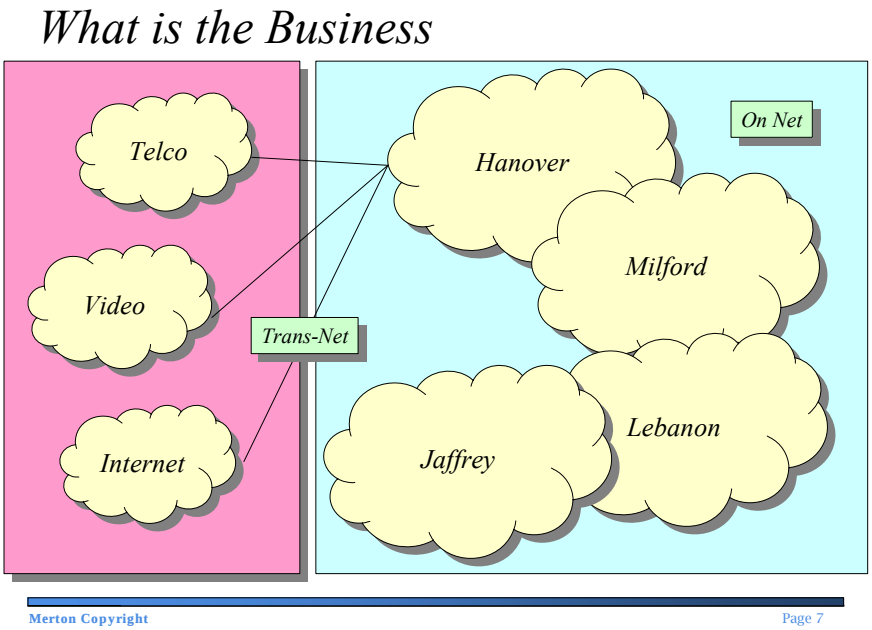
[218] The section by McGarty at Columbia 1996 and the section in Telecommunications Policy 1997 focus on broadband and triple plays for wireless systems.

219 See papers by McGarty relating to the details of the architectures and their functions and costs.

network with drops of fiber to each subscriber. The fiber drops are provided on an as-requested basis. The network does not have to be deployed fully day one. It can be built out as demand warrants.

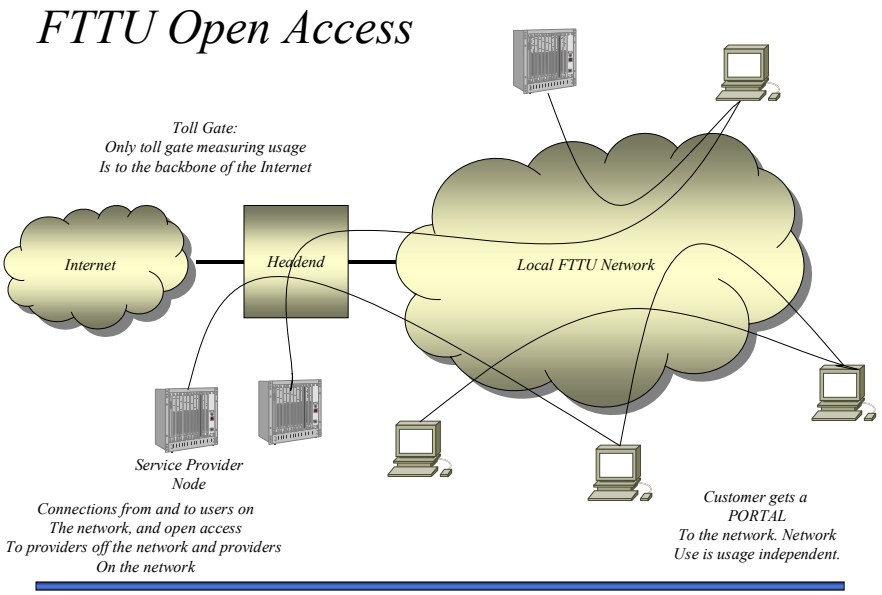


Another view of the network is shown below.



8.2.2.2 Local Open Networks

The following depicts the local openness of the network. Each user of the network can connect to any and all other local users via the IP capabilities of the network. Each connection to the network has an IP or IP addressable port. The connection is via ports, elements which can enable communications and interconnectivity between any user. The network is flat and open not hierarchical and closed. This is a key fundamental difference in network architecture design and implementation.



8.2.2.3 Interconnected Open Networks

The following depicts the interconnection of three regional BBNs. This interconnection is readily achievable via the use of the IP standard interface. Clearly some form of DNS, Domain Name Servers must also be employed and naming and address management will be an issue however the ability to interconnect at layer 3 is critical.

8.2.3 Recent Market Research

There is also the question in the broadband community as to what the true demand for broadband is. This is a difficult question because it presumes that the person being questioned has an understanding of what broadband is. Is it DSL, cable modems, or much more as we speculate herein. To answer this question we have performed extensive market research in New England. The following is a list of all towns we have studied and the level of effort on each. This ranges from 50 towns which have been contacted to one financed by RUS and one final franchise with a total of 11 franchise applications in process.

Town	*State*	*Contact*	*Selectmen*	*Market Study*	*Engineering Study*	*Feasibility Study*	*Franchise Request*	*Franchise Approval*	*RUS Application*	*RUS Approval*
Acton	MA	x	x							
Attleborough	MA	x								
Belmont	MA	x	x	x	x	x	x			
Concord	MA	x	x		x		x			
Leverett	MA	x	x							
Martha's Vineyard	MA	x	x	x	x	x	x			
Newburyport	MA	x								
Norwood	MA	x	x							
Princeton	MA	x	x							
Reading	MA	x	x							
Shutesbury	MA	x	x							
Wakefield	MA	x								
Wellsley	MA	x	x							
Weston	MA	x	x	x	x	x				
Westwood	MA	x	x	x	x	x	x			
Amherst	NH	x	x	x	x	x	x		x	
Bedford	NH	x	x	x	x	x	x		x	
Bow	NH	x								
Brookline	NH	x								
Chesterfield	NH	x								
Colebrook	NH	x	x	x	x	x	x			
Concord	NH	x	x							
Derry	NH	x	x							
Dublin	NH	x								
Fitzwilliam	NH	x								
Goffstown	NH	x	x	x	x	x	x		x	
Hampton	NH	x	x	x	x	x	x			
Hanover	NH	x	x	x	x	x	x	x	x	x
Harrisville	NH	x	x	x	x	x	x			
Henniker	NH	x								
Hollis	NH	x								
Hopkinton	NH	x	x	x	x	x	x			
Jaffrey	NH	x	x	x	x	x	x		x	
Keene	NH	x								
Lebanon	NH	x	x	x	x	x	x		x	
Manchester	NH	x	x							
Marlborough	NH	x	x	x	x	x				
Merrimack	NH	x	x	x	x	x	x			
Milford	NH	x	x	x	x	x	x		x	
Nashua	NH	x	x							
Peterborough	NH	x	x	x	x	x	x		x	
Rindge	NH	x	x	x	x	x	x		x	
Swanzey	NH	x	x	x	x	x	x		x	
Troy	NH	x	x	x	x	x				
Warner	NH	x								
Winchester	NH	x	x	x	x	x				
West Warwick	RI	x								
Brattleboro	VT	x								
Norwich	VT	x								

White River Junction	VT	x	x	x	x	x	x		x	
Count		50	35	23	24	23	20	1	11	1

The above Table depicts the 50 municipalities that were addressed in this study. All were approached from a business perspective and all were asked if they wanted broadband using a fiber to the user approach. Of the 50, 35 provided a strong affirmative reply resulting in selectmen presentations. 23 market surveys and 24 detailed engineering studies were produced and in some cases these were done on multiple occasions. This resulted in 23 detailed feasibility studies. 20 franchises were requested in the process. We also applied for RUS loan for 11 municipalities and had received approval for one. The remaining 10 were withdrawn based upon the continuing problems with Hanover. Merton was subsequently liquidated as a result of the inability to obtain satisfactory terms for franchises. In fact not one municipality was willing to adhere to the level playing field requirement and each municipality added on additional requirements averaging 2.2 times the coverage for the incumbent.

This section details the results of one typical town, Hanover, NH. Hanover is a typical New England Town of approximately 3,600 households, HH, and 2,600 houses and approximately 1,000 multiple dwelling units, MDUs. Hanover has Dartmouth College and Mary Hitchcock Hospital. It is an upper middle class community with a 92% Internet penetration. This is typical of most New Hampshire HH.

8.2.3.1 Overall Summary

We performed two detailed market research studies in 2003 and recently in 2005. The following Table summarizes the results on key demand questions between these two years.

	2003 Percent	*2005 Percent*	*Diff 2005 v 2003*	*2003 HH*	*2005 HH*	*Diff 2005 v 2003*
Internet	46.1%	36.0%	-10.1%	1,153	1,296	143
Video	34.0%	36.5%	2.5%	850	1,314	464
Voice	0.0%	44.4%	44.4%	-	1,600	1,600
On Net Business	0.0%	31.7%	31.7%	-	1,143	1,143
On Net Local	0.0%	31.7%	31.7%	-	1,143	1,143

The results show the following:

- Broadband demand is down 10% but video is up and voice is now almost 45%, an unexpected demand element. The surprise has been the demand for telephony. This did not appear two years ago but in the current study people now understand that VOIP is a viable technology and is a good economic alternative. The customers also want one package. The demand for broadband here is one for true broadband. In 2003 there was no distinction between any broadband. After two years of promoting the service in Hanover the people now know that when we asked for broadband demand

we meant FTTH. Thus the 36% demand is for true broadband. This may imply the 10% reduction is due to clarity and not lower demand.

- OnNet services demand is 32% and this has still not been put in a pricing model. The On Net services are whet we have been describing heretofore in the section. They are such services as "best efforts" portal services which are 10/100 Base T connections to the network, V LANs, and service level guaranteed connectivity. They are also for consumers only. The commercial demand is on top of this demand number. The analysis indicates that the 32% demand means that 32% of the people want to have broadband not only for external connectivity but also internal. Cross tabbing this shows high correlations between the demands.

- Video demands have gone up slightly and this suggests a continuing dislike for the incumbent, which is Adelphia. Adelphia in this town has been bought by Comcast and this will most likely result in two things. First some modest improvement and second Comcast has the well established history of litigating away any competitor. Thus the ability to enter Hanover and similar towns to provide true broadband may be reduced dramatically with the litigious entrant.

8.2.3.2 Detailed Questions

The following are the results of some detailed questions and their comparison form 2003 and 2005.

Would you be willing to pay $40 per month for a very high speed Internet connection that is up to a 1000 times faster than your current service?

		Percent 2003	*Percent 2005*	*Difference*
	Definitely Not	22.5%	12.0%	-10.5%
	Unlikely	12.3%	21.6%	9.3%
	Possibly	19.1%	30.4%	11.3%
	Likely	16.4%	19.2%	2.8%
	Definitely Yes	29.8%	16.8%	-13.0%
	Total	100.0%	100.0%	0.0%

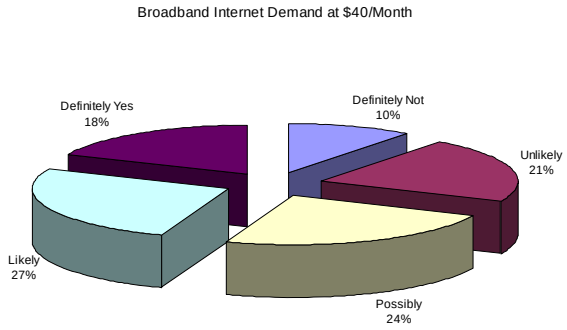
This question shows the following results:

- Target of Likely and Definite is now 36%. The largest decrease is in the Yes category. Based upon focus group analysis the reasons are they understand FTTH and this is what they really want and that the cable incumbent is performing better for those wanting just cable modems. The Yes group is clearly the early adopter group and show a strong demand and a strong understanding of what is expected in the 2005 numbers.

- "Possibles" have some conversion potential up to 31%, and we believe some share can be obtained, say one third of that total. This is most likely and educational efforts and increasing awareness.

- The NOs are down significantly, almost by half indicating a good positive change to use broadband.

The following summarizes the 2005 results.



The next question was related to the desire for video services.

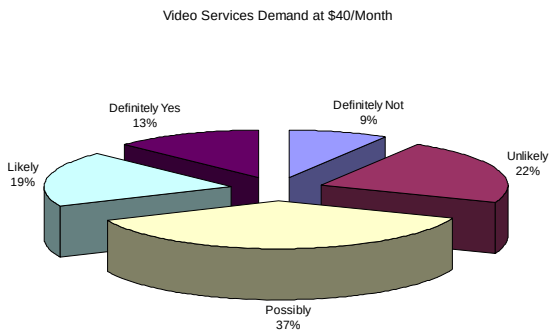
Would you be willing to pay $40 per month for high quality video service with a wide choice of channels for news, sports, music and movies?

		Percent 2003	*Percent 2005*	*Difference*
	Definitely Not	25.2%	20.6%	-4.5%
	Unlikely	16.3%	13.5%	-2.8%
	Possibly	24.5%	29.4%	4.9%
	Likely	15.6%	23.0%	7.4%
	Definitely Yes	18.4%	13.5%	-4.9%
	Total	100.0%	100.0%	0.0%

This question shows the following:

- Video demand is slightly up from 2003. It is not clear why this is the case other than dissatisfaction with the CATV incumbent.

- The definite NOs are also down. This may be due to better understanding of alternatives.



- Total video penetration is still 88% which is at high end of national standard
- The satellite penetration is about 18% of the market
- Adelphia is remaining generally constant at percent levels
- Adelphia sale to Comcast and Time Warner is announced and in process
- Time Warner on April 21, 2005 announced that they will obtain certain New England Adelphia properties, this implies Comcast will obtain the properties in this market analysis.

The next question was related to the desire for telephony services. We did not ask this in 2003.

Would you be willing to pay $35 per month for unlimited local and long distance calling for US and Canada?

		Percent 2003	*Percent 2005*	*Difference*
	Definitely Not		10.3%	10.3%
	Unlikely		21.4%	21.4%
	Possibly		23.8%	23.8%
	Likely		26.2%	26.2%
	Definitely Yes		18.3%	18.3%
	Total		100.0%	100.0%

The results of this question could not be compared to 2003 results since in 2003 this was not asked. However:

- Voice was not initially targeted but there seems to have been some interest in 2003.

- Clear and unexpected demand for telephony and it exceeds all other demands. Based on post test focus groups this seems to be less any dissatisfaction with the incumbent

ILEC, Verizon, than a market understanding that telephony is now a commodity which can be obtained by multiple means.

- This means one must provide this service to be competitive in any market. The problem is still that having broadband one is empowered as a customer to obtain this from a variety of providers and thus market disintermediation is highly likely. It is not clear how one makes a profit I the mid terms with strong commodity competition.

We also then asked the question of Internet provider.

What kind of Internet access service do you have at home?				
		Percent 2003	*Percent 2005*	*Difference*
	Dial-Up	73.5%	43.7%	-29.8%
	DSL	11.6%	32.5%	21.0%
	Cable Modem	1.9%	18.3%	16.4%
	Satellite	1.5%	0.8%	-0.7%
	N/A	11.6%	4.8%	-6.8%
	Total	100.0%	100.0%	0.0%

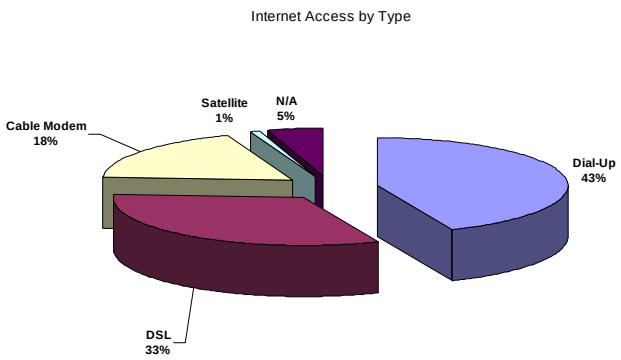
The above table is a summary of 2003 and 2005 changes in ISPs. The observations are quite clear:

- DSL and Cable modems have increased dramatically. There is a 10X increase in cable modems but what is most interesting is that the customers there are most likely to switch. DSL has increased 3X from a higher base and now represents 2X cable modems and almost 33% of the town. There is a strong desire to move with this base as well.

- The dial up base has almost halved as one would expect.

- The Internet penetration went from 88% to 95% which is the highest we have ever seen for a “typical” town, even a University town.

The following shows the breakout for 2005.



We then addressed the issue of what video provider they had. The following chart depicts this result:

Do you have cable or satellite television at home?				
		Percent 2003	*Percent 2005*	*Difference*
	Cable	62.9%	61.1%	-1.8%
	Satellite	19.4%	21.4%	2.0%
	Both	2.6%	4.0%	1.3%
	None	15.1%	13.5%	-1.6%
	Total	100.0%	100.0%	0.0%

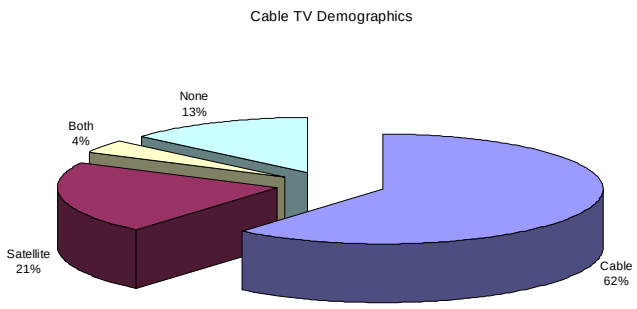
We observed the following over the two year period:

- Cable dropped a small amount but effectively remained constant in the margin of error.

- Satellite increased but like cable was constant in the margin of error.

- The homes having both statistically increased but represent a small minority at best. They use cable basis to get local news and use satellite for their main content.

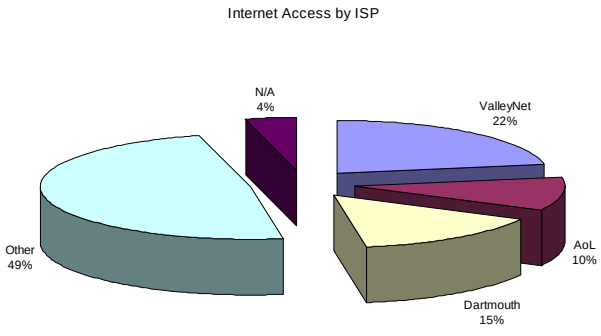
- The HH having none remained constant on a statistical basis as well at about 13-15%.



Finally we asked who their Internet provider was.

Who is your Internet service provider at home?				
		Percent 2003	*Percent 2005*	*Difference*
	ValleyNet	33.3%	22.2%	-11.0%
	AoL	11.3%	10.3%	-1.0%
	Dartmouth	25.8%	15.1%	-10.7%
	Other	19.0%	48.4%	29.4%
	N/A	10.7%	4.0%	-6.7%
	Total	100.0%	100.0%	0.0%

- Note the ValleyNet has lost 1/3 of its market share
- AoL is also down slightly
- Dartmouth is also changed
- All of this is DSL and Cable modem moves
- ValleyNet strategy initially proposed is no longer viable, in addition the direct sales to customer is now key and is bolstered by having all three offerings.



8.3 Franchises and Their History

Franchises are one of the key issues delimiting broadband deployment. In thus section we provide an historical overview, a discussion of current franchise requirements and an analysis of the cost of franchising.[220]

8.3.1 Franchise History

Franchises have been in place for many years. They have gone through what we will call five stages:

8.3.1.1 Stage 1: Early Development and Rights of Way (1950-1977)

In this stage towns such as Altoona, PA were devoid of any television. The franchise was a means to obtain rights of way on systems, namely on telephone poles, and the towns received minimal payment for such rights of way. The content generally was off air retransmission. It was not until 1977 that HBO started to distribute via satellite.

8.3.1.2 Stage 2: Franchise Wars (1977-1987)

The Franchise Wars started in the late 1970s. These were the competitive biddings for the large metropolitan cable franchises. The author was personally involved in many of these, specifically: New York, Chicago, Phoenix, Boston, Houston, Dallas, Pittsburgh, Cincinnati, Columbus, Sacramento, and others. The strategy was to respond to city RFPs with detailed proposals and then to show how cheaply the cable company would provide basis service and also to show what other "gifts" could be made to the city. Thus pricing such as $1.95 per month for basis and the gift of hundreds of trees to line municipal roads were common. All parties knew that the bids were unrealistic but it was a land grab process amongst the larger cable operators.

In addition, during this period new services were promised and some actually introduced. Two way cable was pioneered by Warner with the Qube System. Telephony with Cox and the Indax system. Data networks with institutional cables and single mode fiber deployment, the first in the United States. New video programming was developed, for better or worse, to fill the new channels. Thus came HBO, MTV, Nickelodeon, Showtime, and others. Franchise became a process whereby cities grabbed for as much as they could since the viewed the cable bidders as willing and able to provide unlimited motivations to award franchises.

This period of over exuberance set the stage for things to come.

8.3.1.3 Stage 3: Renewals (1987-1995)

[220] For a more detailed analysis see the book by Huber as well as the one by Brenner. The Huber text is slightly influenced by Thorne a co-author and General Counsel of Verizon whose writings are highly polemical.

The original franchises had ten to fifteen year lifetimes. This meant that during this period, the franchise initially awarded were up for renewal. Several factors made this a contentious period:

First, the towns could see what was won during the Franchise War period and they started to demand the same and more.

Second, consolidation was commencing and this mean that the localism of the original players was being replaced by more centralized corporate types.

Third, the actual content available was expanding and improving. This meant that the profitability for cable was significantly increased and this towns asked for more of the pie.

Fourth, the FCC and Congress intervened with a very heavy hand on re-regulating cable.

These reasons led to certain uncertainty in the industry and sales prices of cable systems reflected this uncertainty.

8.3.1.4 Stage 4: Overbuilders (1995-2001)

The key event in this stage was the Telecom Act of 1996. It deregulated cable again and laid at the feet of cable the ability to provide telephony. Thus the cable providers were considered broadband players.

A second driving element was the Internet and that cable could provide high speed Internet access. The industry provided lower cost cable modems and this was the start of a revenue doubling for cable operators.

The driving factors in this phase were clearly:

1. Deregulation
2. Cable Modems and Internet Demand
3. Expanded Content
4. Consolidation: for example the purchase by ATT of TCI and then by Comcast.
5. Telephony as an added service

This was the most recent phase with the introduction of companies like RCN, Utilicom, and others who attempted to become competitors in established markets by overbuilding. The companies sought franchises as basically proprietary franchises. Some companies, such as RCN also sought to obtain in certain of its markets Open Video Service Franchises. The Overbuilders were driven by the exuberance of the late 1990s to build in markets where they could hope to obtain reasonable market share. In fact they did obtain in many cases more than 50% of the market. There were very few, percentage wise, new franchises.

Another trend in this period also was the development of municipal owned networks, and these were generally overbuild networks. Examples are Norwood MA, Tewksbury MA and others. These networks operated without a formal franchise and there have always been questions concerning their fairness and legality. In these cases it is impossible to see how an arms length negotiation could ever occur with the franchise process.

8.3.1.5 Stage 5: Broadband Operators (2001-Current)

The current market is set for the expansion of broadband. This would include the ILECs and other independent players. However, at this point the franchise has reached a new level as a hurdle to entry. Renewals for incumbents are still a matter of daily course and the towns uses these as hurdles that the new entrants must exceed, not just meet. However, there are fundamental differences in broadband. Broadband is typically and IP, Internet Protocol, type of network and further the networks are inherently open, allowing users connected to the network to become their own distributors of broadband content. In addition there is a change in the way media is being distributed, namely through an IP format much more akin to information than video as we know it. The video is interactive, intermingled as packets with Internet and voice, as well as many other IP based services. Thus the framework of the franchise discussions is changing rapidly and the towns and cities are ill equipped to deal with this change. Their approach is just to raise the bar and attempt to obtain more.

This stage in franchising can thus be characterized as follows:

Incumbent at the Table: The incumbent is directly or indirectly at the table in every negotiation. The towns are frequently dealing with the incumbent and the incumbent has more knowledge of the franchise of t the new entrant than the new entrant of the incumbent. There is a clear imbalance in negotiating strength favoring the incumbent.

Higher Hurdles: The towns are continually raising the hurdles. They see that competition to them represents more revenue and as such make demands to maximize that revenue potential. They demand better coverage than the incumbent, more local services, greater reporting of performance, and increased fees. Thus the cost of entry to a new competitor is greater than maintaining the presence by the incumbent. All of this is driven by the local power that be.

Open Networks: The networks of the new entrants are generally open networks, allowing local users to become their own nodes on the network. The concept of a head end as the single point of entry will disappear. The network architecture allows for any IP based system to interconnect and through the IP fabric interface anywhere on or off the network.

IP Driven Systems: IP is the essence of networks going forward. This means that the network is minimalist in design and all intelligence is pushed to the edge of the network. IP empowers multiple IP based appliances, from he standard video voice and data to web

cams, medical devices, security systems, and monitoring home appliances. IP is a facilitator of technological expansion.

IP Video and Mixed Messaging: IP video is a key element in this new networking world. IP video is not broadcast video. The IP video signal may originate from one or many locations, each packet is sent over different paths, it may be interactive, thus having the ability to change one program from another, and finally IP video packets are indistinguishable from any other packet and are generally and unidentifiable. Finally with an open IP network anyone may become an IP video purveyor. Thus if a video producer wants to establish a new distribution channel for their film, they can do so via local servers on the open networks. It is impossible then to distinguish content purveyors from one another. IP video changes the whole definition of video. It looks and acts like an information service not like a video broadcast transmission.

8.3.2 Objectives

This section focuses on the franchise process during this fifth stage of evolution. Our objectives in this section are as follows:

1. *To define and describe broadband from an expansive perspective focusing on the elements which maximize its overall economic value to a large a constituency as possible.*

2. *To identify alternative technologies and how they may be used in an integrative fashion with fiber as a total least cost broadband fabric.*

3. *To identify changes in the distribution and marketing channels which can establish new economic growth and relate them to the inherent broadband infrastructures.*

4. *To examine by means of specific cases the franchise process as it stands today and identify it characteristics.*

5. *To use the identified characteristics of franchising and relate them to the effectiveness and economic viability of deploying broadband in a competitive environment.*

6. *To evaluate the overall effectiveness of the franchise as a process, compare its historical context to the changing technology bases and assess it effect on broadband in an ongoing basis.*

7. *To prepare recommendations of how from a legal, regulatory and public policy perspective one should handle both broadband and the franchise process.*

8.3.3 FCC Definitions

In this section we use the state of New Hampshire as the basis for subsequent case studies. We first use the FCC definitions of video services and then using New Hampshire law examine what is expected. We then disassemble a typical franchise to see what the municipality is demanding.

The FCC is ultimately the basis for all key definitions. Using the FCC definitions, New Hampshire Franchise Agreements define the following:

Video Programming. Programming provided by, or generally comparable to programming provided by, a ***television broadcast system***.

The question then is what is a "television broadcast system? Also, what is programming? Above, when we dealt with IPV we clearly showed the dramatic structural difference between IPV and Video Programming.[221] Recall that an information service allows: "*…the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications,…*"**.** Indeed, this is just what we have shown IPV to do.

Video Programming Provider or VPP. Any person or group of persons who has the right under the copyright laws to select and contract for carriage of specific Video Programming on a Video System.

This can be a broad based definition. This easily expands it to any person who has content and with an open system it opens the market is a wider base of such providers.

Video System or VS System: A facility consisting of a set of open transmission paths and associated signal generation, reception, and control equipment that is designed to provide VS Service which includes video programming and which is provided to multiple subscribers within the Town, provided that the FCC has certified that such system complies with 76 CFR 1500 et seq.

This includes the FCC certification.

Video System Operator (or VS Operator): Any Person or group of Persons who provides VS Service over a Video System and, directly or through one or more Affiliates, owns a significant interest in such Video System, or otherwise controls or is responsible for the management and operation of such a Video System.

[221] See Act defining Information Service: **(**41) INFORMATION SERVICE- The term information service means the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service.

VS Service: Includes the video programming services distributed by a VS Operator or its Affiliate directly to their Subscribers in the Town for use of the VS Operator's broadband hybrid fiber coaxial transmission facilities.

Thus, we believe that by a simple analysis of what IP video can do and how it inherently works we have at most an information service and not a video programming service.

8.3.4 New Hampshire Law

We now focus on the state issues controlling the franchise process. The focus is on New Hampshire but one could just as readily look and any one of the states and their laws. In Exhibit 1 we present the NH law in its entirety. In this section we focus on several key elements.

Under New Hampshire law a franchise is required before construction. Specifically it states:

"RSA 53-C:2 Franchise Required. – *I.* ***No company shall construct, commence construction, or operate a cable television system in any municipality without first obtaining a written franchise*** *from the franchising authority of each municipality in which such system is installed or to be installed."*

In addition there is the "level playing field" clause. It clearly states that the terms must be comparable. This problem here is what is the definition of comparable. If the franchise is an OVS franchise[222] and the incumbent is not, does the OVS requirement get balanced with the proprietary requirements? The answer is a resounding no. The towns want OVS plus the burden of the proprietary. The second question is level at what point in time, the incumbent has been around for thirty years and has had an embedded advantage. Their renewal is for 5 years. Then the town gives the new entrant 5 years. Again hardly a level playing field. Finally, and this runs rampant in the process, the invisible seat at the table. The incumbent negotiates on its own behalf and also directly against the new entrant, in cooperation with the town. All or some of these actions taken by towns destroy the concept of the level playing field.

"RSA 53-C:3-b Franchises; Administration by Municipality. – *I. All franchises shall be nonexclusive. No municipality* ***shall grant any additional franchises to cable service within its jurisdiction on terms or conditions more favorable or less burdensome than those in any existing franchise within such municipality****. II. Nothing in this section shall be construed to prevent any municipality considering the approval of an additional cable service franchise in all or any part of the area of such municipality from imposing additional terms and conditions upon the granting of such franchises as such municipality shall in its sole discretion deem necessary or appropriate….."*

222 See 47CFR76.1500

These are but a few of the issues which a new entrant faces as the try to build a new broadband infrastructure.

8.3.5 The Franchise Process

This section presents the results from several recent actual franchise processes.[223] The specific towns have not been identified and the characteristics are an amalgam of all of the towns. This represents the effort over 35 towns and cities in Massachusetts, New Hampshire, and Vermont.

8.3.5.1 The Franchise Elements

The Franchise process is fairly well understood. It is characterized as follows:

Local: The process is always local. This means that one must deal with a new cast of characters in each town and that each of these has a different set of agenda and each has a different style and needs and wants.

Adversarial: The process, no matter what the intent is at the beginning, is always adversarial. This is due to the presence of the attorney for each side as well as the town being in the position of "wanting" more each time it gives away a franchise.

Unseen Seats at the Table: One of the most difficult problems in an overbuild franchise is the incumbent. The incumbent may actually have an unseen seat at the negotiating table, demanding the terms meet or exceed whet the incumbent has. Typically this is seen in the length of the franchise. The incumbent may be facing, after two renewals, a shorter term, say 5 years. The incumbent then demands the town use the same for the new entrant, albeit the incumbent had two back to back 15 year agreements. Parity is not well understood.

Competitive: The process is competitive; with the incumbent and with the town. It is not a process of well defined meets and bounds but a process of ever increasing hurdles. Event though there is a level playing field requirement the towns keep raising the bar each time they get a bite from the apple.

Uncontrolled and Unmanaged: The franchise process generally is not a managed process on the part of the town. It is not one persons job and thus there are many hands in the process, and these hands come and go. Thus when one believes that something has been accomplished it may be reset with the introduction of a new person.

Political: This means that one must spend a great deal of time politicking the proposal, working with the town decision makes and insuring acceptance. This requires a unique

[223] See Brogan & Cleland and Verizon Filing July 23, 2004. The Verizon plea to the FCC is one that says that Franchises are the ultimate stumbling block to broadband.

set of talents, political, social, technical, market, financial, which are rare to find and thus impact on the ability to scale. More will be said about this latter.

Non Scaleable: The process is not scaleable. That is having done one, it is not easier to do the second. It starts all over again. Even if one has done a hundred, the hundred and first is just as complex as any one of the preceding franchises.

Lack of Consistency: There is no necessary consistency from one town to another or from one agreement to another. There may be a set of state wide lawyers who assist the towns but each franchise is its own adventure. The impact of the incumbent, the influence of local citizens with their own interests or town interests, the impact of local politicians all add to the process.

The specific elements of the process in time are as follows:

Market Study: This requires a clear understanding of the market demand and a key part of that is displacing the incumbent. Generally the demand is well understood the issue will be the switching costs of getting a new customer. These are low in areas where the incumbent has a poor position in the market because of poor service or product.

Vendor Analysis: Vendors must be chosen for each town. In some cases the same vendor may be used but clearly the process must be repeated over and over. Part of the process is to understand the costs of deploying the system. The vendor work on fiber build, make ready, and installation costs are critical to the design.

Engineering Study: The engineering study is the walk through in the system. It requires strand mapping, pole counts, measurement of frontages and set backs, documentation and analysis. It also requires detailed make ready assessments and buried versus aerial analysis.

Financial Analysis: After all the work has been done on costs and revenue, a detailed financial plan is prepared. The town may ask for some of this detail.

Franchise Process and Negotiations: A this point the franchise process itself begins. It is composed of the following elements:

1. *Requesting a Franchise From the Selectmen:* This means that the town manager or equivalent can be persuaded to have the company present to the Selectmen for the request. This may take two or more meeting spread out over three to six months. The Selectmen may ask for more detail and may further ask for more concessions. At this point no negotiations have started. There is also significant citizen input, as well as input from perceived competitors, including the CATV incumbent.

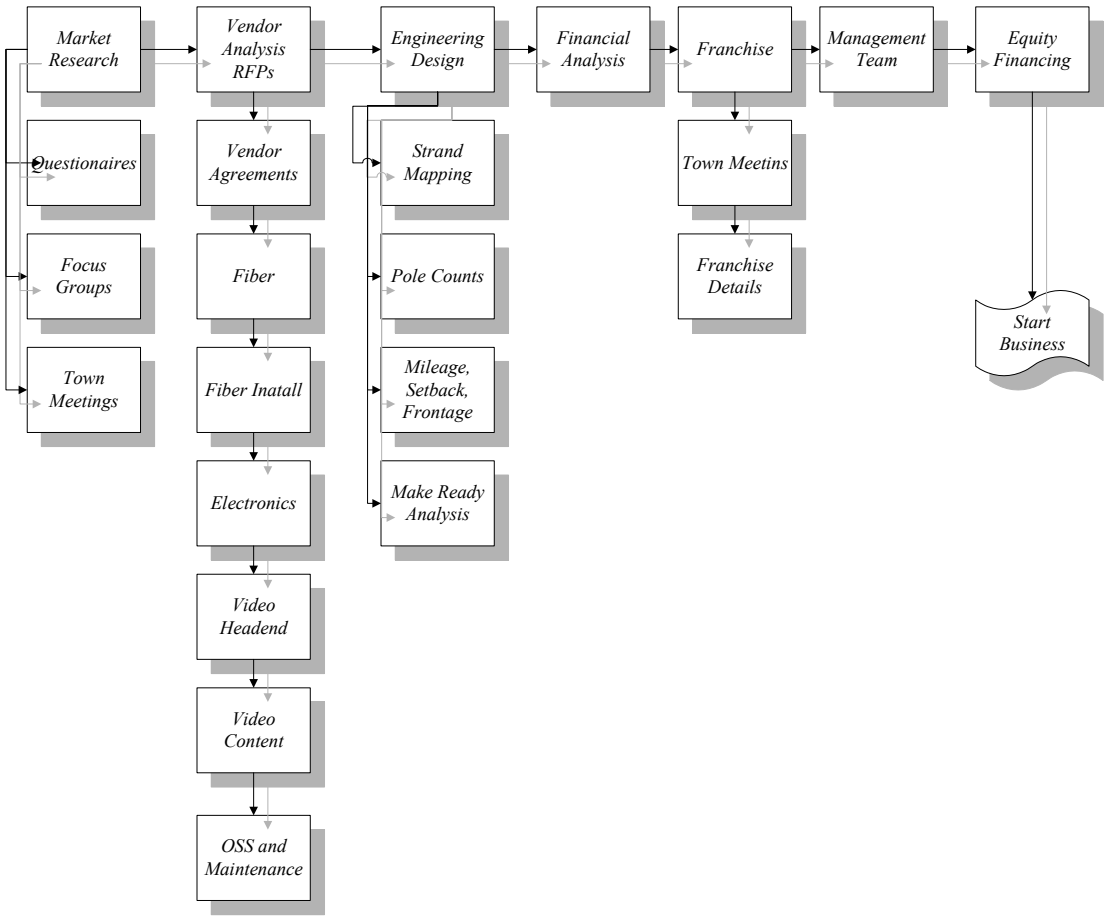
2. *Vote to Enter Negotiations:* This vote is critical. At this point the town appoints a negotiator and an attorney. The key problem is that the towns negotiator may

change or the negotiator may have no skills at negotiating. Also the negotiator may have a set of biases which make the process untenable.

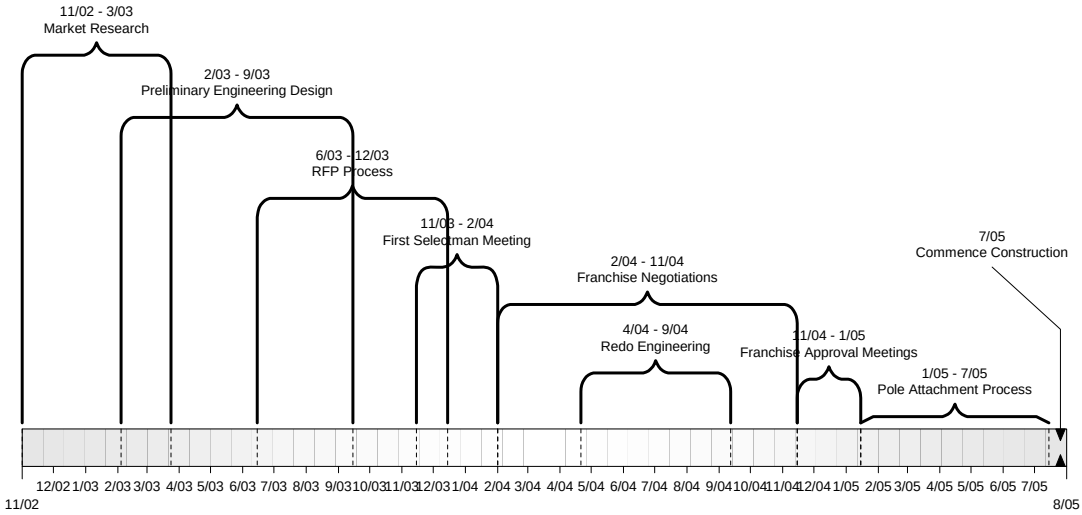
3. *Negotiations:* This is the longest phase. If one is lucky there is an existing franchise to be used. Generally this is not the case and a new one is prepared. This is done for the reason of trying to gain more by using a newer form. This may take six to twelve months. Also new demands are made. Frequently a new engineering study is required. Strand mapping may require the towns presence. Areas not covered by the incumbent may now be brought to the coverage map. Frequently, despite the words in the franchise document, the operative document will be a coverage map, and frequently the coverage demands exceed that if the incumbent. Also frequently if an OVS franchise is sought the town not only demands OVS but all and more than the proprietary incumbent.

4. *Final Vote:* If one is lucky, at the end of this two to three year process there is a Selectman's vote. The control of this is in the hands of the town manager and the negotiator for the town. They can delay this for any one of a hundred reasons.

The following flow chart summarizes and details the steps discussed above.



The following is a typical time line process of the Franchise. This is based upon our experience in multiple towns and reflects actual timeframe dates. It takes almost three years before construction is commenced. The market research and engineering studies are all required inputs by the town in the process.



The above process clearly shows that the length of time for the franchise process is excessive.

8.3.5.2 Franchise Structure

Exhibit 2 depicts the contents of a typical franchise. We have reproduced this here as a table and have highlighted key sections.

Section	*Subsection*	*Comment*
ARTICLE 1 - DEFINITIONS		Generally these should comply with the FCC REGULATIONS in 47 CFR.
ARTICLE 2 - GRANT OF FRANCHISE		
	SECTION 2.3 - NON-EXCLUSIVE USE OF PUBLIC WAYS	The Right of Way issue is a key issue. The Franchise gives the entrant standing in seeking rights of way via pole attachments. However there are many other ways in

		which this can be accomplished.
	SECTION 2.4 - DURATION OF FRANCHISE	This is a key factor in making parity. It should be equal to the incumbent at its start not where they may be at the current time.
	SECTION 2.6 – GROSS REVENUE FEE	This is the franchise fee. It should match the incumbent. It should also not exceed any statutory limit. In an OVS system the issue again is who has responsibility for third party providers.
	SECTION 2.8 - TRANSFER OR ASSIGNMENT OF THE FRANCHISE	Transfers are key to liquidity events. This is often overlooked until the process becomes untenable. The clause MUST allow reasonable transfers.
ARTICLE 3 - SYSTEM SPECIFICATIONS AND CONSTRUCTION		
	SECTION 3.4 - PARENTAL CONTROL CAPABILITY	This is a positive control. The issue becomes in an OVS system who has the responsibility here.
	SECTION 3.8 – GOVERNMENTAL DROPS TO VIDEO SYSTEM	This is the free service. One must look at this in an open network fashion as we seek to provide fiber. The analogy to coax does not apply especially if IP is employed.
	SECTION 3.9 – INSTITUTIONAL NETWORK (I-NET)	The INet issue is again a problem in an IP OPEN network. Towns after long discussions fail to understand this issue.
ARTICLE 4 - TECHNOLOGICAL		These are standard clauses.

AND SAFETY STANDARDS		
ARTICLE 5 - SUBSCRIBER RIGHTS AND CONSUMER PROTECTION		These are clauses which the incumbent should be meeting. However we see that towns try to raise the bar in these clauses.
ARTICLE 6 - RATES AND CHARGES		The rates and charges are standard. However, again the issue is one of OVS and third party providers which the franchise holder has no control over.
ARTICLE 7 - REGULATORY OVERSIGHT		Again standard indemnification and representations and warrantees.
ARTICLE 8 - PUBLIC, EDUCATIONAL AND GOVERNMENTAL ACCESS FACILITIES AND SUPPORT		These are PEG issues. Frankly how MUCH free access does a town require. This is frequently redundant.
ARTICLE 9 – FORECLOSURE, RECEIVERSHIP AND BANKRUPTCY		Standard clauses
ARTICLE 10 - MISCELLANEOUS		Standard Clauses
Exhibit 1 – Revenue and Fee Reporting Form		
Exhibit 2 – Municipal Drop Locations		This is where the town wants connections.
Exhibit 3 – FCC Customer Service Regulations		
Exhibit 4 – Schedule		This is the starting point of

of Rates and Charges		rates and charges. This is always a battle ground even for an overbuilder.
Exhibit 5 – Form for Annual Reports		
Exhibit 6 – Municipal and School Buildings and Sites Connected to the Institutional Network		
Exhibit 7 – Origination Locations		
Exhibit 8 – Build-Out Map and Construction Schedule		This is what is COMMITTED to be covered. In all cases the town wants more than the incumbent has. They will not bend on these issues. This is where the risk is in most franchises.

8.3.5.3 Franchise Costs

Now we can begin to consider the costs. We have shown that in our experience in over 35 towns that the process takes on the average two years. It also entails the effort of two senior people plus legal support.

The following Table depicts what we have experienced in a single franchise effort. This is for a town of an average number of households ("HH") of 3,000. This is almost $300 per HH for franchise costs.

Cost Element	*Units (days)*	*Cost Per Unit*	*Total Cost*
Engineering Consulting Staff	120	$1,200	$144,000
Marketing Consulting Staff	90	$1,400	$126,000
Financial Consulting Support	70	$1,000	$70,000
Franchising Team (Employees)	300	$800	$240,000
Legal Support	55	$2,400	$132,000
Overhead % Salary		55%	$72,600
Misc Support & Travel			$35,000
Total			$819,600

The obtaining of franchises for larger systems will incur similar and not readily scaleable costs. When the author was doing franchises for the large Metro systems such as New York, Pittsburgh, Sacrament, Dallas, Phoenix, Boston and others, teams of dozens of people were deployed for a year or more. The number of questions requiring answering increases and the detail of the answers also did increase. Thus based on an analysis of the current small set of 41 towns in New England, and a prior set of almost two dozen large cities, the costs of $300 to $500 per household is not unreasonable. If we were to then do this on a per subscriber basis, then at 25% penetration this becomes $1,200 to $2,000 per subscriber. This is equal to and in many cases greater than the capital costs to build the system. It becomes a hidden costs element.

8.4 Internet Transit

The “Internet” is actually a set of independent networks, interlinked to provide the appearance of a single, uniform, network. Interlinking these independent networks requires interconnection rules, open interfaces, and mechanisms for common naming and addressing. The architecture of the Internet is also designed to be neutral with respect to applications and context, a property we refer to here as transparency.

The major problem with the current Internet operations especially in the U.S. is the cost of transiting or interconnection. For example, in Hanover, NH the cost to connect an ISP to the Internet backbone runs $400 per Mbps per month. In Frankfurt Germany the cost to connect to Level 3 for all Central Europe is $12 per Mbps per month. Why the difference. Clearly buying power has something to do with this but also there are factors which go well beyond costs. This pricing is not cost based. It is what the market will bear. And in the current market, small players bear a dramatic price. However, most users do not demand great access. However consider the simple example of HDTV. If we want to get HDTV over the Internet at 20 Mbps per channel, and we desire to look at it 6 hours per day on one set this will cost a single user $2000 per month per channel for Internet Transiting! Hardly a pricing mechanism to promote the simplest of broadband applications.

8.4.1 Current Structure

Currently the control, management, and development of this overall interconnection scheme is held tightly within the United States, controlled by a closely knit group of twelve entities, six commercial and five U.S. government entities, called Tier 1 ISPs. This group is composed of the set of original ISP carriers and excludes such groups as AOL/Time Warner and other major players. It also excludes all major non-US carries and companies.

To support these customer expectations, an Internet service provider must have access to the rest of the Internet. Because these independent networks are organized under separate administration, they have to enter into interconnection agreements with one or more other Internet service providers. The number and type of arrangements are determined by many factors, including the scope and scale of the provider and the value attached to access to its customers. Without suitable interconnection, an Internet service provider cannot claim to be such a provider, being part of the "Internet" is understood to mean access to the full global Internet.

Connections among Internet service providers are driven primarily by economics—in essence who may have access to whom with what quality of access and at what price—but all kinds of considerations are translated into policies, frequently privately negotiated, that are implemented in the approaches to interconnection and routing. A significant feature of today's competitive Internet service marketplace is that direct competitors must reach interconnection agreements with each other in order to provide the overall Internet service that their customers desire.

These business agreements cover the technical form of interconnection, the means and methods for compensation for interconnection based upon the services provided, the grades and levels of service to be provided, and the processing and support of higher level protocols. Interconnection also requires that parties to an agreement establish safeguards, chiefly in the form of rules and procedures, to ensure that one provider's network is not adversely affected by hostile behavior of customers of the other provider.

Approximately twelve entities, six commercial and six U.S. governmental entities[224], provide the backbone services, running over communications links with capacities measured in many gigabits, or billions of bits per second, that carry a majority of Internet traffic. These providers, termed "Tier 1," are defined as those providers that have full peering with at least the other Tier 1 backbone providers.

Tier 1 backbones by definition must keep track of global routing information that allows them to route data to all possible destinations on the Internet, which packets go to which

[224] ATT, MCI/Worldcom (UUNet), Sprint, PSI, C&W, Microsoft, as well as, NASA, DoD, DoE, NAS, and other government agencies.

peers. They also must ensure that their own routing information is distributed such that data from anywhere else in the Internet will properly be routed back to its network.

Tier 1 status is a coveted position for any ISP, primarily because there are so few of them and because they enjoy low cost interconnection agreements with other networks. They do not pay for exchanging traffic with other Tier 1 providers; the peering relationship is accompanied by an expectation that traffic flows, and any costs associated with accepting the other network's traffic between Tier 1 networks, are symmetrical. Tier 1 status also means, by definition, that an ISP does not have to pay for transit service.

Much of the Internet's backbone capacity is concentrated in the hands of a small number of Tier 1 providers, and there is some question as to whether it is likely to become more so, in part through mergers and acquisition. Concerns about market share in this segment have already emerged in the context of the 1998 merger between MCI and Worldcom, at that time the largest and second largest Internet backbone providers. In that instance, European Union regulators expressed concerns about the dominant market share that would have resulted from such a combination.

In the end, in order to get approval for the merger, some of MCI's Internet infrastructure as well as MCI's residential and business customer base was sold off to Cable & Wireless and the merger went forward.[225] Some of the advantage held by the very large players is due to their ability, owing to their large, global networks, to provide customers willing to pay for it an assured level and quality of service. Part of this dominant position also stems from their Tier 1 status, which assures customers (including tier 2 and tier 3 ISPs) of their ability to provide a high quality of access to the public Internet. In addition, Tier 1 providers, by determining how and with whom they interconnect, also affect the position of would-be competitors.

Below Tier 1 sit a number of so-called second and third tier service providers, which connect corporate and individual clients (who, in turn, connect users) to the Internet backbone, and offer them varying types of service according to the needs of differing target marketplaces. This class also includes the networks of large organizations, including those of large corporations, educational institutions, and some parts of government. These ISPs cannot generally rely on peering alone and enter into transit agreements and pay for delivery of at least some of their traffic.

The bulk of the Internet providers sit in these lower tiers. These include both a small set of very large providers aimed at individual/household customers (e.g., AOL) as well as a large number of smaller providers. These include providers of national or regional scale as well as many small providers offering dial-up service in only a limited set of area codes.[226]

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[225] See, for example, Mills, Mike. 1998. "Cable & Wireless, MCI Reach Deal; British Firm to Buy Entire Internet Assets." *Washington Post.* July 14, p. C1.

[226] Richtel, Matt. 1999. "Small Internet Providers Survive Among the Giants." *New York Times.* August 16, p. D1.

8.4.2 Regulatory Environment

In September 2000, the Federal Communications Commission (FCC) and the International Telecommunication Union (ITU) expressed concern about the power and resulting anti-competitive behavior with respect to peering of the large Tier 1 backbones in the United States. The ITU was looking for some sort of governance to mitigate the situation, while the FCC (and the developed countries) was happy with letting the market decide who peers with whom. The FCC put out a report in September 2000 (FCC OPP Working Section, September, 2000) that said, among other things, that there are certain valid reasons why a large Tier 1 backbone provider (which has made significant investment into its network) would not want to interconnect with a smaller backbone.[227] The FCC said there could be valid competitive reasons why this would be the case, and if the reasons were anti-competitive, the anti-trust laws would take care of them. In 1997, UUNet, followed by other large backbones, invoked competitive reasons in its attempt to end peering with a number of smaller backbones and instead charge them for transit. The increasing transparency of peering requirements since September 2000 was likely in response to this; the Tier 1 carriers attempted to show that when they denied peering to smaller backbones, they were doing so because of competitive--and not anti-competitive--reasons.

At around this same time, Level 3 was coming into the picture. Sprint refused to peer with Level 3 a few years prior to 2000, spurring Level 3 to became the champion of transparent peering requirements. Level 3's president and chief operating officer Kevin O'Hara said in September 2000, "We believe openly-published, specific and objective interconnection policies serve the Internet industry's best interests. We also urge all providers in the U.S. and internationally to follow our code of conduct - a self-regulated approach by our industry will lead to continued success and growth of the Internet."

Therefore, the publishing of peering requirements by Level 3 and Genuity (another of the first to publish), was probably in part an attempt to take away some of the market power of the big players. Level 3 was apparently having difficulties negotiating peering agreements when it first started doing so at the time their network was nearing completion. It wanted to take potentially anticompetitive options away from its largest rivals, the large backbones. It did so by putting pressure on them to publish their requirements and thereby (i) letting Level 3 know exactly what they needed to do to peer with the big players while (ii) making sure the large backbones couldn't exercise their market power by forcing small backbones (who may have demanded to peer with Level 3) to pay transit fees to them.

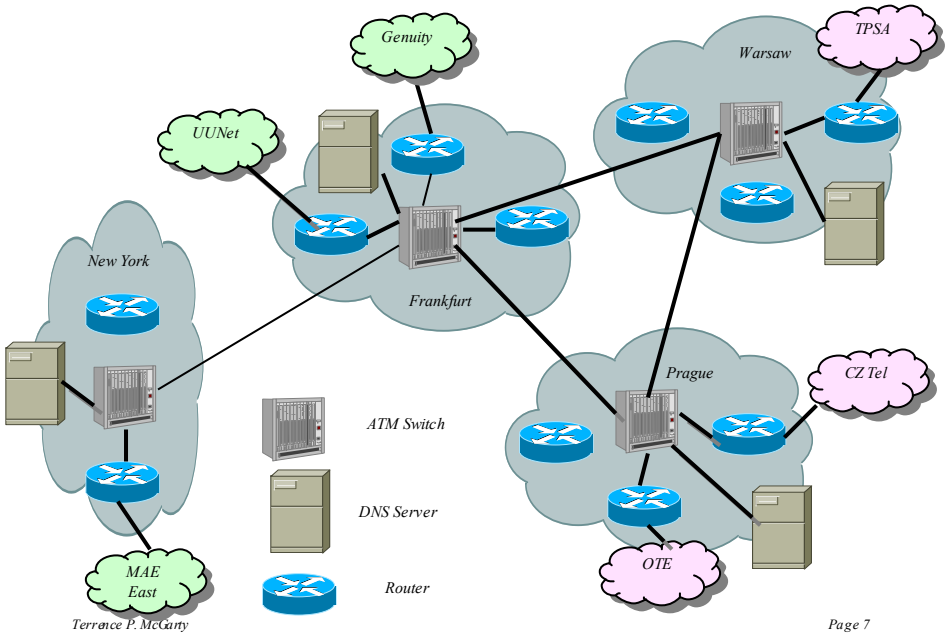
In summary, in September 2000, significant pressure was brought upon the large (mostly US-based) backbones by the FCC and ITU. The large backbones, preferring self (as opposed to government) regulation of their business responded to the FCC's suggestion

[227] See FCC OPP Report No. 32 issued September, 2000 by the Federal Communication Commission. It details the US regulatory history.

that under some circumstances, they would have valid reasons for denying peering to smaller backbones--thus being able to charge them transit fees. Smaller backbones, at that time, saw it in their interest to have industry-wide transparency in peering requirements and hence published theirs to set precedence. Pressure on the large backbones to (i) avoid government regulation, (ii) preempt anti-trust accusations, and (iii) meet the standard of transparency set by an industry newcomers, led many of these players to publish their peering requirements.

8.4.3 The Service Infrastructure

This section presents a summary of the structural elements of International Internet interconnectivity focusing on Central Europe. The overall architecture of the backbone network is shown below. It is composed of various access points which are locations for interconnection, peering, transiting, and switching. The network is frequently ATM based to allow virtual IP connections to maximize utilization and quality of service, however all IP backbones using MPLS are common. There are six key elements to the overall service: routers, ATM Switches, DNS Servers, backbone networks, External Peering Points, these are peering elements with Genuity, UU Net and other Tier 1 ISPs, Internal Peering Points. These are the peering points for member entities and are for intra network peering. Consider the European market as an example.



The overall architecture of the MAE Europe construct is shown below. It consists of NAPs which are interconnected as a distributed single entity. These NAPs then interface with other NAPs and MAE East and West, as may be required.

8.4.4 Elements

It is best to start with a set of Definitions:

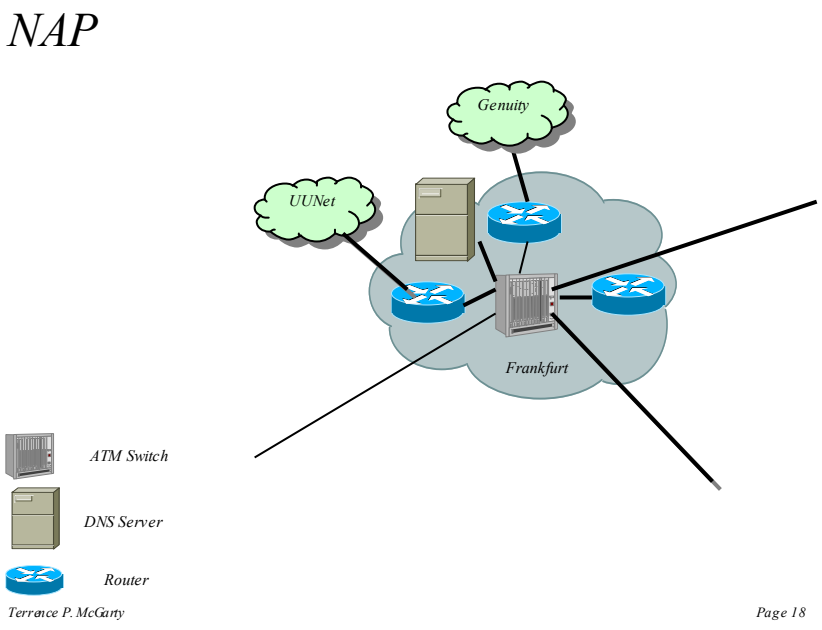
MAE East/West is a point at which multiple Tier 1 ISPs have agreed to interconnect. These points are interconnected by the broadband Internet backbone network. At the MAEs, one in Reston Virginia and on in San Jose California, the Tier 1 Carriers agree to both inter-exchange traffic as well as provide IP address switching facilitation. For a customer on ISP to connect to a provider on ISP 2's network, the two must agree to share addresses and allow interconnection.

Network Access Points (NAPs) are one of several locations where ISPs interconnect their networks. A NAP also includes a route server that supplies each ISP with reachability information from the routing arbiter system.

Domain Name Systems (DNS) are the on-line distributed database systems used to map machine names into IP addresses. DNS servers throughout the connected Internet implement a hierarchical namespace that allows sites freedom in assigning machine names and addresses.

8.4.5 NAPs

The Network Access Point is an inter/intra country or region point for ISP interconnectivity. A typical example is shown below.



The original system of peering has evolved over time. Initially, most exchange of traffic under peering arrangements took place at the NAPs, as it was efficient for each backbone to interconnect with as many backbones as possible at the same location, as shown in the example in Figure 2. Each backbone must only provide a connection to one point, the NAP, rather than providing individual connections to every other backbone. The rapid growth in Internet traffic soon caused the NAPs to become congested, however, which led to delayed and dropped packets. For instance, Intermedia Business Solutions asserts that at one point packet loss at the Washington, D.C. NAP reached up to 20 percent. As a result, a number of new NAPs have appeared to reduce the amount of traffic flowing through the original NAPs. For example, MFS, now owned by WorldCom, operates a number of NAPs known as Metropolitan Area Exchanges(MAEs), including one of the original NAPs, the Washington, D.C. NAP known as MAE-East, as well as MAE-West in San Jose, and other MAEs in Los Angeles, Dallas, and Chicago.

Another result of the increased congestion at the NAPs has been that many backbones began to interconnect directly with one another. This system has come to be known as *private peering*, as opposed to the public peering that takes place at the NAPs. Backbones *A* and *B* have established a private peering connection through which they bypass the NAP when exchanging traffic for each other, they both only use the NAP when exchanging traffic with backbone *C*. This system developed partly in response to congestion at the NAPs, yet it may often be more cost-effective for the backbones. For instance, if backbones were to interconnect only at NAPs, traffic that originated and terminated in the same city but on different backbones would have to travel to a NAP in a different city or even a different country for exchange. With private peering, in contrast, it can be exchanged within the same city.

This alleviates the strain on the NAPs. At one point it was estimated that 80 percent of Internet traffic was exchanged via private peering. Because each bilateral peering arrangement only allows backbones to exchange traffic destined for each other's customers, backbones need a significant number of peering arrangements in order to gain access to the full Internet. UUNET, for instance, claims to "peer with 75 other ISPs globally." As discussed below, there are few backbones that rely solely on private or public peering to meet their interconnection needs.

The alternative to peering is a transit arrangement between backbones, in which one backbone pays another backbone to deliver traffic between its customers and the customers of other backbones. Transit and peering are differentiated in two main ways. First, in a transit arrangement, one backbone pays another backbone for interconnection, and therefore becomes a wholesale customer of the other backbone. Second, unlike in a peering relationship, with transit, the backbone selling the transit services will route traffic from the transit customer to its peering partners.

Those few large backbones that interconnect solely by peering, and do not need to purchase transit from any other backbones, will be referred to here as *top-tier backbones*. Because of the non-disclosure agreements that cover interconnection between backbones, it is difficult to state with accuracy the number of top-tier backbones; according to one

industry participant, there are five: Cable & Wireless, WorldCom, Sprint, AT&T, and Genuity (formerly GTE Internetworking).

In addition, as noted above, transit gives a backbone access to the entire Internet, not just the customers of the peering partner. In order to provide transit customers with access to the entire Internet, the transit provider must either maintain peering arrangements with a number of other backbones or in turn must pay for transit from yet another backbone. In other words, a backbone providing transit services is providing access to a greater array of end users and content than it would as a peer, thereby incurring correspondingly higher costs that are recuperated in the transit payments. In a competitive backbone market, transit prices should reflect costs and should not put entering backbones at a competitive disadvantage.

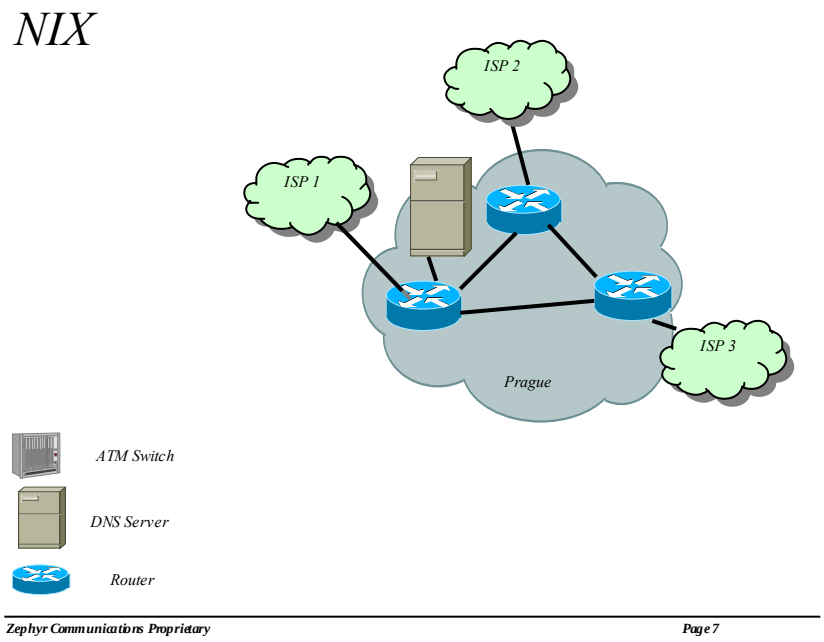
8.4.6 MAEs

MAE, the Merit Access Exchange, is a peering point of ISPs who then interconnect into the vBNS, the broadband Internet backbone. The MAE in many ways look like a NAP.

ISPs maintain IP networks, connected to the Internet through network access points (NAPs), at key locations currently California, Chicago, Washington, D.C., and New York, or by connecting to other ISPs. NAPs are the entry points to the Internet, where ISPs share information. There are other means of sharing such data between networks, such as the Commercial Interexchange (CIX). Netcom's star-shaped points of presence and telecommunications backbone are centered on the NAPs' hookups. Note that the ISP network is a 45 mbps backbone of T-3s that connect the major points, as well as to the Texas area, where there is no NAP (also see UUNET's backbone network topology in Figure 6.2). Typically, larger ISP networks are cell-switched and framerelay- based. For reliability, ISPs usually depend on more than one interexchange carrier (IXC) to provide time division multiplexing (TDM) point-to-point (or permanent leased line) T-1 and T-3 circuits, which interconnect the POPs. ISPs provide two types of service: leased line and dial-up. We have seen the emergence of another class of ISP, those which interconnect POPs by leasing frame-relay service directly from IXCs, which reduces somewhat the capital an ISP must make to its own network

8.4.7 NIXs

The NIX, the National Internet Exchanges, is simply a local intra country DNS type facility allowing local ISPs to have interconnectivity. It is shown below in simple form. The NIXs are quite prevalent in Central Europe. They evolved from the academic institutions and generally provide intra-country peering. It is possible to use a Polish ISP and be able to access only Polish web sites and send mail only to Polish subscribers. The ISP has no external connection. The NIX has no connection to the outside world and the ISPs who connect do so only with each other and block any attempts by others to transit.



The NIX concept has exploded in all countries except the U.S. the NIX is a way to disintermediate the Tier 1 ISPs and get around all of the excess costs associated with this type of networking. The NIX artifact is a way all countries except the U.S. manage to enable true broadband deployment with low cost interconnection, namely be mutual peering of any and all traffic. This structure is the second barrier to broadband only in the U.S.

8.4.8 The Elimination of Transit Costs

As we have shown above the NIX approach represents a way to eliminate transit fees by having the presence of local interconnection. This has been accomplished on almost a global scale in every country except the United States. Perhaps there is a lingering need for internal security measures by forcing all communications onto the Tier 1 backbone networks and then be made accessible to Government agencies or perhaps it is nothing more than an unending need to manage the Tier 1 interface and continue to collect fees.

8.5 Litigation and Delay

There has been and continues to be significant litigation by the broadband incumbent which adds to the overall cost of a new entrant as well as the incumbents costs to the deployment of broadband. This section briefly summarizes this litigation efforts over the past few years.

The following Table lists some of the recent litigation. New lawsuits arise each week. The incumbents, especially the cable companies, have taken it upon them selves not only

to have a seat at the table of any new entrants franchise negotiations but in addition they frequently threaten litigation to both the new entrant as well as the municipality.

Municipality	*Litigation*
Lafayette, Louisiana	Just one day after promising cooperation and a possible partnership, BellSouth sued to stop Lafayette, Louisiana from pursuing $125 million in revenue bonds to fund a triple-play fiber network .They're the *"proverbial wolf in sheep's clothing,"* argues one city leader. With the money BellSouth has spent on fighting the city's effort to get into the broadband business (lobbyists & lawyer fees, PR, etc.), they probably could have wired a significant part of the state, argues locals. See http://www.broadbandreports.com/shownews/59523
UTOPIA, Utah	ILEC **Qwest** has gone to court accusing the **Utah Telecommunications Open Infrastructure Agency** (Utopia) – the $340 million, 14-city fiber-to-the-user project in Utah, of illegally stringing some of its fiber from Qwest-owned telephone poles. It's asking the Utah courts to force Utopia to remove its fiber and to sign a standard contract Qwest demands of anyone using its poles before the fiber goes back up. See: http://www.telecomweb.com/news/1118242986.htm
Tri Cities Illinois *(Geneva, Batavia, and St. Charles)*	Communications companies like Comcast are also taking the local fight to the statehouse and to Congress. Fourteen states, heavily lobbied, have passed restrictions that either encumber municipalities looking to get in the broadband game, or prohibit their involvement outright. Philadelphia, which is launching an ambitious project to cover its entire 135 square miles with cheap wireless access, barely snuck by a 2004 Pennsylvania law prohibiting cities and towns from offering the service without giving the local telephone company a first option. This year the industry is supporting legislation in five more states, and in Washington, D.C., negotiations have begun on a rewrite of the mammoth 1996 Telecommunications Act—another opportunity for lobbyists to push restrictions. See: http://www.motherjones.com/cgi-bin/print_article.pl?url=http://www.motherjones.com/news/dispatch/2005/05/municipal_broadband.html

We have directly experienced this in New Hampshire with the incumbent cable companies and their representatives. In one tow no sooner had we left than the regional VP call the town manager and in less than a veiled way threatened to sue to town for even allowing an competitor.

In another case the representatives of the cable industry litigated to influence the USDA RUS loan process by using the Freedom of Information Act to obtain any and all loan

information. The same group alleged that certain information of government filings may have been deliberately falsified, tantamount to saying that a crime was committed. The tactics by the cable incumbents cause additional delay, are costly and frequently are facilitated in an indirect manner by the municipalities. In all cases the municipality invites the cable incumbent to the franchise meetings, provides access to the incumbent of all plans and information provided by the new entrant and frequently the cable incumbent provides the municipality with a list of questions to ask the new entrant thus forcing further transfer of strategic information to the sole benefit of the cable incumbent.

8.6 Conclusions

There are many conclusions which can be determined from this study. We first focus on the most critical area, franchising.

8.6.1 Franchise Recommendations

Franchising has multiple failures in the current environment of broadband. Several of these based upon our actual case experience are as follows:

1. Franchise Time to Market is Excessive: The length of time to obtain a franchise is excessive. Each municipality has separate negotiations, separate needs separate meeting of selectmen and town members and there is generally little if any consistency. The time between meetings is excessive and the amount of human resources is also excessive.

2. Franchise Cost to Market is Excessive: The costs incurred in the franchise process are excessive. The amount to a hidden tax on the system design frequently adding 25%-45% added cost per subscriber above the infrastructure costs. In addition these are hidden costs and cannot be capitalized. They create a significant burden on any new entrant into a market.

3. Franchises Control Technology and the Franchise becomes a Disincentive to Innovation: Franchises dictate what technology should or must be used where in the system. As we have demonstrated, wireless may blend economically with fiber. But the municipality controls only fiber and they then dictate what design using fiber must be made and thus push out any option of a wireless system integration.

4. Franchises Not Applicable to IP Networks: IP is an open network element. IP is the basis of the Internet and as such is the key elements in keeping the Internet open and accessible for its enormous growth potential. Franchises are inherently a controlling process with no standards. Thus each time one enters into a franchise new controlling elements are introduced and these violently conflict with IP. The local municipality are technically not competent and they may rely upon technical advisory groups, hidden from the new entrant, who may have their own agenda. These groups may have competitors as part, and thus may demand certain

technical factors which reduce the competitive nature of the new entrants services and other grossly anti competitive demands. The essence of IP was and till is openness. It means de minimis regulation, and hopefully none.

5. Franchises not Applicable to Open Networks: Open networks mean that any potential provider of content, video or whatever, can have access to the network and in turn can become the purveyor. This is one of the many ways in which the OVS concept provides maximum flexibility. The users in an open network fabric do not even have to identify themselves to anyone and the transactions are between these users and the users of the network at large. Franchises inherently assume a hierarchical central control of everything, transport, content, and charging. This is not the case with the Internet as a whole and it is certainly not the case in a open network IP based broadband system. Thus the basic assumptions of franchising if applied to broadband are not only flawed but become counter-productive.

6. Franchise Processes are Inherently Unfair and Unbalanced: We have seen repeatedly the cable incumbent having a seat at the negotiating table, indirectly, but clearly present. They demand and the town responds with higher hurdles for a new entrant. For example, we have seen the demand for larger coverage areas, shorter durations, increased reporting, more data to be provided, increased institutional and PEG requirements and other similar increased demands from the municipalities.

7. Franchise Processes Establish an Un-even Playing Field: The franchise as we have demonstrated by the cases discussed, establish a continuing raising of the bar. The municipality view each new franchise as another bite at the apple. The incumbent views this as a way to disincentive the new entrants and establish a barrier to entry. All existing arties try to obtain new concessions. This process will ultimately result in a totally uneconomical market for any new entrant. It clearly is a direct disincentive to invest.

8. Local Authorities Want Long Term Control Over Architectures, Services, Technology, and Systems: The franchise on one had is looked at as a short term agreement, in some case as short as five years but on the other hand as a long term control mechanism. The long term control forces decisions on technology which are frequently counterintuitive to the market.

As a result of these many observations of the current franchise process and the analysis performed above, all based upon actual experience with current franchising systems, there are several recommendations which can be made. These are as follows:

1. IP Video should be considered as an Information Service not video:

2. Franchise Fees, Taxes, and other fees placed upon IP Video Distributors should be eliminated since they impact directly on technical implementations and do not properly reflect the evolving business models:

3. Regulation of IP Services should be minimal to non-existent consistent with how the Internet was let to evolve. Any regulation of IP services will result in market and technology distortions and reduce growth potential: IP is an open capability end enabling technology for the Internet. Regulation of IP is counterproductive. If any service migrates to IP then it should be unregulated.

4. If there is a rewrite of the Telecommunications Act, the status of IP services, whether video, voice or any other, should be clearly established as a non-regulated or non-regulatable information service: The last rewrite of the Telecommunications Act in 1996 was predicated on then already decade old technology. In the middle of the explosive growth of the Internet at the time of that re-write, it failed to account for any future growth and was very backward looking. Hopefully a forward looking rewrite will result this time. Key to that is the unbundling of any and all broadband elements and the establishment of a true level playing field. The restrictions of the current act and releases from these restrictions from the incumbents relate only to the existing copper pair paradigm. Broadband should be established on an open and level playing field basis.

5. Additional items such as rights of way and pole attachments must be opened up at fair and reasonable prices: All entrants should face an open and level playing field. This should include the pole attachment rights. This of course could present a problem is available space but with the fair balanced and even handed approach, stipulated at the Federal level, this can be achieved. Local pole rights of way will create chaos in both the long and short term.

6. Municipalities, if they desire to provide their own infrastructure, must do so at arms length and with a level playing field of costs: Municipalities have recently been getting into the field of developing their own infrastructure. The problems they can create an multiple. The have argued that they do not need franchises. This is the first unfair advantage. They then try to use municipal space on poles then having not to pay pole attachment fees. A second unfair advantage. They also have no requirements on franchising in excess of what they desire to do. Clearly if a municipality wants to do the deployment of broadband, then at a minimum they should do so via a separate arm length entity to prevent cross subsidizing, and in addition should face the same costs structure from fees and requirements as any other entrant. This includes compliance with all laws and taxations and fees.

8.6.2 Recommendations in the Telecom Rewrite to Support Broadband

It seems clear that there will be a modification to the Telecommunications Act of 1996. The reasons are manifest; primarily the drivers of the Internet, wireless, and broadband

are the major factors. The industry has changed dramatically in less than ten years. Competition, which at that time seemed almost a foregone conclusion has almost disappeared. The industry is coalescing again into a pre-1982 world of a single of few dominant carriers. However, the new technologies are growing in the world around us but not in the United States.[228]

The goals of the 1996 rewrite were not only not achieved, the anticipation of them resulted in one of the largest collapses of the equity markets globally. Investment by new entrants anticipating a truly open market led to investment of trillions in high yield non-secured debt and equal amounts in vendor financing. The result was a multi trillion dollar collapse of the stock markets world wide. This was highly anticipated as early as mid 1999, with the excessive high yield debts and vendor commitments, based on an assumption of an open telecommunications market.[229] This open market did not occur. The FCC failed in its role, the Courts in the US over-ruled any attempts by the FCC and others to even try, and the incumbents practiced to a finesse the art of "delay being the deadliest form of denial". This section outlines the key elements which must be addressed in the next rewrite of any telecommunications act. Failure to do so by Congress will result in a even more serious set of failures than those which they instigated in 1996.

8.6.2.1 Eliminate Access and Interconnection Fees

Access or interconnection fees are the fees that the incumbents charge anyone else to connect to their network. Economists in their wisdom have justified these based on the ad hoc propiter hoc theory of network externalities. Simply stated, they argue that since the incumbent have more wireline customers that any other player they bring value to the interconnection which demands compensation. Well since January 2004 there are more wireless access lines than wireline and following the reasoning of the economists we should immediately switch this fee structure.

We have argued extensively elsewhere that the basis establishment of any access or interconnection fee is anti-competitive and favors the incumbent.[230] True competition

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[228] See McGarty, T.P., Alternative Networking Architectures; Pricing, Policy, and Competition, Information Infrastructures for the 1990s, John F. Kennedy School of Government, Harvard University, November, 1990. or Alternative Networking Architectures, B. Kahin Editor, McGraw-Hill (New York), October, 1991. These two papers were written almost fifteen years ago when the author was at MIT and at NYNEX. The reflect an view of open distributed networks built around an IP fabric. At that time the concept was the NREN, a national educational network. That network became what we now see as the Internet.

[229] See McGarty, T.P. Comparative Deregulation of Far Eastern Telecommunications Markets, Telecommunications Policy Research Conference, Washington, DC, September 28-30, 1997. and The Imminent Collapse of the Telecommunications Industry, MIT ITC Working Section, August, 2002. The latter of these two papers was prepared at the request of staff at the Executive Office of the President in the summer of 2002. The general conclusions were that the incumbents were in trouble with their current business model. It also predicted the dominance of wireless access lines a fait accompli.

[230] See McGarty, T.P., Economic Structural Analysis of Wireless Communications Systems, Advanced Telecommunications Institute Policy Section, Carnegie Mellon University, February, 1993.; Access to the Local Loop; Options, Evolution and Policy Implications, Kennedy School of Government, Harvard University, Infrastructures in Massachusetts, March, 1993.; Wireless Access to the Local Loop, MIT Universal Personal Communications Symposium, March, 1993.; Access Policy and the Changing Telecommunications Infrastructures, Telecommunications Policy Research Conference, Solomon's Island, MD, September, 1993. The author more than ten years ago was pressing for the total elimination of interconnection. The author argued that the concepts that led to justifying interconnection and access fees was an ad hoc propiter hoc argument based on fallacious assumptions. These assumptions if propagated into the current market would change the access fees around and force payment from wireline to wireless. This is also an absurd conclusion. This is an antinomy, a proposition all of whose conclusions are false. The only conclusion is no fee at all.

should be based on true costs reflected in true prices. By having no such fees we allow the market to efficiently clear itself of inefficient producers and products.

Recommendation: The total elimination of access and/or interconnection fees. The requirement for any and all networks to interconnect to peers at no cost.

8.6.2.2 Eliminate Franchise Requirements

Franchises are the largest single hidden cost for the deployment of broadband in the United Sates. Franchise are also the single major reason why the United States is lagging behind other countries in the deployment of broadband. There are over 30,000 franchising entities in the US, towns, cities, counties, and a few states. Each requires their own "pound of flesh" in a long and drawn out process.[231] In fact, it has been shown that the Franchise process can add up to $800 per subscriber in additional up front costs.

Thus the Franchise process must by necessity be dramatically changed. It may be eliminated if the FCC were to rule that IP video were an information service and further that it allow any IP video provider to enter the broadband market without a franchise.

Recommendation: The Franchise process must be dramatically changed. One solution is to move it to the state level from the local level. It would make it parallel to the PUC approach with telecommunications services.

8.6.2.3 Eliminate the Control of Media Content and Allow Broader Distribution of Content over IP Based Technologies

Media content is the last bastion of control over the video market.[232] If video content is to be the cornerstone of broadband deployment, and if broadband deployment will eventually rely of technological expansions with IP capabilities, then the media content owners must not be permitted to block distribution of their products by red-lining new entrants because of technology. For example, consortia such as NCTC, controlled by the incumbent large media companies, disallow members who have either an open video system franchise or who use IP video. The reason for this is to maintain their related partners control over the market. This means that new and innovative entrants cannot gain parity in a new media market.

Recommendation: That media content providers shall not be allowed to discriminate amongst distributors of content on the basis of their regulatory or technological status.

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[231] See McGarty, T.P., Franchises, the Hidden Cost of Broadband, Telmarc Report January 2005. The author is currently obtaining franchises in dozens of small towns and cities, Twenty five years ago the author as an office or the then Warner Cable did the same in over a dozen large cities. The conclusions of this section are based upon actual and now current case studies. They show indeed that Franchise are the single most severs deterrent to broadband deployment in the US.

[232] See McGarty, T.P., The Impact of Broadband Options on the Disaggregation of the Media Industry, September, 2004, Telmarc Working Section.

8.6.2.4 Eliminate Right of Way Limitations

Broadband and wireless require access to the public rights of way. The 1996 Act established some additional flexibility to rights of way but these have not been satisfactory. The Incumbents and the municipalities are all in some form controllers and delayers of this process. There are local, state and federal issues, there are delays resulting from the inefficiencies of the Incumbent, and there are delays resulting from the local municipalities again wanting a piece of the action. If broadband and wireless will ever have a chance this process must be rationalized now.

Recommendation: The right of way process must be dramatically changed. State PUCs must be given more authority to remedy delays, costs overages, or other anti-competitive measure taken by incumbents to delay entry by new competitors.

8.6.2.5 Open Access

Open Access is a key to the effective deployment of broadband.[233] Open access have two connotations; first, open to any user who seeks to use it as a service delivery means, second, open from a technological set of standards. Broadband is a roadway to access to services, it is a means to an end and not the end in itself. It is like a highway, and one should be able to operate cars, truck, and any form of safe and reasonable motor vehicle service upon the highway. Broadband is that highway and openness is a key to its effective deployment.

Recommendation: Congress must require that all broadband providers must provide both open networks to purveyors of broadband services and open access in terms of technological interfaces.

8.6.2.6 Establish a Process at the FCC for Spectrum Re-allocation and Usage by Means of Advanced Technological Spectrum Sharing

The largest set of problems that the FCC faced in the past thirty years has been the fiascos over the allocation of spectrum. The FCC's approach was in the initial allocation of cellular spectrum to provide it on the basis of a random draw at no costs. All one had to do was to apply, then if the luck of the draw was with you, you got the spectrum and then sold it to the highest bidder, making you an instant millionaire. The FCC’s second approach with the instigation of Congress was the auctions, and the worst of those auctions was the C Band small business, minority, women etc auction. The biggest winner was Nextwave, backed by Pohang Steel, Korea’s largest steel manufacturer, and other such “small businesses and minorities” Even with that backing Nextwave went bankrupt, BUT never lost the spectrum. It took more than ten years and a Supreme Court decision to make the bankrupt company again rich.

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[233] See McGarty, T.P., Municipal Broadband Networks, A Local Paradigm, September, 2004, Telmarc Working Section.

Is this a way to allocate spectrum at a time when technology can really be more efficient. Just look at the unlicensed band for WiFi, such as 802.11 systems, and what we see is tremendous growth, simplicity of access, and falling costs of entry. The question then is why not let technology take a chance at allocation spectrum. This has been proposed many years ago and has substantial merit.[234]

Recommendation: The FCC change its antiquidated means of spectrum allocation and establish innovative means and methods to share spectrum without the need for the costly and time consuming auction process. This means the use of higher power capabilities in shared spectrum with the options of real time sharing.

8.6.2.7 Revise and restructure Universal Service

Universal service has been an added tax to the telecommunications market and has been a thorn in the side of policy makers as they look at the deployment of such new services as VOIP. Universal service itself is questionable as currently deployed and has been addressed extensively.[235]

Recommendation: The Congress must change the overall concept of Universal Service. Currently this is a tax redistribution system which is not effectively working. If the Congress wants to redistribute wealth to those not as fortunate then they should do so expressly and not allow the incumbent to be the tax collector and ineffectively redistribute the funds collected.

8.6.2.8 Liberalize and Federalize Taxation Issues

The major element in delaying broadband has been the franchise and the franchise is a local process with a local tax collecting capabilities. In addition states have taxing authority on various telecommunications services but have been delimited on taxing Internet related services.

Recommendation: Congress must establish some rationalization of the taxing process. Taxing at the municipal level is much too complex, and at the state level is too inconsistent.

8.6.2.9 Deregulate Broadband

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[234] See McGarty, T.P., and M. Medard, Wireless Architectural Alternatives: Current Economic Valuations versus Broadband Options, The Gilder Conjectures; Solomon's Island, MD, September, 1994. The author and Prof. Medard first prepared this study more than ten years ago to show that there are technological means to deploy bandwidth in an efficient and economical fashion. Since that time, Prof. Medard ahs performed significant and groundbreaking work at MIT and has published extensively on this topic as well as having obtained over a dozen patent describing actual implementations. Recently other approaches such as wireless grids have further expanded this potential. The FCC approach is based on a century old methodology to spectrum management, akin to Marconi's spark communicator. We are seeking that the FCC skip the 20th Century and rapidly get into the 21st.

[235] See McGarty, T.P., The Economic Viability of Wireless Local Loop, and its Impact on Universal Service, Columbia University CITI seminar on "The Role of Wireless Communications in Delivering Universal Service", October 30, 1996.; and The Economic Viability of Wireless Local Loop, and its Impact on Universal Service, *Telecommunications Policy*, Elsevier (London), 1997. In these two papers the author argues for a dramatic restructuring of Universal service. The concept in a broadband world no longer makes sense.

Broadband must be totally deregulated. The FCC has made rules in that direction and it appears that this will continue. The incumbents as well as new entrants should be allowed a level playing field. If anyone is to invest in broadband it must be with de minimis regulation; federal, state and local. Regulation as we have seen always distorts the market. Interfaces should be open, interconnection should be open, and interconnectivity should be open. IP based networks are the key to this capability. In effect it is the local expansion of the Internet.

Recommendation: The FCC and Congress must take all steps to totally deregulate broadband if this is provided by the means of the deployment of new facilities.

8.6.2.10 Provide and Ensure for a "Level Playing Field" for all local markets allowing for total parity amongst all players or entrants, both commercial and municipal networks.

There has been a great push for municipal broadband and just as great a push back. Any provider should have equal chance on an equal playing field. Municipals should not be kept out but at the same time they should not be preferentially treated. Municipals, since they control the franchise process, if they desire to enter must do so via a separate arms length subsidiary. This law has been proposed in New Hampshire but strongly opposed by the Municipal Association. The Association demanded preferential treatment while at the same time extracting predatory rates and services from non municipal competitors. This creates not only a non-level playing field but a hostile and intimidating environment.

Recommendation: Congress should allow municipals to enter the broadband market but only through separate and arms length entities which must meet all the statutory and regulatory demands of any other entrant.

8.6.2.11 Expand the scope of Information Services to Include all Broadband and Related IP Elements

Information services as defined by the Act has expanded in scope over the past few years. The classification of cable modems and VOIP has made information services as the classification most appropriate for any element which is broadband or IP related. Expansion of this to IP video for example is also essential. VOIP for example has been determined that it be an information's service. This has taken over eight years by the FCC to reach what is an obvious point to most event at that period of time.[236]

Recommendation: Keep the classification of telecommunications services to the classic wireline provisioning and video services to the classic analog provisioning. Allow any

[236] See McGarty, T.P., Internet Voice: Regulatory and Legal Implications, Presented at the VocalTec Seminar on September 9, 1996, New York, NY.; Economic Factors on International Internet/Intranet Telecommunications, MIT Research Program on Communications Policy Conference Internet Telephony Interoperability Forum, Bristol, England, June 11, 1997; The Application of IP Telephony to Local Exchange Carriers, MIT, Internet Telephony Consortium, March, 1999.; Internet Telephony Markets and Services, in Internet Telephony, MIT Press (Cambridge), 2001.

and all other services especially those using IP should be considered as information services and thus be unregulated by any entity.

8.6.2.12 Allow any entity to compete in broadband; enable municipals to do so at arms length

Municipalities have recently been allowed to fall to some third order citizenship.[237] The Supreme Court recently ruled that municipalities have no status as entities and thus do not deserve the rights that entities have under the 1996 Telecommunications Act. Municipalities can build roads, sewers, power distribution networks, gas and other basic facilities but they cannot build broadband infrastructure. In an extreme case in the state of Pennsylvania, the recent laws band municipalities unless and until they receive permission from Verizon! This is the extreme of privatizing government. Municipalities should have the right, because it means the people have the right. However the right should be consonant with their abilities in these other areas. Specifically three key element should be incorporated; it should be done in separate subsidiaries, it should be done with a basic concept of a level playing field, namely that they pay market rates as any other competitor, and that whatever they provide as a broadband pipe is done in an open manner, open to users and open using commonly accepted technology, most likely IP based technology.

Recommendation: Allow, by express statement of Congress, any "entity", including any and all municipalities to provide broadband infrastructure provided that they do so in a separate subsidiary, operating at arms length and providing a fully open network.[238]

8.6.2.13 Expand the ability to seek remedies by harmed third parties from dominant incumbents

The FCC has not been the only methods of seeking remedies envisioned by the Congress. The 1996 Act released the ILECs from protection from Antitrust suits for example.[239] The only entity allowed such protection is now professional baseball.[240] However, the Courts in interpreting how to allow parties to seek remedies have severely limited the ability of aggrieved parties to obtain such relief due, they say, to the ambiguity in the law. The law must be made less ambiguous and the Courts must have no room to second guess

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[237] See the recent decision by the US Supreme Court; 541 US ___ NIXON, ATTORNEY GENERAL OF MISSOURI *v.* MISSOURI MUNICIPAL LEAGUE *et al.* certiorari to the united states court of appeals for the eighth circuit No. 02-1238. Argued January 12, 2004--Decided March 24, 2004.

[238] Note that this follows the recent New Hampshire Legislative approach as compared to the Wisconsin, Florida, or Pennsylvania approach. The New Hampshire approach is a positive and not a restrictive approach. The Pennsylvania approach goes so far as to require any municipality to get the permission of Verizon!

[239] See Verizon vs. Trinko, US Supreme Court, Argued October 14, 2003—Decided January 13, 2004.

[240] See McGarty, T.P., Current Telecommunications Legal Issues, Litigation v. Legislation: Is the 1996 Act a Beginning or an End?, MIT ITC Working Section, December 2002.; Competition in the Local Exchange Market: An Economic and Antitrust Perspective, *Federal Communications Law Journal*, submitted 1996.

the Congress. Third parties must have the options to seek their remedies through the courts, not just administrative remedies through an overloaded FCC.

Recommendation: Congress shall expressly amend the antitrust legislation allowing third parties who have been harmed by anti-competitive actions to seek remedies as any other party.

8.6.2.14 Open and Fair Access to the Internet Backbone: The Elimination of the Cartels

There are five entities who control access to the Internet, they are called Tier 1 ISPs.[241] They control the destiny of the Internet as a viable medium. For example, to connect to other users of the Internet one must "transit" or peer with one or all of these players. They charge prices which are reflective of "what the market will bear" and not reflective of any costs to them. For example, one can connect in Hanover, NH at a price point of $400 per Mbps per month. In Frankfurt, Germany the rate may be $12 per Mbps per month, due to much greater volume. Does this mean that people in Central Europe are getting a better deal than those in central New Hampshire? The answer is yes, but at this point no one notices. However, if I want to look at an HDTV video, say 6 hours a day in my home over the Internet, this would cost $2,000 per month just for the transit fee for that one user![242] This is a clear and present danger for true Internet utility. We have detailed this in previous papers.[243]

Recommendation: The rationalization of pricing for peering connections with the FCC having the authority to establish market based rates.

8.6.2.15 Privacy of Broadband Must be Preserved and Protected

Privacy has come under stress with the post 9/11 Patriot Act. However there are fundamental issue regarding privacy which Congress must imbed within any new Telecommunications Act. These are nothing more than what we have come to expect as a result of our inherent Constitutional protections.[244] This means that there should be clear and unambiguous statement of what the rights are and how they can be protected. In addition clear remedies for violations must be articulated.

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[241] They are UUNet, Level3, ATT, MSN, and X

[242] Foe example, an HDTV is 20 Mbps and for 6 hours per day, that is 25% of the time, and for $400 per Mbps this yields; 20 X 25% X $400 which is $2,000 per month.

[243] See McGarty, T.P., Internet Architectural and Policy Implications, Kennedy School of Government, Harvard University, Public Access to the Internet, May 26, 1993.; From High End User to New User: A New Internet Paradigm, McGraw Hill (New York), 1995.; Peering, Transit, Interconnection: Internet Access In Central Europe, MIT Internet Consortium, January 2002. The author prepared these papers while at the same time having founded and run the largest fiber backbone network in Central Europe. In that network the author was paying a Tier 1 carrier the rate of $12 per Mbps per month FOB Frankfurt, Germany. In the authors current endeavors of deploying FTTU in New England the rate is $400 per Mbps per month in that region. The Central Europeans have Internet backbone access at almost one fortieth of that of US citizens. That is the "crime" of the oligopoly of the Internet control at Tier 1.

[244] See McGarty, T.P., Privacy in the Internet Environment, MIT Working Section, January, 2004. This section presents a detailed analysis of the current privacy protections and limitations and interprets them in an Internet environment.

Recommendation: The revised Telecommunications Act must expand the issues of privacy to encompass not just cable and telephony but all broadband issues. This must include not only protection of improper intrusion but also an expansion into the ability to protect from third party intrusions such as SPAM and other similar areas.

8.7 EXHIBIT 1: New Hampshire Law

TITLE III
TOWNS, CITIES, VILLAGE DISTRICTS, AND UNINCORPORATED PLACES
CHAPTER 53-C
FRANCHISING AND REGULATION OF CABLE TELEVISION SYSTEMS BY CITIES AND TOWNS

Section 53-C:1

53-C:1 Definitions. – In this chapter:

I. "Cable television system' means facilities by which television signals are received at a central location and for consideration are transmitted to customers or subscribers by means of cables or wires.

II. "Company' means any person, partnership, association, or corporation, including a municipality, owning or operating a cable television system, except for any nonprofit system serving fewer than 100 subscribers.

III. "Franchise' means an initial or renewed authorization issued by a franchising authority to construct or operate a cable system.

IV. "Franchising authority' means any governmental entity empowered by federal, state, or local law to grant a franchise.

V. "Master antenna television system' means a cable television system which serves only the residents of one or more apartment dwellings under common ownership, control or management, and any commercial establishment located on the premises of such apartment house and which transmits only signals broadcast over the air by stations which may be viewed normally or heard locally without objectionable interference, and which does not provide any additional service over its facilities.

VI. "Municipality' means a city or town.

Source. 1974, 23:1. 1989, 338:1, eff. Aug. 1, 1989.

Section 53-C:2

53-C:2 Franchise Required. –

I. No company shall construct, commence construction, or operate a cable television system in any municipality without first obtaining a written franchise from the franchising authority of each municipality in which such system is installed or to be installed.

II. Nothing in this chapter shall prevent municipalities from cooperating to jointly exercise franchising authority in accordance with RSA 53-A.

Source. 1974, 23:1. 1989, 338:2. 1996, 72:1, eff. July 12, 1996.

Section 53-C:3

53-C:3 Authority to Grant Franchises. – Municipalities are hereby authorized to grant, renew, amend or rescind for cause franchises for the installation and operation of cable television systems in accordance with the provisions of this chapter within the geographical limits of its respective town or city.
Source. 1974, 23:1. 1996, 72:2, eff. July 12, 1996.
Section 53-C:3-a

53-C:3-a Franchise Applicant Considerations. – No municipality shall grant a franchise for cable service to a cable system within its jurisdiction without first, at a duly noticed public hearing, having considered:

I. The financial ability of the franchise applicant to perform.

II. The ability of the applicant to provide adequate and technically sound facilities, equipment and signal quality.

III. Adequate channel capacity and appropriate facilities for public, educational, or governmental use, taking into account available technology, subscriber interest, and cost.

IV. The prohibition of discrimination among customers of basic service.

V. Reasonable service quality in terms of available technology, subscriber interest, and cost.

VI. Construction and installation which conforms to all applicable state and federal laws and regulations and the National Electric Safety Code.

VII. A competent staff able to provide prompt, adequate service and to respond comprehensively to customer complaints or problems.

VIII. Reasonable rules and policies for line extensions and disconnects, customer deposits, and billing practices.
Source. 1989, 338:3, eff. Aug. 1, 1989.
Section 53-C:3-b

53-C:3-b Franchises; Administration by Municipality. –

I. All franchises shall be nonexclusive. No municipality shall grant any additional franchises to cable service within its jurisdiction on terms or conditions more favorable or less burdensome than those in any existing franchise within such municipality.

II. Nothing in this section shall be construed to prevent any municipality considering the approval of an additional cable service franchise in all or any part of the area of such municipality from imposing additional terms and conditions upon the granting of such franchises as such municipality shall in its sole discretion deem necessary or appropriate.

III. All cable service franchises in existence as of May 1, 1989, shall remain in full force and effect according to their existing terms.
Source. 1989, 338:3, eff. Aug. 1, 1989.
Section 53-C:3-c

53-C:3-c Credits and Refunds for Interruption of Service. – Every franchisee shall agree to the following:

I. In the event its service to any subscriber is interrupted for 24 or more consecutive hours, it will, upon request, grant such subscriber a pro rata credit or rebate.

II. It will maintain an office which shall be open during usual business hours, have a listed toll-free telephone number, and be capable of receiving complaints, requests for adjustments, and service calls.

Source. 1989, 338:3, eff. Aug. 1, 1989.

Section 53-C:3-d

53-C:3-d Notice to Subscribers Regarding Quality of Service. –

I. Annually, every cable television system operator shall mail to each of its subscribers a notice which:

(a) Informs subscribers how to communicate their views to the cable company and to the office of the attorney general, consumer protection and antitrust bureau;

(b) States the responsibility of the office of the attorney general, consumer protection and antitrust bureau to receive and act on consumer complaints.

II. Such notice shall be in nontechnical language, understandable by the general public, and in a convenient format. On or before January 30 of each year, the operator shall certify to the franchising authority and to the office of the attorney general, consumer protection and antitrust bureau that it has distributed the notice as provided in this section during the previous calendar year as required by this section.

Source. 1989, 338:3, eff. Aug. 1, 1989.

Section 53-C:3-e

53-C:3-e Recording of Subscriber Complaints. –

I. Every cable television system operator shall keep a record or log of all written complaints received regarding quality of service, equipment malfunctions, billing procedure, employee relations with customers and similar matters. Such records shall be maintained for a period of 2 years.

II. Such record shall contain the following information for each complaint received:

(a) Date, time, nature of complaint;

(b) Name, address, telephone number of complainant;

(c) Investigation of complaint;

(d) Manner and time of resolution of complaint; and

(e) If the complaint regards equipment malfunction or the quality of reception, a report indicating corrective steps taken, with the nature of the problem stated. Every cable television system operator shall make the logs or records, or both, of such complaints available to any authorized agent of the franchising authority upon request during normal business hours for on-sight review.

Source. 1989, 338:3, eff. Aug. 1, 1989.

Section 53-C:3-f

53-C:3-f Franchise Document Clearing House. – Within 60 days of the granting of an initial franchise and any renewal of such franchise, the franchisee shall file a copy of the franchise and any Federal Communications Commission rulings or other rulings affecting such franchisee with the secretary of state. Within 60 days of June 2, 1989 cable system operators shall file a copy of their existing franchise with the secretary of state. The secretary of state shall maintain a file of all franchise documents so recorded and make copies available upon request for the cost of reproduction and mailing, plus a reasonable

administrative fee. The filing fee for initial and renewal franchise documents shall be $50 per franchise or renewal of such franchise. In years in which the filing of initial or renewal franchise documents is not required, the franchisee shall pay to the secretary of state a fee of $50 for each locality served by the franchise.
Source. 1989, 338:3, eff. Aug. 1, 1989.
Section 53-C:3-g

53-C:3-g Rights of Individuals. – No cable television system operator shall deny service, deny access, or otherwise discriminate against subscribers, channel users, or any other citizens on the basis of age, race, religion, sex, physical disability, or country of natural origin.
Source. 1989, 338:3. 1990, 140:2, XI, eff. June 18, 1990.
Section 53-C:4

53-C:4 Authority to Establish Fees and Impose Conditions. – In conjunction with the rights granted in said franchises, any franchising authority may require reasonable fees payable to the municipality and may impose conditions not inconsistent with applicable Rules and Regulations of the Federal Communications Commission, as amended from time to time.
Source. 1974, 23:1, eff. April 2, 1974.

8.8 EXHIBIT 2: Franchise Contents and Elements

ARTICLE 1 -DEFINITIONS

ARTICLE 2 -GRANT OF FRANCHISE

- SECTION 2.1 - GRANT OF FRANCHISE
- SECTION 2.2 – PROVISION OF VIDEO SYSTEM SERVICES
- SECTION 2.3 - NON-EXCLUSIVE USE OF PUBLIC WAYS
- SECTION 2.4 - DURATION OF FRANCHISE
- SECTION 2.5 - RENEWAL OF FRANCHISE
- SECTION 2.6 – GROSS REVENUE FEE
- SECTION 2.7 - LATE PAYMENT
- SECTION 2.8 - TRANSFER OR ASSIGNMENT OF THE FRANCHISE
- SECTION 2.9 - EFFECT OF UNAUTHORIZED TRANSFER ACTION
- SECTION 2.10 - POLICE AND REGULATORY POWERS

ARTICLE 3 -SYSTEM SPECIFICATIONS AND CONSTRUCTION

- SECTION 3.1 - SERVICE AREA; LINE EXTENSIONS
- SECTION 3.2 - SUBSCRIBER CONNECTION
- SECTION 3.3 – VIDEO SYSTEM
- SECTION 3.4 - PARENTAL CONTROL CAPABILITY
- SECTION 3.5 - EMERGENCY ALERT SYSTEM
- SECTION 3.6 - LEASED ACCESS CHANNELS
- SECTION 3.7 - THIRD PARTY VIDEO SERVICE PROVISIONING
- SECTION 3.8 – GOVERNMENTAL DROPS TO VIDEO SYSTEM
- SECTION 3.9 – INSTITUTIONAL NETWORK (I-NET)

ARTICLE 4 - TECHNOLOGICAL AND SAFETY STANDARDS

- SECTION 4.1 - SYSTEM MAINTENANCE
- SECTION 4.2 - REPAIRS AND RESTORATION
- SECTION 4.3 – CREDIT FOR SERVICE INTERRUPTION
- SECTION 4.4 – VIDEO SYSTEM LOCATION
- SECTION 4.5 – TREE TRIMMING
- SECTION 4.6 – STRAND MAPS
- SECTION 4.7 – BUILDING MOVES
- SECTION 4.8 – DIG SAFE
- SECTION 4.9 – RESIDENTIAL EXTERIOR WIRING
- SECTION 4.10 – EMERGENCY POWER

9 INTERNET NEUTRALITY; PROPERTY RIGHTS IN CYBER SPACE

9.1 Executive Summary

The problem of "*Internet Neutrality*" can best be defined by asking the question: what rights does the consumer have when using the Internet? The service providers have their rights under contract law which exists between them. The focus of all the discussions seem to be on what each of the other players will get out of the Internet and there seems to be little of any discussion of what the consumer, the one ultimately paying for the service, will obtain. The issue was brought to the fore by the statements of Ed Whitacre of AT&T who in our opinion has basically stated two things:

1. He, in our opinion, believes that AT&T and the local incumbent have property rights in the local connectivity, rights that go beyond just ownership, but which extend to whoever else can compete and how they can compete;

2. He, in our opinion, desires to "share" in the wealth of the providers of content and services, which he perceives, are benefiting from the presence of his network[245].

The ***"Whitacre Conjectures",*** as we shall call them, frame the discussion of the Internet and its future[246]. Key to this future is also the issue of who will build a true broadband network. Key to that question is; what is the best broadband network that we can have? People analyze some of these issues by looking at what other countries, such as Korea, are doing and then look at the United States and remark that we are behind.

In this Note we look at the issue in terms of property rights, and how they can be enforced under common law. We look at this issue not from a classic Washington perspective, namely attempting to write a new law as is commonly done, but from a

[245] What is critical to note here is that in the second part of the Whitacre Conjectures there is an expectation to share in the wealth of another having contributed nothing to the generation of that wealth. The expectation in sharing is based upon the fact that he has the "pipes" which facilitate that wealth. This is akin to a cab driver in New York expecting to share the wealth of an Investment Banker because he carried the Banker to a deal. They do have legal terms for such an expectation. In the Verizon case the argument is based upon the theory of multi sided markets, which is a set of mathematical equations based upon the Second Whitacre Conjecture. It has been developed by Darby. He states that since FTTH is good and needed, and tacitly assumes that AT&T and Verizon are the only ones who can do this deployment that they should receive part of the benefit from anyone who uses it. The truth is they can do that expressly by charging Transit fees to their Internet backbone. However, they want a percent of the gross revenue received not just a fee for transport. Viewed in this manner it appears as if it were a tax. It is a tax by a non-Government entity and without representation. We can remember what happened to George II when he tried such an action!

[246] The irony about the Whitacre Conjectures is that SBC in 1994 acquired one of the best small cable systems in the United States for the purpose of getting then SBC into cable. In less than two years of less than sterling management, SBC sold the system and the whole experience was for naught. He had a golden opportunity, which he did not take advantage of. Likewise, AT&T bought TCI, a system quite the opposite of the one SBC acquired. In addition, AT&T overpaid dramatically. AT&T then managed to run what was left into the ground until it was acquired by Comcast and resurrected. Thus in both cases the incumbent had the clear opportunity to position itself in the strategic role in the distribution channel and fumbled. One may ask what right they may have to seek remuneration from those who succeed. In a Darwinian sense, they should be allowed to fade off to the sunset.

customer and consumer litigation perspective, one where we see this as a consumer rights issue and we further see that the remedies are available under common law via litigation. In fact, we see that the success of the FCC in mediating these issues is clearly lacking. In fact, as we summarize herein, they have generally delayed and distorted the intents and market effects. Rather we see that the courts via consumer litigation can be a more efficient mediator and maker of an efficient market. In particular we have seen in the recent debate between Vint Cerf from Google and Dave Farber representing what may be the incumbent RBOC positions, that both of the debaters were seeking remedies at new FCC law or in old Antitrust law[247]. We do not see that as the only or even best alternative. There are better remedies and cleaner remedies we argue in the common law[248].

9.1.1 A Framework at Law

The consumer's use of the Internet is paid for by the consumer directly. The consumer uses it for transactions, information and entertainment. We first look at the current state of the Internet and then look at what rights the consumer may have in this new electronic media.

9.1.1.1.1 The FCC, in decisions made over the past three years, has commenced to place duties on the INTERNET, WHICH make it comparable to the classic monopoly telephone network. This is a chilling effect on the growth of the Internet.[249]

Since late 2002 and thru the current period the FCC has made substantial rulings, which dramatically position the Internet and the services, which it provides under stricter regulatory control. These actions fall into two areas; (i) those which empower the incumbent and materially reduce the ability of new entrants to prosper, (ii) those which apply regulations upon Internet uses which make them more regulatable and controllable by the FCC. These two general actions by the FCC in toto to create an environment where the old monopolist incumbent has strengthened its position while at the same time creating an environment in which the Internet and its players must comply with rules with

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[247] See www.cspan.org for the debate. The Communicators: The Great Debate - What is Net Neutrality?
This week on "The Communicators", the Center for American Progress hosts "The Great Debate: What is Net Neutrality?" Vinton G. Cerf, Google, V.P. & Chief Internet Evangelist and Dave **Farber**, Carnegie Mellon University, Distinguished Career Professor of Computer Science and Public Policy debate the issue of net neutrality. "The Communicators" is a new C-SPAN series that focuses on the people and events that shape telecommunications policy. 7/22/2006: WASHINGTON, DC: 1 hr. 20 min.: C-SPAN

[248] We call this the Washington School versus the New York School of law. In the Washington School one seeks to create new laws assuming that they can be accomplished in some fair and balanced manner. In reality we know that these new laws are almost written by the lobbyists for the incumbents to preserve their positions. In addition when an agency such as the FCC reduces the law to Administrative Code it against goes through a process of lobbyist influence. This engenders delay and confusion and great market uncertainty. However, litigation at common law (property, contract and torts) allows the use of hundreds of years of common law precedent in the court. It is what is used in what we call the New York School versus the Washington School.

[249] See FCC Rulings: FCC 02-77 Broadband over Cable Declaratory Ruling; FCC 04-179 Unbundling of Incumbents Order; FCC 04-290 Unbundling of Incumbents Order on Remand; FCC 05-78 Un-regulating Broadband Order; FCC 05-150 Universal Service Order; FCC 05-153 CALEA and Broadband Access; FCC 06-56 CALEA on VOIP; FCC 06-94 Universal Service and VOIP.

which the incumbent is so familiar. This double spiral created by the FCC forces all of the Internet players into the playing field of the incumbent, a strengthened incumbent. It is akin to feeding the wolf, and then herding the sheep into the wolves den.

Specifically, as to strengthening the incumbent, the rules on broadband allow the incumbent not to unbundle many of the key network elements which would have empowered new entrants, despite the 1996 Act, and moreover, it protects the incumbent's network elements which are merely backbone elements such as their dark fiber. These steps by the FCC make certain that no new entrant can use elements on an unbundled basis to reach the customer, and moreover, the dark fiber restriction forces new entrants to build all of the facilities, even if the marginal costs to use the incumbent would be more beneficial.

As to the herding of the Internet into an incumbent regulatory den, the application of universal service charges and CALEA are but a start. The FCC is applying all of the tools, which it has employed to regulate the incumbent to establish its ability to regulate the new entrant.

9.1.1.1.2 The Consumer, perforce of his investment and labors, has created a property right in the packets that he creates and sends across the Internet.

Property and property rights are well-established elements of common law. The definition of what is property has gone through extensive evolution over the past four hundred years since Locke first wrote in his Treatises. There are various approaches to defining property; approaches that are Lockeian based which look at adding value by labor, those of Hohfeld as regards to rights and duty, and many more. We examine all of these and conclude that the packets generated by the Consumer for effecting transactions on the Internet are the property of the Consumer who has created them. Issues relating to privacy and otherwise can be left for future discussion[250]. By looking at Internet usage and operations as a handling of the Consumer's property right in their packets we have developed an alternative paradigm for establishing relationships between the parties. The Whitacre Conjectures we believe fall asunder when one looks at the issue in these terms.

9.1.1.1.3 The Consumer property right imposes a duty on the carrier of the packet, the local broadband provider, which is akin to that of a bailment. It is a duty of care and a duty not to open the packet and tamper with it.[251]

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[250] See McGarty, Privacy. The author examines the privacy rights in an Internet world. We also look in the body of this section at a Coasian view of property rights and the implications as regards to the Internet. There is also the discussion about the existence of the property rights of the other parties we see in any transaction. In fact, we conclude that they exist but are dealt with via forms of contract law.

[251] The tampering issue has both a technical and legal imperative. Technically, we use the Saltzer, Reed and Clark argument of end-to-end control. If the packet were tampered with to ascertain what is in or other such details such tampering raises the risk that the packet would not get to the other end correctly or in a timely fashion. The legal issue is that if we accept the bailment concept, we show herein, then it breaks the duty of the bailee if the packet is open-end and examined, it increases their liability, and is actionable.

Property rights convey to a person's Internet traffic. The packets are the personal property of the individual under the understanding of common law. The historical common law concept of bailment provides a basis for understanding the duties and obligations of the transporters of the data packets in an Internet environment. More specifically, we as the creators and owners of the Internet packet property retain ownership as the bailor and the bailee, namely the carrier, has duties based on over a thousand years of common law.

Common carriage is both a legal administrative law construct and a constructed accepted at common law. In fact the current administrative law construct, as stated in 47 USC, the rules of the FCC, being circular should be interpreted primarily at common law. Thus we can look to the transporter of our packets as a special type of bailee, namely a common carrier. This means that we can then use the duties of common carriers at common law for remedies and recourse. Common law, as separate from administrative law, provides us individually with remedies in the event of damages. Damages may result by the carrier applying an unlawful tax, a separate surcharge, on our packets. To do this clearly the carrier must open the packets and thus violating the duties of a bailee. Common law then is the proper ground for redress. Administrative law is a way for the Government to view its relationship to the carrier. Common law is the way the individual view their relationship. Thus there may, and frequently is, a variance between the two.

9.1.1.1.4 The Local Carrier has the duties of a common carrier at common law, not at FCC Administrative dicta. The duties of a Common Carrier are simply to sell equally and equitably to any and all who come along without discrimination.

The local carrier, and in fact all carriers, accept the packets and these are the personal property of the Consumer. The ***common law*** for a thousand years understands that such handling of another's property has certain duties. We pay the carriers to transport the packets. The carrier has a duty under centuries of common law as regards to those packets. We pay them for a service and if they do so as a common carrier, a form of bailment created in the late sixteenth century, we expect them to honor the duties related thereto. The duties are that they deliver the packet unopened and take care not to loose it or allow it to be stolen. As a common carrier, we agree to limit the loss to the cost of transport, not the loss incurred if the packet creates a loss in some valuable transaction. Using the end-to-end argument of Saltzer Reed and Clark, we take the responsibility at the end points, namely at the TCP level, they handle the IP level. This is not an issue of privacy but an issue of bailment.

9.1.1.1.5 The FCC is but one venue for the regulation and control of the Internet. A second venue is common law and the courts. Customer property rights under common carrier bailments at common law can allow remedies to be sought and obtained and through this vehicle, a true open market opportunity, the balance in the market can be obtained.

The FCC is strongly influenced by the incumbents, as of course is Congress. However, at common law in the courts with juries, one can seek redress of breach of duties of the local carriers.[252]

9.1.2 Technical Options and Realities

To understand the issues and to understand what the rights are, one has to have a clear understanding of the technical issues as relates to the Internet. We review some of the key ones below.

9.1.2.1.1 Existence of an Internet Backbone Market: The Tier 1 carriers are multiple and they have a limited form of competition. It is somewhat of an oligopoly market but with limited competition. a customer may seek access and interconnection in a reasonably well established equitable market. There does not appear to be excess PROFITS, as one would find a pure monopoly.

The Tier 1 market has become competitive. It is a market based on contractual relationships not regulation. It is in many ways a Coasian market. There is no FCC regulation, no mandated access or interconnection; it is based upon competition and open pricing. This is a counter example to what the incumbent telcos and cable companies seek in the local market.

9.1.2.1.2 Lack of OPENNESS in Incumbent Local Networks: The Cable operators and the Incumbent monopolists have network architecture for local ACCESS, WHICH are all INHERENTLY closed and hierarchical. They are not open networks and DELIBERATELY prohibit open on net access and interconnectivity . This establishes a barrier to entry for what they may perceive as competitors seeking to DISINTERMEDIATE their services.

Openness is a powerful concept. It means that there is no proprietary control, that anyone may interconnect via a portal and that peer-to-peer communications is readily achievable. Moreover, openness means that anyone wanting commercial access can gain that access in a standard and predictable fashion.

Openness further implies an open and free flow of communications on both a global and local landscape. The localism element must become an integral part of openness.

[252] There is a discussion of common law and the various political schools relating to it. The recent work of Feinman, Un-Making Law, The Conservative Campaign to Roll Back the Common Law, discusses the issues of recent court decisions to strengthen property rights with the loss of public goods. We discuss this herein but in a sense, we accept the Feinman argument that common law has substantial benefits to the individual, but we also argue for strong property rights as regards to the individual. The Feinman argument is related more to corporate property rights and the general issues of takings in environmental cases. We believe that one must be careful to balance property rights since if they are lost then the individual suffers the most. The takings argument will become a strong corollary of our argument. If we accept property rights in the packet then anything the FCC or the Government does to weaken them is a takings and cane be adjudicated thereunder.

Openness means that the network allows any user to communicate with any and all other users. It further means a minimalism of implementation of broadband, as it is with the Internet, and an ability to move all of the intelligence and creativity to the edge of the network, in the hands of the user. The essence of the Internet has always been openness. This was accomplished via the use of the minimalistic approach of IP technology and allowing the intelligence to move to the edge of the net. Furthermore, openness also has the characteristic of empowering and enabling any user to connect to any other user or sets of users. Thus openness means that the network deployed should be IP based and should allow individual access to any and all other users of the network in the broadest sense.[253]

Localism is a similar characteristic. Localism means that the power to create is left in the hands of the user. It is the complement of openness, which is the network looking outward. Localism is the complement of the network looking inwards. This section describes how one can view broadband not just as a local or regional embodiment of openness and localism, but how it can play as both a national and international fabric for these concepts.

Localism further means a participatory process driven by some form of co-ownership in the MBN. The participatory process and the ownership issue go hand in hand. The ownership may mean nothing more than a seat at the table with guarantees of openness. The participatory process demands an ability to allow those with vested interest to have their voices heard. Localism also means that there can be a focusing of the interactions and communications on a local level.

The major observation here is that as little as five years ago 95% or more of Internet traffic went to MAE East or West and then back again. Thus Europe communicated with web sites in the US and then back. India had over 99% of its traffic sent back and forth to the US. This has changed. Poland talks to Poland more than 50% of the time, France to France in excess of 70% of the time and now India has over 70% of its Internet traffic to and from itself. Localism thus has a second dimension of internal communications and facilitating the process as well.

If one were to look at the Internet traffic over the past fifteen years one would observe a fascinating pattern of change. In 1994, for example, over 98% of the Internet traffic from Mexico went to the US and back. In 1998, the same amount went from India to the US and back. The tremendous flow was driven by two factors; lack of local content and lack of local infrastructure. At the present time the flow in India is now less than 50% to the US, the majority if to and from India. This means a growth of Indian content and a growth of Indian infrastructure. Similar but even more dramatic changes are prevalent in Europe. Czech traffic was predominantly to the US and Western Europe, today it is predominantly to and from Czech. This is the result again of local content and local

[253] There is no reason, however, to compel the local carrier to be open, nor is there any reason to demand it from a regulatory perspective. Our argument is that each of these players should act in a free open market environment. Our arguments about openness is related to what is best for the market.

infrastructure. This moreover is an example of localism. Namely, that there exist natural communities of interest wherein the predominant communications occur. There are thus natural clusters of commonality. The question then is can these cluster be brought down more locally, albeit by expanding the communications local fabric.

9.1.2.1.3 OPENNESS is obtainable in Certain Wireless Networks: In the municipal and private NON-INCUMBENT wireless architecture there is INHERENT OPENNESS in the networks. This may allow for significant change in the market positioning and entry.

Wireless networks using 802.11 mesh routers are naturally open. Every node is a router and every node is an entry point. This is not the case for FTTH or Cable modems. The open network paradigm extends the Internet to a local environment. This is a critical change. This makes the local network a true local Internet!

9.1.2.1.4 Existence of Multiple Players and Competition in All Elements of the Channel is Clear: The distribution channel composed of all market elements and players shows considerable existence of multiple alternatives. There are many Tier 1 players, there is an evolving market for local access players, wire and wireless, and there of course are many content providers. The consumer has the potential for choice.

There is a school of thought, based on the old school of the Bell System Journal of Economics, which was the mouthpiece of the old AT&T to justify their actions in the days of monopoly, which holds that there exist network externalities, and that the incumbent should benefit from those externalities. The school is composed of a great deal of ad hoc propiter hoc argument, arguments of justifications for the maintenance of monopoly power of the incumbent. The influence of the school is significant. We argue the contrary. Externalities are non-existent. Take the simple example of how Verizon makes money today. The copper side of the business, the old access lines, charges the wireless carriers interconnection or access fees based on the externality concept. Namely, the wireless carrier benefit by connecting to the customers. Since January of 2004, however, there are more wireless customers in the US than wireline. This would mean that as of that date, the externality shifts to the wireless carrier. It did not. It remains now a subsidy for the old wireline business. With multiple players at all levels of the distribution channel, and with consumer choice, the only true externality, if such exists, is the customer. The customer can choose, and the providers of service then compete in an open market, one that should be free from regulation and interconnection fees.

THERE ARE MULTIPLE OPTIONS TO PROVIDE LOCAL CONNECTIVITY; CABLE, DSL, FTTH, WIMAX AND WIFI TO NAME A FEW. OF ALL OF THESE OPTIONS THE FTTH OPTION IS THE MOST COSTLY, WELL IN EXCESS OF $3,500 PER HH PLUS THE FRANCHISE COSTS. THE INCUMBENT RBOCS ARE SEEKING A MECHANISM TO UNDERWRITE THIS OVERPRICED OPTION AT THE EXPENSE OF OTHER PLAYERS IN THE DISTRIBUTION CHANNEL AND AT THE EXPENSE OF COMPETITORS.

It is clear that there is no single option and it is clear that there is no monopoly structure. There are multiple options and new ones arriving every day[254].

9.1.3 Principles for Operations and Implementation

Based upon the analysis of the Internet herein and elsewhere we recommend adherence to the following principles[255]:

9.1.3.1.1 Use of a Minimalist Architecture is an essential and proven method to optimize innovation and minimize costs.

The Internet can operate over different, changing underlying technologies, and applications are free to evolve above the transport layer. This has been described as the "hour glass" architecture. In this architecture, bits are bits and the network does not optimize for any class of applications. The network is minimal at its heart and the intelligence, via appliances or whatever is at the edges.

The Internet is a very complex system of computers, protocols, and applications. This tends toward complexity in individual components as well. However, this tendency towards complexity works against both the complex hardware or software, and against the systems, which depend on its correct behavior, as it, becomes difficult for those who designed it to debug, and for those who depend on it to deploy and use. For this reason, components and protocols must be designed with serviceability in mind, which means that they must be simple to deploy and use. We note that much in the Internet today is not as simple as the end user would like; the trend must be towards increased simplicity in the components.

Decentralized and global in scope, the Internet is difficult to control. Governments are now considering regulation but in an environment designed for maximum freedom, regulation and control are and will continue to be difficult.

9.1.3.1.2 Ensure easy many-to-many transmission via packet addressing and ensure performance Quality by observing and END-TO-END design.

If I connect anywhere, I have access everywhere. There are no segregated communities: all networks are interconnected and share the same address and name spaces.

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[254] The recent announcement by McCaw of the Intel and Motorola (see Business Week, July 24, 2006) investment in his Clearwire WiMax business is but one example. The cellular companies have options themselves, and the growth of WiFi municipal and private networks in another. Cable itself can lay fiber the last few hundred feet if necessary. However, the issue raised does beg the question as to why Verizon and possibly AT&T would want to build FTTH if it is so costly. If the investment is $3,500 per subscriber then this requires a substantial revenue stream ARPU to amortize. Furthermore this number is at 30-35% penetration by year 3 and reaching a penetration level in excess of 60% by year 10. How will Verizon do this? It is not at all clear.

[255] See McGarty, Municipal Broadband Networks, A Local Paradigm. This section details many of the proposed design and openness issues we have highlighted herein.

The Internet is drastically different from the traditional hierarchical and one to one telecommunications services. It is a packet system, allowing control and enhancement at the periphery of the network and allowing for the "broadcasting" of packet to many destinations simultaneously. In many ways the Internet is the blending of characteristics peculiar to telephony and broadcast.

9.1.3.1.3 Allow innovation to take place at the edge via open interfaces will ensure the maximum return and will permit and support maximum creativity.

The Internet is highly creative and innovative. This is because the point of innovation is at the edge of the network, through software running on devices connected to the network. Because of the hourglass architecture, the interface used by edge devices is standardized and open to all. Placing the intelligence at the ends permits rapid change (e.g., by adding new devices or loading new software into existing devices) that do not have to wait for changes or investment in the network infrastructure.

The Internet has already gone through several iterations. Routing protocols have been deployed in bounded domains, for example, and replaced with other protocols as technology has matured. IP addresses were at one time given out in blocks of fixed sizes, whereas today they are assigned in blocks defined by economic penalties and demonstrated needs. What has worked, over a period of twenty-five years, has been continual gradual change, with interoperate*ion between newer and older hardware and software. Sudden revolutionary changes have not worked as well, such as the sudden phasing out of one protocol in favor of another. For this reason, it is unrealistic to believe that major infrastructure components, hardware or software, can be changed without a significant period of coexistence and interoperation.

9.1.3.1.4 Ensure Scalability in the network for expansion and avoid the insertion of any ELEMENTS, WHICH can become bottlenecks.

Design with scalability in mind and strong architecture supervision guarantees future evolution. This is particularly important for "infrastructure" applications (a.k.a. middleware) and is guaranteed, today, by the open discussions in the IETF standard process.

9.1.3.1.5 Provide a Distributed and Adaptive design for innovation and survivability

The Internet is more distributed and adaptive than other information networks. The Internet Protocol (IP) enables distributed control of the network except for the assignment of the highest level of addresses and Domain Name System (DNS) names. This distributed control provides for more rapid development and introduction of innovative applications and services.

9.1.4 Proposals

9.1.4.1.1 The FCC or any regulatory or legislative body should avoid picking, influencing, suggesting, or facilitating any winners in a technical competition. It is the function of the market to do so.

The argument is frequently given that the FCC did the correct action when it did not get in the way of CDMA versus TDMA[256]. In the current approach of the FCC, especially in their recent ruling making the Internet look more like the old regulated telephone system, they are effectively making choices. The issue of the Internet should be a hands off issue, letting the market select the choices.

9.1.4.1.2 The Consumer's property rights in the data they generate should be protected. The Consumer is the person creating value and paying for the service. The Consumer's property right extends end to end is established under common law.

All of the current arguments regarding the Internet and its neutrality fail to look at the consumer. We argue herein that the Consumer is the key element and that the Consumer has perforce of many historical and legal precedents a property right in the packets the they transport across the Internet. Rights imply duties and when the Consumer hands the packet off to the local carrier there is created a duty of care, based upon the principles of bailment.

Predicated upon the Consumer's property rights, the Consumer should be free to ENTER into any for a legal transaction as the consumer so desires to seek goods and services over the Internet[257].

The Consumer may select whatever means of access and purchase he seeks, subject to general principles of law; no illegal acts such as child pornography, terrorism etc. The consumer can seek whatever option of local access he desires. Thus this is an argument for multiple local access including but not necessarily limited to such alternatives as municipal networks; fiber or WiFi. If the consumer seeks to have access to a service demanding large amounts of bandwidth at high level of quality then the consumer would seek a local provider to provide that service at a price determined by the market. This means that if a provider can only provide the service at some high cost of capital, then the provider should rationally select a price to charge, consistent with their business practice. The provider has no right to charge third parties in the distribution channel via some taxation of takings by a third party such as a Government agency[258]. Thus if the

[256] The senior author was personally involved in that process when he was COO of NYNEX Mobile and was one of the key proponents of CDMA. The FCC knew nothing of the operational concerns and we argued frequently that they should just sit back and let people have their money at risk make the choice.

[257] In the view held herein, the premise is that the consumer has a property right, that the local carrier has a common carriage position at common law and that the remedy available to the consumer at common law for any harm is available under common law. Common law covers torts, property and contract. These three elements are all part of this concept that we have developed. There is another set or means for remedies; antitrust law. The issue of tying agreements comes to the fore. However one must be careful so seek remedies there due to the weak position put on the consumer by the Supreme Court in the Verizon v. Trinko case. See McGarty, Competition in the Local Exchange Market (1996), Municipal Broadband (2002) and Collapse of Telecom (2002).

[258] The charging of the other players in the channel by the FTTH entrant assumes that FTTH is the best solution, it makes a technology choice, and it further assumes that there is some agent, such as the FCC, which has the authority to

incumbent telco spends $4,000 per subscriber for installation, it is their problem is the market price is $30 per month for broadband, and if they cannot ever profitably operate at that point the market should clear that alternative. If a municipality can do the connection at $2,000 per subscriber and can provide $30 access then the municipality should be the efficient market answer.

9.1.4.1.3 The Internet should be an open network where connectivity is PERMITTED at any point. This implies that local OPENNESS should be fostered so as to enable local content and services.

The concept of openness is critical to the future of the Internet especially when we see it becoming a local entity. Openness means that anyone can connect locally to the network and interconnect locally to anyone else on the network. It means local IP connectivity, it means no Transit fees. Localism is also a strong element.[259]

9.1.4.1.4 Pricing of any element of the DISTRIBUTION channel should be done at market rates to the Consumer. Thus any local transport supplier should be able to charge for greater data CARRYING capacity, increased quality of service or similar factor. The local carrier has no right to INTERFERE in the transaction between the Consumer and the Supplier, and as a corollary, the local Carrier has no right to seek additional remuneration from the Supplier.

In fact we argue that the local carrier has a duty under bailment principles not to look within the secure packet at all. The local carrier has a duty to carry the packet from point A to point B. The local carrier violates its duty and the Customer can seek remedies under common law for that violation.

As to local access payment, if the Consumer wants to view 5 HDTV stations on a streaming basis that requires 100 Mbps service at a high QoS level. Then the Consumer must purchase that level of service from the local carrier at whatever price the carrier charges. If the charge is too great then there is no market. The local carrier has no right to charge the content provider unless the local carrier directly touches the content provider and then only by contract; in fact we consider that relationship a secure relationship. The interesting issue is that the marginal cost to a carrier is dramatically different between cable and telco. If the telco incumbent uses a FTTH design then the marginal cost just for local transport is near zero. However the marginal cost for Tiering may be quite substantial, unless of course the local carrier is a Tier 1 carrier such as AT&T or Verizon; in that case their marginal cost is zero!

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implement this. On the other hand if the local carrier is also a Tier 1 provider, then if these Tier 1 providers can work together to re-negotiate the Tier 1 peering agreements to account for this flow, namely making them transiting with fees, then the cost would flow downward to the suppliers via their transit fees.

[259] See McGarty, Internet Architectures, the author develops at length the concepts of Openness and Localism. This section was prepared for the Dutch Government Panel looking at broadband. The ideas have been adopted and the Dutch approach is unique. It is ahead of the US.

If the Content supplier were not a Tier 1 ISP then the content provider would be charge perforce of its Transit Agreement with its Tier 1 carrier for the transmittal of the videos, and that would be a substantial amount! Thus one could look at how the Internet works today, and in fact if Verizon, as a Tier 1 carrier, used its local carrier and its Tier 1 backbone, then it would be sharing in the revenue perforce of the Transit Fee it charges the Content provider. Does it desire to collect several times? The mechanism, a contract vehicle, is already in place!

9.2 Issues and Positions

Internet Neutrality is a war cry for those who desire to control the evolution of the Internet. The Internet was originally conceived as an open network, a network where the intelligence was at the edge of the network. It was conceived and implemented in stark contrast to the existing telephone network which was a hierarchical network with a central control.[260] The issues currently being focused on are economic issues yet their resolution may have a strong negative effect on the growth of the Internet.

We approach this analysis by first establishing the world views of several players in this effort; RBOCs, CATV operators, and content providers. Underlying this, of course, is the customer.

9.2.1 Schools of Thought

Let us first try to phrase some of the positions of the various camps as they have been presented:

9.2.1.1 RBOC Camp

Despite the fact that they come from the common carrier world, they now want to "share" in what any purveyor of services makes on the Internet. They do not want to just get paid for the access they provide, they believe that such an arrangement is unfair. They want to have a piece of the action of anyone who creates value[261],[262]. This implies a "tax" being levied on the consumer since, if such an arrangement were to occur, there would be a passing down of the costs. The result would be a distortion to the Internet market as we

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[260] We have discussed this in details in the 1990 Harvard section which focused on the NREN, the National Research and Educational Network, which became what we now call the Internet. At that time we looked a multiple network architectures and we argued that the TCP/IP approach was optimal. That is we argued that pushing the intelligence to the edge of the network allowed for explosive growth in applications and services. The reality of the subsequent history proved this correct.

[261] Recently, however, the ILECs, via their spokespersons, have voiced a new concept of common carriage, or possibly a total ignorance of it or its outright unilateral denial. Specifically Ed Whitacre, the CEO of SBC, now AT&T, is quoted as stating:[261]

"Now what they would like to do is use my pipes free, but I ain't going to let them do that because we have spent this capital and we have to have a return on it," says Whitacre. "So there's going to have to be some mechanism for these people who use these pipes to pay for the portion they're using. Why should they be allowed to use my pipes?".....*"The Internet can't be free in that sense, because we and the cable companies have made an investment and for a Google or Yahoo! or Vonage or anybody to expect to use these pipes [for] free is nuts!"* See http://www.dslreports.com/shownews/69002 and Business Week November 7, 2005 ***Rewired And Ready For Combat*** http://www.businessweek.com/magazine/content/05_45/b3958089.htm

[262] One just has to read the Whitacre quote to see what he is explaining. The recent, July 17, 2006 debate on CSPAN between Vint Cerf and Dave Farber was a clear example of the debate. Cerf was clear and articulate as regards to the need for neutrality. Farber. an apologist for the incumbent RBOCs based upon his position and background, seemed to hold that there is no problem and would never be one. However the issue of sharing in the profits of the profitable became a cornerstone of the Farber argument. see www.cspan.org The Communicators: The Great Debate - What is Net Neutrality?

know it. We argue herein that the RBOCs are proposing this approach because they are in a business whose economics are being destroyed by alternatives. The RBOCs argue that they cannot build a broadband infrastructure unless they "tax" the purveyors of services which, in turn, will be passed down to the consumer. Why not just raise their price to cover their costs? Then they could not compete with the cable incumbent. This is not an economically logical method.[263]

One of the more recent arguments in the RBOC camp is the argument based upon the principle of multi-sided markets as propounded by Rochet and Tirole and specifically by the RBOC polemicist Darby. The essence of this argument is that it is costly to build fiber to the home. The cost of this exceeds what may be gained for the service in an open market. Thus, since the other parties benefiting from this service, such as Google et al. are making potentially a significant amount from it, they should be charged as a player in this multi-sided market. The implications of this are; first, that such a charge becomes a "tax" on the consumer since all such charges flow down to the ultimate player; second, the whole premise assumes that the RBOC belief and execution of a FTTH network is the sine qua non of broadband is open to pure speculation from economic basis. FTTH may actually be "best" technically from a data point of view, however, but even that is open to debate. Do the RBOCs truly believe that taxing is permitted if you're providing a "vital service to society" as they believe that they are doing, albeit at a high cost? That is to be seen, but doubted.

There are wireless options and there are independent small fiber operators who present open market competition. Why should we allow a large incumbent to tax everyone for what is a proven inefficient means of distribution? Perhaps FTTH is a better long term solution, perhaps not. Wireless can provide 100 Mbps and more and FTTH can do 10 Gbps and more. Do we have a need for 10 Gbps at this time, no but the demand may follow. Is this the reason to create a tax, in anticipation, and to advantage just one player? We feel not. We follow this argument in detail herein.[264]

The view from an incumbent is that, in order for them to survive, they must be able to provide video and broadband in a greater degree than is done with DSL. They realize that DSL is a cumbersome and limiting technology and that the Cable companies have greater capacity. They desire to build FTTH but they understand that this is very costly and delay prone with the franchise problem. In addition, they view the cable business model as one to their liking; they perceive the cable model as one where the cable company gets a piece of the total revenue generated; namely, the video content providers get a percentage of the revenues from video content distribution. The perception is one of sharing in the

[263] We show in this section the economics of CATV and FTTH. The analysis of the economics is compelling. The CATV players can achieve for far less what the incumbent RBOC can for excessive amounts.

[264] Even more significant is the fact that in the wireless domain we have just seen almost a billion dollars spent on a McCaw wireless WiMax system by Intel and Motorola. We also have first-hand knowledge of FTTH as builders of them and we see that the main costs is the franchise, a government tax if you will on any new entrant. The new telco laws being proposed eliminate this but they still leave behind an large inefficient carrier spending grand sums in a highly questionable economic manner. The market should determine the correct technologies not government regulation.

gross sales and they would like to emulate this model. They see Google making money every time someone clicks on an ad which Google has on its screen and they would like a share in that revenue. This is regardless of the fact that they have no claim to it, putatively owing to their designation as common carriers. This is also regardless of the fact that they could never create this also; just look at the fact that the RBOCs owned the yellow pages and they let this asset miss the Internet revolution. Also just look at Verizon' loss of more than $250 million on its failed attempt to get into video content as a studio. Clearly their record is dismal when it comes to content. They fail to understand that the cable companies themselves created most of the content; MTV, HBO, Showtime, Nickelodeon, etc. were all investments and creations of cable companies.[265] Notwithstanding any sense of reality or the facts, one can see and hear in Whitacre's statements and in the Verizon remarks and comments that they want to share in the upside.

9.2.1.2 Cable TV Camp

The CATV providers are starting to find themselves in a bit of a bind. They never were a common carrier and in fact eschewed any resemblance to that at all turns for reasons of exemption from regulation. They are packagers of entertainment. They are the intermediaries between the content makers and the customers, in that they put entertainment packages together and present them to the consumer. In addition, the CATV carriers use coax -which has limited bandwidth, most of which is already occupied with video - to the home and rarely do any fiber direct to the home. Thus, in a CATV broadband service, one shares a channel with many other homes and there is no way to achieve any bandwidth comparable to that of the fiber plant directly to the home. Thus, cable companies have two "advantages" in this battle; they were never common carriers and they don't have much bandwidth to allocate even if they were expand takings 750 MHz illegal demand more manage local network risk of liability for discriminate change[266]. However, there is a bit of a problem looming on the horizon for the cable companies. The mere fact that content providers can provide video on the Internet implies that the cable companies could be disintermediated by an Internet distribution strategy. That is, a third party, possibly the studios themselves, could use the Internet to establish a

[265] Cable history is telling. In the late 1940s in town like Altoona, PA, rebroadcast of TV was important since the town was in a valley and could not get over the air. The local entrepreneur used an antenna, captured the signal and transmitted it over coax. Then in the late 1970s and early 1980s Cable began to go for large municipal franchises, the large cities; New York, Boston, Chicago, Pittsburgh, Houston. Dallas, and many more. The senior author was deeply involved in many of these at the time. These required providing more and more channels but there was not the content. Thus the Cable companies "invented" and "created" the content at their own cost. From this came MTV, Showtime, HBO, Nickelodeon, and many more. The Cable companies invested in the future. One should also remember that HBO almost died but for RCA and Scientific Atlanta. It was 1976 when RCA launched the satellite and SA provide low costs receive only terminals, before that the distribution costs and market share of HBO were minimal, after that it grew hyper exponentially. Cable made the investments in content, it created content. The RBOC have a dismal record in doing that, in fact we have seen that they have actually been content destroyers. Now they want a piece of that content.

[266] The CATV system inherently has limited bandwidth. As example there may be fiber to local subhubs but coax from there to the user. As such it may have little excess capacity. Any demand to add more capacity without any additional recovery from revenue is a takings.

distribution channel which fails to compensate the CATV company properly for its assets, namely the "get" transport only. This is the risk that CATV players see arising.

The cable companies are more interested in avoiding disintermediation. They don't want to see the Internet used as a way to go around their basic business model. The see themselves as a packager and local distributor, bringing and offering content. They do not want to have to lose that by allowing content providers to reach the customer directly over the Internet. If the content could be provided over the Internet, then they feel they would lose the core of their business. They have a point. Of all the players, the cable companies seem the most logical.

9.2.1.3 Internet Content Providers Camp

The content providers sell content, or whatever is in their business model, directly to the end user. They use the Internet to connect to the customers but the connection is precipitated by the customer. Content providers do NOT at this time target customers. For example, if I were to buy a printer on-line from Staples, then I shop around and select Staples, place my order to Staples, and Staples consummates the transaction. They may use UPS to deliver the product. UPS charges based upon weight, distance, and time to deliver. A small package over a short distance with no time restriction ma costs one price to UPS, and then to me; or a large package from a distance delivered in one day may cost me, ultimately, a greater price. Content providers have used this model for centuries. We shall discuss this later. UPS does not charge by what is inside the package, unless of course it is hazardous and requires special handling, such as hydrochloric acid shipments.

This is the most difficult to understand. Clearly, they do not want to be taxed by the RBOCs. One might also conclude that, as content providers, they would want as many distribution channels for their products as possible. But anyone familiar with basic marketing knows that one can have channel conflicts. Thus DVDs conflict with theatres, and conflict with cable. Over the years the players have reached agreements to sort this out. This may occur between cable and content providers. But one may ask does this model go further? Do some of the players in this model world truly desire that there should be no charge for increased bandwidth or service. Does this group argue for unbundling and common carriage? Frankly that is what we explore herein.

The three schools of thought are important to understand. The content provider school is the classic approach based upon seven hundred years of English law. It was the basis for establishing the whole construct of transport of goods and was the basis for the English law system which allowed England, and then America, to flourish as centers of world trade. The only attempt to negate this was the taxes by George III called the Tea Tax, and anyone familiar with US history knows the impact that had: the Boston Tea Party and ultimately a revolution.

9.2.2 Basic Principles

The principles that guide the remainder of this work are as follows:

1. The Government should not get in the middle of deciding technologies or market winners. The Government's role should be de minimis and focused on protecting rights of the consumer.

The history of the FCC interfering directly or otherwise and getting it wrong are too numerous to mention all. The FCC for example stayed out of the TDMA and CDMA debate. The FCC did get into the issue of digital television, a project still not complete, if ever. The FCC after much struggle stayed out of the HDTV debate, and the result was somewhat positive.[267]

2. The market will often be the best selector of the best alternative. Any interference with a free and open market will bias the result and will generally end in an unbalanced and not at all survivable alternative.

One could argue however that the antitrust issues should be the sole purview of the Government. We argue herein that the Government even here is at best weak and at worst destructive (see Trinko case discussion latter in this section). We argue that litigation on behalf of the consumer is the true key.

3. The consumer is key and the consumer has certain rights which have not been clearly explicated. We will argue herein that the consumer indeed has property rights in the packets that he sends out across the network; that the packets are enclosed and packaged for security purposes; and that when these packets are handed over to a carrier bailment is established, a duty on the part of the bailor to care for the package (in essence, common carriage duty).

These basic principles lead us to major conclusions. Key to these conclusions is that the incumbent RBOC has no right to look inside any of a person's packets to determine their content or where they are going, as this would be a breach of the bailment and is protected under common law. This argument we will develop in detail.

[267] The classic case of indirect control by the FCC was the story told by Bob Kahn about how AT&T lost the Internet at the very beginning. Kahn relates how when he was at ARPA in the early 1970s he went to Bell Labs, Murray Hill I believe, and met with a large group of Bell Labs folks, always a large group in those days since that is what distinguished AT&T, large attendance at any meeting. He asked that they share with him the AT&T 300 bps modem design so he could have it modified to support the ARPA net use. They not only said no but effectively hell no. They said they were a Government monopoly and that they and only they could deploy such devices. Further they would never share with the Government. Third, if the Government wanted to do this then it should give Bell Labs a big contract and Bell Labs would do what it thought best. Kahn politely said no thanks. Out of they came such companies as Codex (acquired by Motorola), Linkabit (now the Qualcomm folks) and the Meade-Carver designs for ICs. Kahn used the ARPA funds to create the industry which demolished the arrogance of Bell Labs. Ironically it is now the same Bell Labs, what little is left, which supports Whitacre and his broadband goals. They, namely AT&T, rejected the Internet, they rejected content, and now they want to be compensated.

9.2.3 Approach

In this section we take the following approach:

First, we take an overview approach to the Internet reviewing its key elements and then using the construct developed to analyze directions for growth and change. We also use the constructs to establish definitions and understanding for analyzing issues regarding interconnection and control. Our approach in this review is to place the technical and business elements of the Internet into a framework which allows for common use of terms.

Second, we review the issues regarding interconnection and access. The issue here will become a key factor in understanding the relationships among the parties. There is a well established school of thought which has provided a set of analytical tool which justify the status quo. We reject those classic tools and re-examine the interconnection issue from a business perspective while respecting the technical elements which make the separate parts function.

Third, we address the concepts of property, bailment, common carriage, and common law. Here we argue that the packets we personally create in communicating on the Internet are our property and that any carrier is indeed a common carrier. In addition, we argue that the true legal venue may very well be common law since common carriage, property, bailment, and damages are over a thousand years old in the well accepted set of common law principles. Thus, the way the Government may want to control the telecom world is via administrative law, but the way to seek redress remedies is via common law.

Fourth, we review the current FCC rulings and recent Supreme Court rulings as regards to the world of the Internet. It is clear that the FCC has taken a stronger position of supporting the incumbent at the adverse result to new entrants. We review those elements. The FCC, under the current administration, has clamped down on opening the network and has added to the Internet purveyors the burdens of the well established telecommunications providers. The new changes to the telecommunications act we suspect will further increase that burden.

Fifth, we lay out several recommendations to be considered by policy makers in this area. When the net telecommunications law is enacted - and we suspect it may very well be this Session of Congress, but one never know - the FCC will have the authority and responsibility to interpret and manage it. This will be another great challenge. We look at several of the challenges in this area and we see that the issue of Internet Neutrality is not a separate issue in its own right; but rather a fundamental issue regarding the individual and his property rights.

9.3 How the Internet Works

The Internet is a collection of networks and subnetworks using the TCP/IP protocol. It is a relatively dumb network wherein end users have an address called the IP address. In the early 1990s, several large carriers ganged together to provide a backbone. The backbone providers such as AT&T and BB&N, now Level 3, had actual backbone network facilities and agreed to interconnect their networks. Each of these large carriers provided access to some subset of IP addresses. In this section, we present the structure of these carriers and how they relate to one another. In the subsequent section, we talk about interconnection and access, and then tie the elements together into a legal framework.

9.3.1 Internet Structure

Let us now consider the actual structure of the Internet. The Internet is simply a network of networks which have agreed to use the TCP/IP set of protocols as specified by the Internet Engineering Task Force (IETF). The specifics are contained in what are called Requests for Comments (RFCs). The RFCs are consensus and living document specifications which describe how one gets around the Internet. There is no real central control. It does not exist and, in fact, is anathema to the Internet construct.

There are several general elements that need defining. They are:

9.3.1.1 IP Addresses

IP addresses are the way one user on the Interne connects to any other user. They provide a sense of unique identity to any entity on the Internet. The IP address is a set of numbers in the range of 0.0.0.0 to 255.255.255.255. This is 2^8 times 2^8 times 2^8 times 2^8 possible numbers, or a total of 4.3 billion possible addresses.

Consider a simple fictitious example, in which there are two Tier 1 carriers: AT&T and Level 3 which cover a set of IP addresses as follows:[268]

AT&T covers 000.000.000.000 to 128.128.128.128
Level 3 covers 129.0.0.0 to 255.255.255.255

Inn this simple and hypothetical example, the two ISPs cover all possible IP addresses, and if they further agree to interconnect, then any customer of one can connect to any customer of the other, and thus there is full Internet connectivity. If, however, there are

[268] In order for a computer to connect to the Internet it must have an IP address. There are around 4 billion possible IP addresses between **0.0.0.0** and **255.255.255.255** and, excluding a few set aside for special purposes, most are valid for use on the Internet. (See http://www.rhebus.com/techinfo/iprange.htm)

many such addresses but they are clustered in a different and separate manner then there must be another way to ensure full connectivity.

For example let us define a sample IP address co-location as:

$$IPA_k = \{\text{all IP addresses belonging to ISP}_k\} = \bigcup_{n=1}^{N} IPA_{n,k}$$

Then to cover all IP addresses we must select all the ISPs which cover all the addresses. Namely;

$$IPA_{Total} = \bigcup_{k=1}^{K} \bigcup_{n_k=1}^{N_k} IPA_{k,n}$$

must be the total set of IP addresses. Otherwise we will have a small island of unreachable addresses. Now the question is how do we treat these various ISPs and do they have some form of pecking order. If there are several large ISPs and many small ones, is their any form of parity? What are the policy and legal issues regarding these relationships?

9.3.1.2 Tier 1 ISPs

At the beginning of what has become the Internet, the period of the late 1980s, there was a collection of large players including such companies as IBM and MCI who banded together to assist in the development and operations of the backbone. These players expanded and became what we call Tier 1 ISPs. A Tier 1 ISP generally is a facilities based carrier which has global coverage and has in its own network adequate traffic to bring to the table to appear as a peer to the other larger carriers. The Tier 1 ISPs are effectively a closed club of carriers who have agreed to interconnect and when one looks at the IP addresses that these carriers cover it represents almost all of the Internet. It is important that one recognizes that they are almost all and not all: there are small islands of IP addresses which may not be covered (these will be discussed later).

The current list of Tier 1 ISPs includes the following:

1. AOL Transit Data Network (ATDN) AS 1668
2. AT&T AS 7018
3. Global Crossing (GX) AS 3549
4. Level 3 AS 3356
5. Verizon Business AS 701
6. Nippon Telegraph and Telephone Corp. (NTT) (Verio in the US) AS 2914
7. Qwest AS 209
8. SAVVIS AS 3561
9. Sprint Nextel Corporation AS 1239

10. Google [269]

In the above list we also have provided the carriers AS number which stands for Autonomous System. This is the number which the ISP has for overall network interconnection purposes.

9.3.2 Peering, Transit and Overall Interconnection[270]

The issue of interconnection in an IP framework is described by the terms peering and transit.

Peering is usually a bilateral business and technical arrangement, where two providers agree to accept traffic from one another, and from one another's customers (and thus from their customers' customers). Peering does not include the obligation to carry traffic to third parties. Peering relationships are costless, as all Tier 1 ISPs agree to carry each others traffic for no cost.

Transit is usually a bilateral business and technical arrangement, where one provider (the transit provider) agrees to carry traffic to third parties on behalf of another provider or an end user (the customer). In most cases, the transit provider carries traffic to and from its other customers, and to and from every destination on the Internet, as part of the transit arrangement. Transit involves one party paying the other. Thus, a Tier 2 ISP must pay a Tier 1 ISP to carry their traffic.

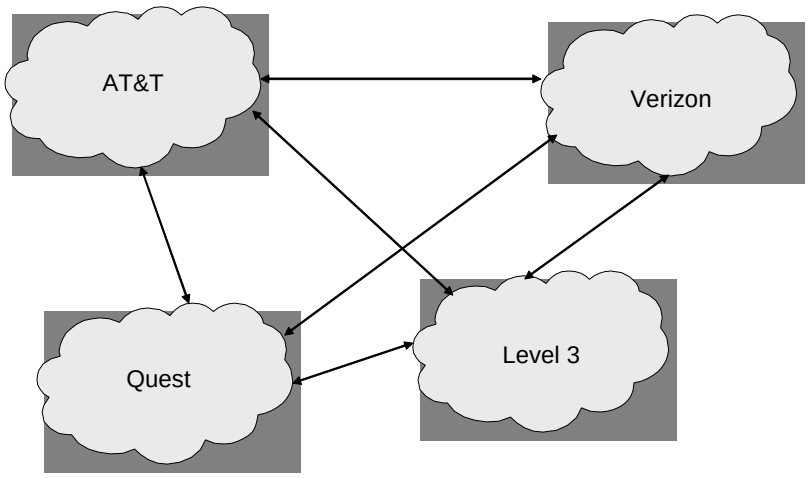
Peering thus offers a provider access only to a single provider's customers; transit, by contrast, usually provides access at a defined price to the entire Internet. Peering is done on a bill-and-keep basis, without cash payments, where both parties perceive roughly equal exchange of value; however, there is often an element of barter.

The Internet backbone, as defined by the collection of all Tier 1 ISPs, can be viewed as below. Each domain of a Tier 1 can also be considered as what is defined as an Autonomous System (AS) and they are assigned an AS number. Within an AS, the routing is controlled by the Tier 1 carrier. The routing between the AS domains is performed by Border Gateway Protocol (BGP). Each AS has a BGP which allows them to interconnect with each other, and ultimately any IP can connect to any other IP - almost. There may exist orphan IP addresses. An orphan address is not part of the connectivity of the BGP and AS networks, and is thus unconnectable. For example, there may exist National Internet Exchanges (NIXs) which are totally contained within a country. For example, in Poland and the Czech Republic early on the local ISPs

[269] The senior author was informed of this while meeting management at Google in Mountain View. It is not at all clear that this is true. We have tried to verify this but to no avail.

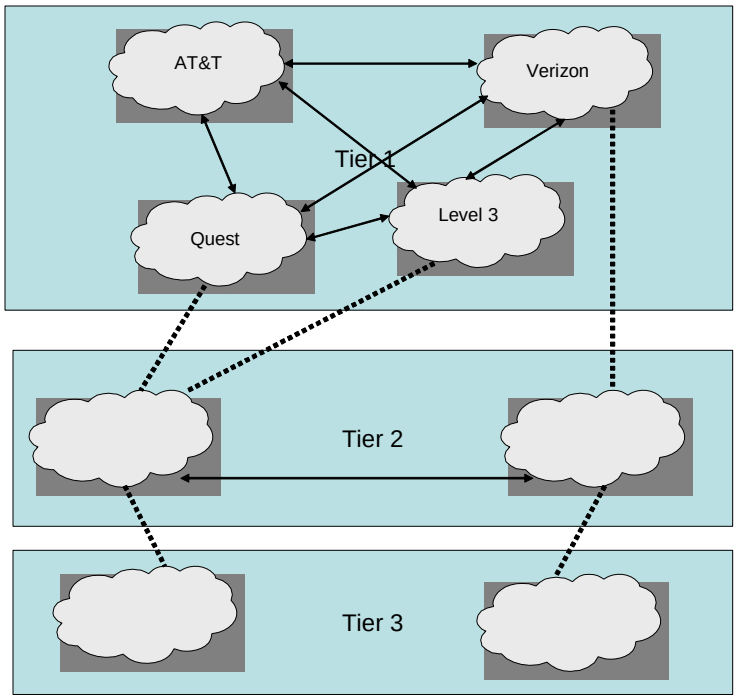
[270] See McGarty, *Peering*, 2002 for a full discussion as well as details on the agreements and legal standing of peering agreements. Also see McGarty, MAE Europe Business Plan, 2002, for a constructive model of how the Tier 1 carriers could be disintermediated.

connected in a single point but they did not connect to any Tier 1 carrier. They just connected to each other. Local email could be sent and local web pages viewed, and it was cheap - because no Tier 1 carrier needed to be paid - but it was limited. If, however, any one of the small ISPs did have a Tier 1 connection then all the traffic leaked through that portal.



Tier 1 ISPs: All connections are “peering” connections and are at no cost between the Tier 1 Carriers. Each Tier 1 carrier connects to some bundle of IP addresses. Thus if one wants to get to all IP addresses then one connects to a Tier 1 who putatively connects to all via peering.

Now, we can expand the concept of Tier 1 to Tier 2 to Tier N. Tier 1 entities all peer, and Tier 2 entities may peer with each other but transit with the Tier 1 entities.

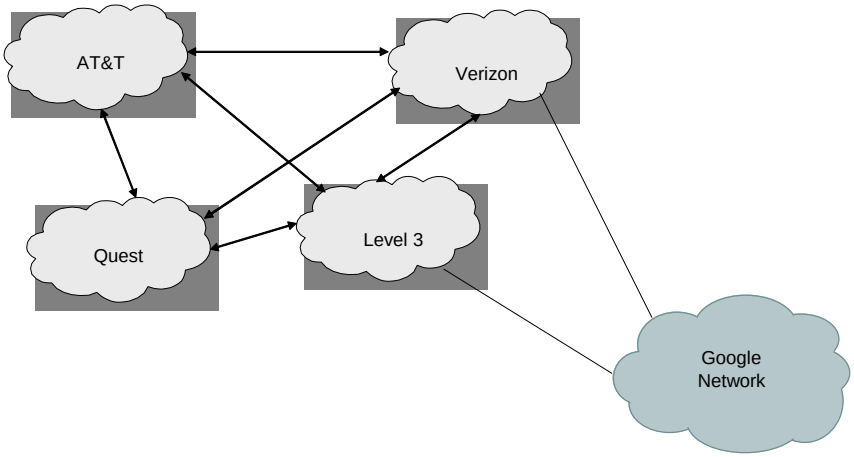


9.3.3 Connections to the ISPs

The next element to understand is where a content provider connects in this world of the Internet. The following Figure depicts this connectivity. Let us assume Google connects to Level 3 and also to Verizon. The two connections are for redundancy and reliability, just in case one of the Tier 1 carriers fails.

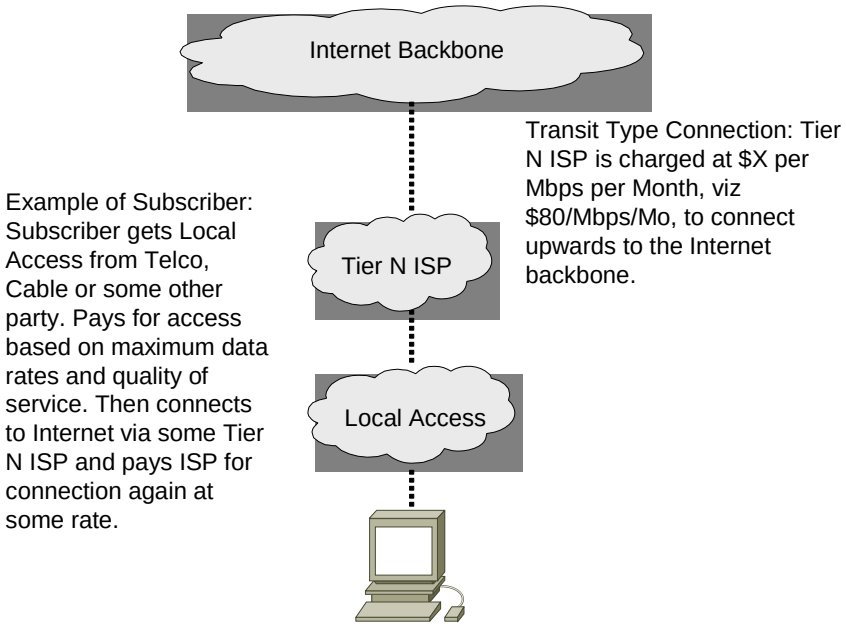
Google pays these Tier 1 carriers a fee for interconnection.[271] It is very much like any other Internet player; namely, it is on the basis of dollars per Mbps per month. It is competitive since there are a reasonable number of ISPs and they are all looking for the traffic. Thus, with a small market, there is some reasonable basis for price competition. It is clearly not a monopoly but is not a fully open market either; it can be viewed as a weak oligopoly.

[271] This assumes that Google was a non-Tier 1 ISP. If, however, Google is indeed a Tier 1 ISP then there is no cost. In fact the whole basis of the argument between AT&T and Google regarding content would be vacuous. In the case a peering agreement, then by contract the agreement would provide for costless interconnection. In addition AT&T would have no standing if such an agreement exists since it would become a fait accompli in terms of contract law.



Google Connects to the Internet Backbone at a Tier 1 Level. It pays the Tier 1 Carrier a Rate for access on the basis of $X/Mbps/Mo. It may have multiple connections for diversity purposes.

At the other end, we look at what the customer is buying. The customer buys two things: i) transport to or from an ISP meet point, namely a point where the ISP has a router and a presence, and ii) transport from their residence of place of business to the meet point. A local ISP may or may not also be the transport entity. For example if I buy Verizon DSL then Verizon is my local ISP and my Tier 1 ISP. However, if I have a dial up connection then the local access may be from Verizon but the Internet access may be from Earthlink. In that case, Verizon has a connection to my home and Earthlink has a set of connections which may be co-located at a Verizon Central Office. Now consider another possibility, say I get my access from Cablevision. It provides a connection to its facilities and to its Internet node. I may not have a Cablevision account, since I may have a separate IP address at say Verio, owned by NTT, and they provide a server and support my IP account. Unlike the Verizon dial-up and Earthlink example, the Cablevision example has Cablevision doing both, they bundle me to my Verio account, even though they do not provide me with any direct internet service.



Now let's explore this a bit further. What am I buying from each of these entities? I am buying access to the Internet backbone and anyone who is on it. But more importantly, I am buying a limited amount of access, not an unlimited amount. Let's see why.

Assume that I buy my access from Cablevision. They connect to the Internet backbone and they pay a Tier 1 carrier say $25 per month per Mbps. This means that, depending on the formula, they take all the traffic in Mps per unit time, call this T(t), and they integrate over a month and divide by the number of seconds to yield an average rate. Let this total traffic be:

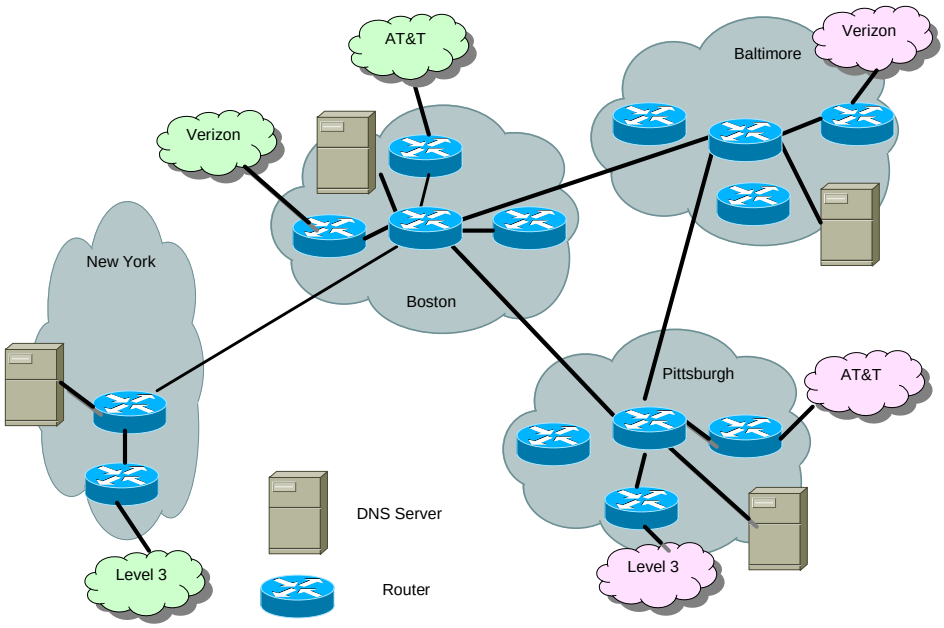
$$T_{Traffic} = \frac{\int_{Day1}^{Day30} T(t)dt}{30\text{days}\times 24\text{hours}\times 60\text{min}}$$

As long as this is less than 1 Mbps average then they pay $25. If I decide to look at an HDTV movie on streaming video at 20 Mbps for 3 hours a day every day of the month then my usage is 1/8 of 20 Mbps, or almost 3 Mbps! That means that I am using three times the maximum capacity. That also is not what Cablevision is selling. What they are selling for a $29.00/month rate is, at best, my access to the 1 Mbps circuit share with ten other users, or 100 Kbps on average. Namely for me:

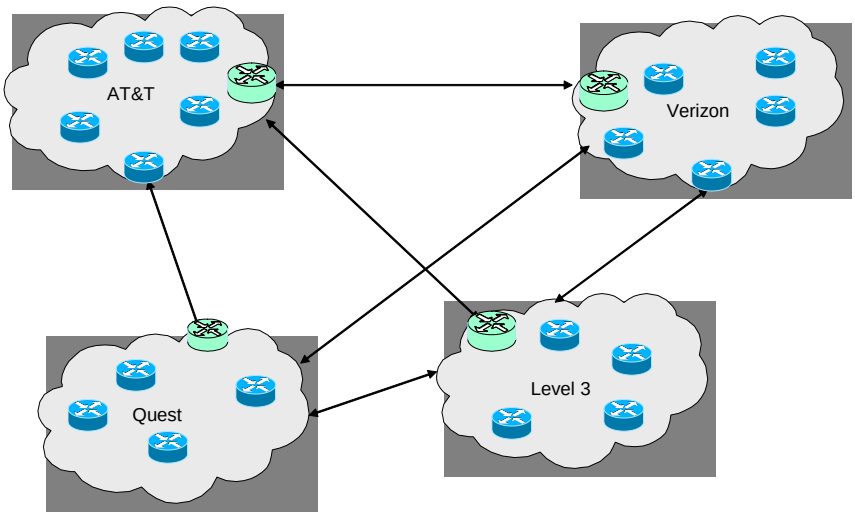
$$T_{Traffic,Me} = \frac{\int_{Day1}^{Day30} T(t)dt}{30\text{days}\times 24\text{hours}\times 60\text{min}} \le 100Kbps$$

This is what I have really purchased. This if I were to watch an HDTV 20 Mbps video, I could see the video only for 216 seconds and then I ran out of capacity! If I wanted to see more I would have to pay more to Cablevision; otherwise they would be losing money on me.

One of the questions regarding Internet access is do I have the "right" to get as much as I want from my provider or does my provider have the right to charge based upon usage. Clearly, usage-based charging is the only way to work, because there are usage-based costs which must be covered. Thus, if I want to get something from the Internet where the Tier 1 Carrier charges, then I must pay that cost plus for the cost for that access. What the "plus" is, is open to negotiations but no company can be in a business where it loses money.



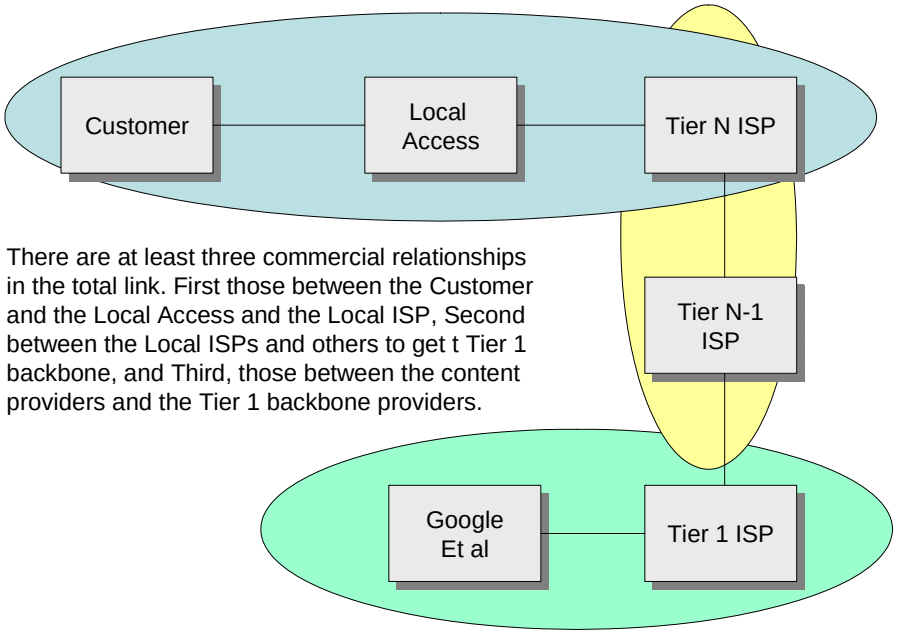
A more general structure of the Tier 1 players is shown below. We show here two key ideas. First, we see that each Tier 1 ISP interconnects to each other at some one or many points. The interconnections are performed generally through use of the BGP. The second idea is to observe that within each Tier 1 ISP's network, there are routers and routing tables which they control with which they manage their network but as a result of which quality of service is dictated. Within the network of any Tier 1 ISP there may be many specific control elements, limitations of bandwidth, blockages, data and traffic overflows, so that in going from one point to another and with some Tier 1 ISP in the middle, one may suffer significant delay.



Within each AS there are many multiple router hops and a routing strategy which may be totally unknown to the outside. The BGP in the edge routers control between AS, Flow within the AS are optimized for each separate Tier 1 carrier.

Is there a way around the delay? The answer is generally yes. One can move the sources of content closer and go around the Tier 1 carrier that is blocked. This is the Akamai approach of placing remote servers and content caches in remote locations so as to manage service quality. This is a backbone solution not a local solution. It can be extended locally but there are architecture issues which are critical.

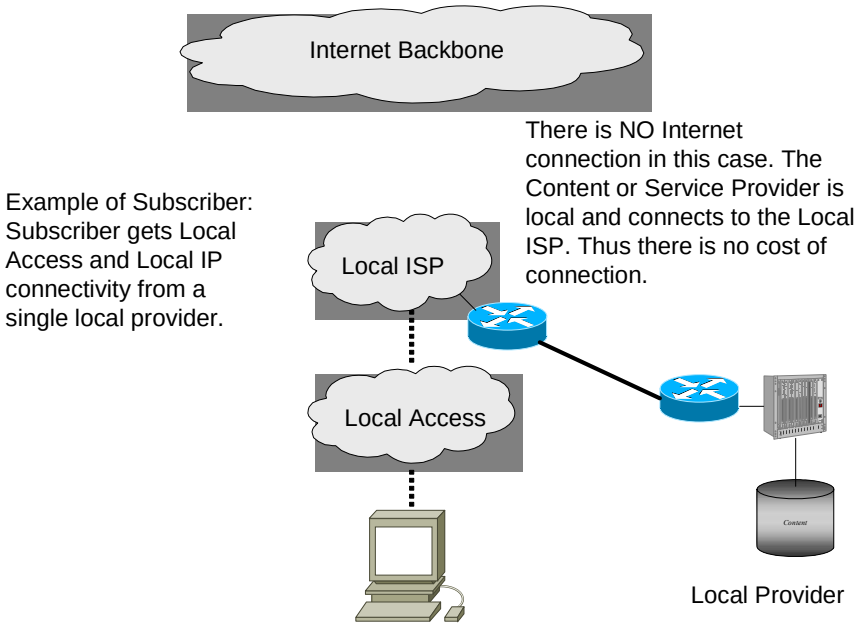
Putting all of these elements together we obtain a Figure shown below.



What we see in the above figure is a depiction of the players from a supplier to a user and the interaction of all the players in between. Google, if it were a Tier 1 ISP as alleged to the authors, then would be its own Tier 1 interface and its connection to all other Tier 1 players would be a matter of contract. If that were the case all the issue of Network Neutrality, whatever that is, would be moot, since the issue is not telecommunications law but contract law.

9.3.4 Local On Net Connectivity

This discussion of the backbone, its capacity, its performance, and is control begs another question: what if there is no Internet cost and that all the backbone players were irrelevant. Let us consider the following example as shown in the figure below. Here we have a local content provider connected to the local ISP. There is no Internet backbone connection. What becomes of the economics of the local ISP and access provider in this case? The costs to this provider are the costs of his transport. Let us look at two cases: FTTH, fiber to the home and cable television. They are fundamentally different. We shall call Case 1 the FTTH case and Case 2 the CATV case.



9.3.4.1 Case 1 (FTTH):

In this case, the local operator, say Verizon, has built and deployed a FTTH system. It consists of a single strand of fiber to a residence. The capacity of the fiber is at least 10 Gbps. The telco charges say $40 per month for Internet access. Recall that this rate is based on a competitive rate assuming that there is a backbone Tier 1 interconnect, albeit Verizon is interconnecting with itself. Let us assume they still have some imputed rate.[272] However if I desire to have access to a local content provider with no interconnection costs, then if I use 100 Kbps continuously or even 10 Gbps continuously there is not marginal increase in cost. Thus, putatively I need not be charged for that element. If for example Warner Studios wants to put a server in my town and I can then get access to al the Warner products at 20 Mbps per TV set and I have 10 TV sets this is 200 Mbps and is still a fraction of my capacity even if I watch it continuously!

9.3.4.2 Case 2 (CATV):

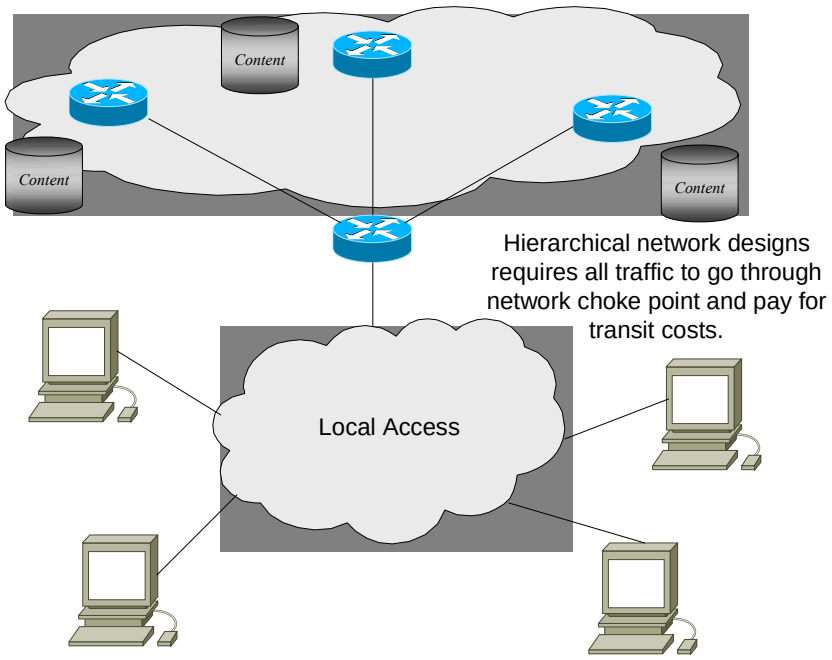
The CATV network architecture is comparable to the Telco in that it is a hierarchical network structure. Namely there is a headend and then the network is deployed in what is tiered a tree and branch design. This means that if any user or user set desires to communicate with any other user or user set then this can only be accomplished via an interconnection through the backbone Internet. In asking to place a call across the street, the call may have to go through Bangkok as a hub. Not a wise choice. Furthermore, the

[272] This may be a critical issue however. If Verizon connects as Tier 1 to itself then the logic we went through before does not imply. They have a de minimis cost of interconnection as a Tier 1 provider. The same does not apply to the CATV companies, none of which are Tier 1 providers.

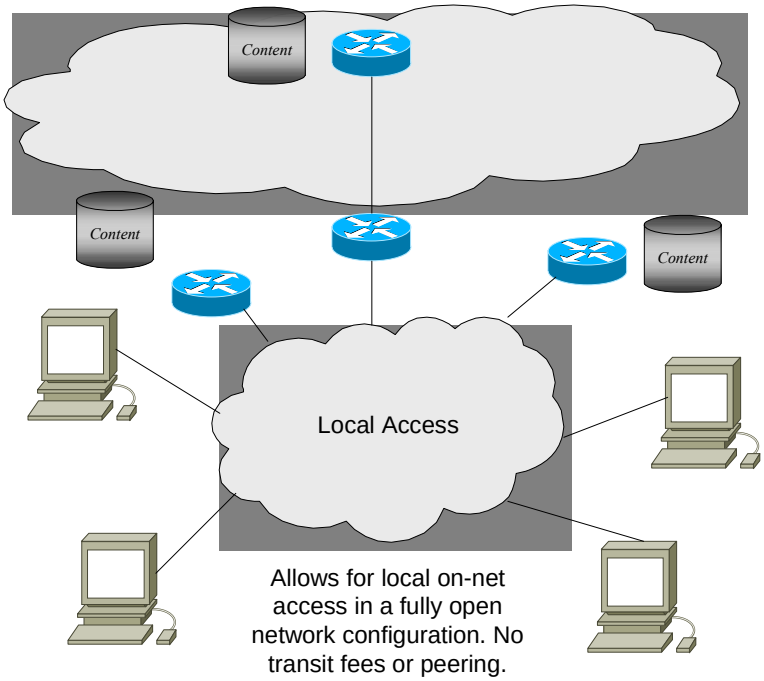
CATV carrier has very limited bandwidth to the home if they are employing a coax system for the last distribution capability.

9.3.5 Local Networking Extensions

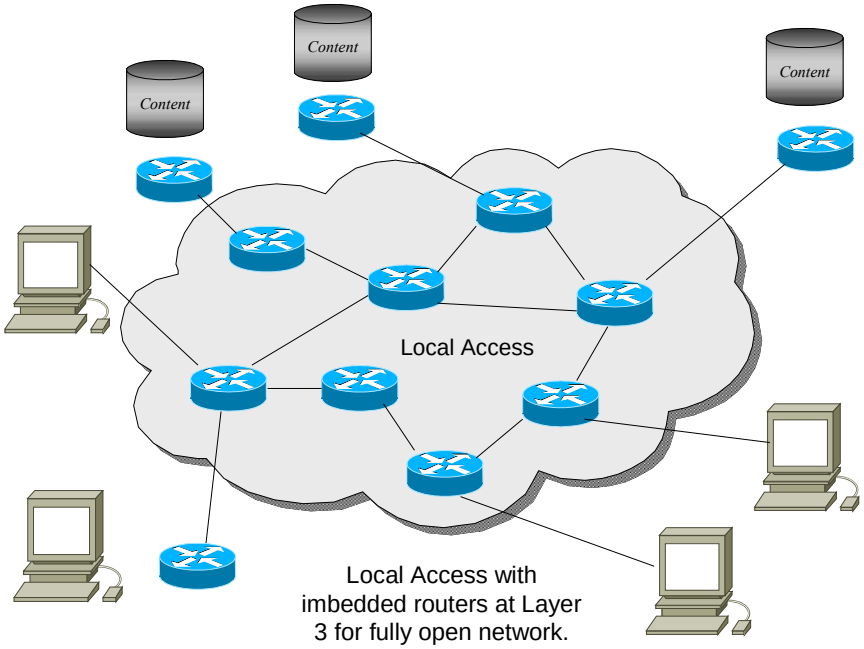
A typical local network of an RBOC or CATV carrier is shown below. All content is accessed on the backend of the headend or other central facility. Providers of local content must make separate arrangements on that side to connect and such arrangements impair the local entrant by adding costs and other overhead expenses such as co-location and operations support.



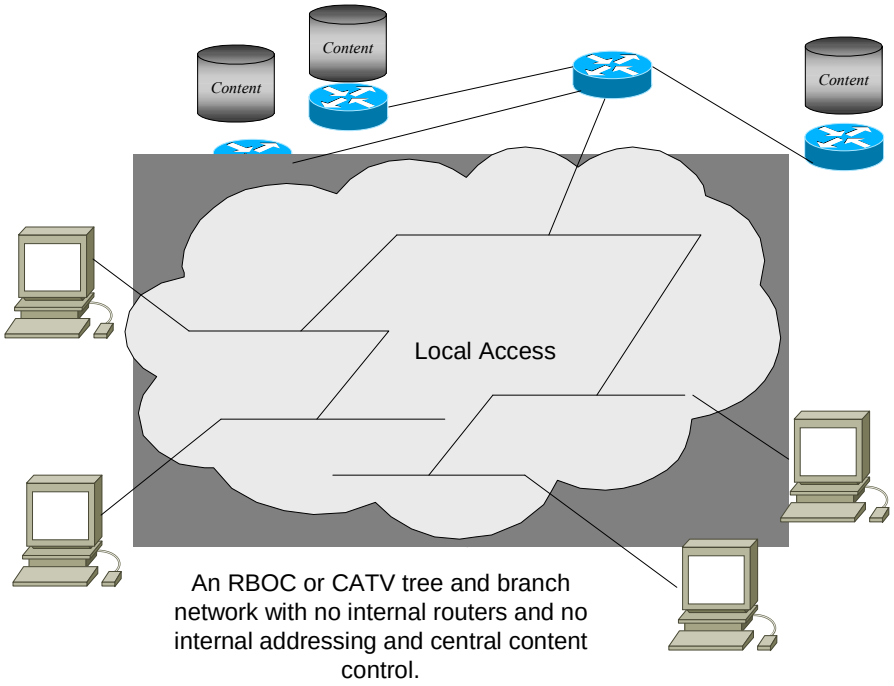
In contrast, the local operators in an open network should be able to interconnect locally and be able to interconnect via the local network. Thus, there is no travelling over the Internet backbone and the transit costs are reduced to zero. The problem for an RBOC or CATV operator in this design is that it opens their network up for significant disintermediation. Thus, almost universally such a network design would be discouraged if not outright prevented. However with the advent of certain municipal and WiFi mesh networks, this design may be in the development and deployment stages. Such a network creates a local Internet where now the small local, or even regional, network takes on the flavor of an "AS" as one sees in the Tier 1 carrier networks; namely sub net routing in the network.



To show the details of the sub-netting permissible the following figure depicts that architecture. It shows the local network with routers. Those routers may each be part of an 802.11 or 802.16 mesh access point which performs a Layer 3 or IP level function. The router capability so deployed allows for improved network access, better load balancing, improved security and potentially improved quality of service.



To contract the above with the incumbent RBOC and CATV players, the following figure shows the typical tree and branching architecture. This is classic CATV co-ax layout but also is inherent in most of the RBOC fiber designs. This approach again forces all the IP functionality back to a headend and the network is at best a layer 2, MAC layer approach.

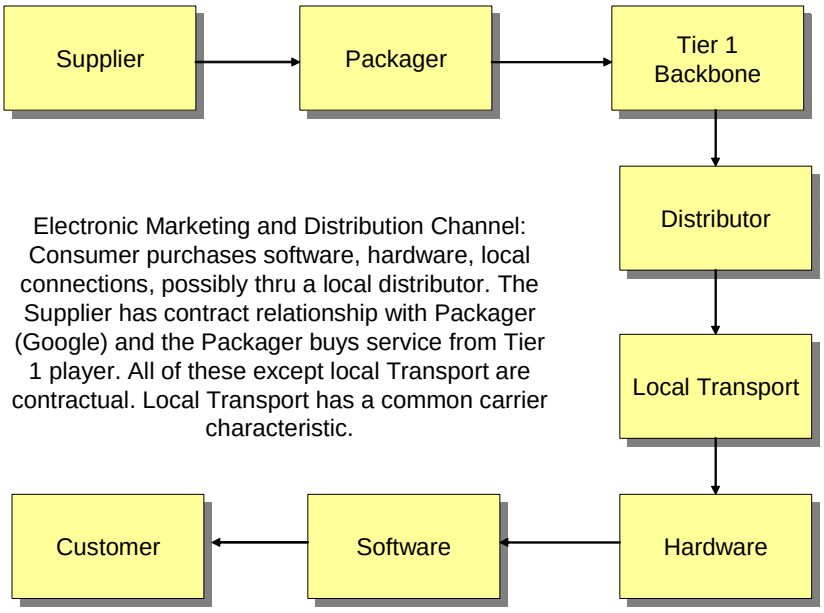


An RBOC or CATV tree and branch network with no internal routers and no internal addressing and central content control.

9.3.6 Market Forces

The next question we look at is the issue of who are the players in Internet transactions, what are their relationships, and what is the economic environment they find themselves in? One of the issues we keep seeing in Internet Neutrality arguments is a focus on one player and total disregard of the total food chain. The one player tries to make their role out as special and then uses that perceived special role as the basis for special treatment.

Consider the link of players shown below. This is the collection we see when looking at what we call the electronic marketing and distribution channel called the Internet.



The players in the above chart are described below:

Player	*Function*	*Relationships*
Supplier	The supplier is the basic provider of a product or service. It may be a movie studio or a game company, a seller of clothing, a book dealer. The supplier may be Continental Airlines, McGraw Hill Books, Chase Bank. They are the fundamental suppliers of products and services.	The supplier has a contractual relationship with the Packager.
Packager	The packager is the entity which facilitates the supplier's access to the customer. In one sense, it is a wholesaler, and in another sense it is a retailer. The Packager facilities the access of any supplier, and may bundle suppliers together.	The Packager has a contractual relationship with the Tier 1 provider. This is generally a bulk data transport relationship. The more traffic, the lower the per unit costs. There are many Tier 1 players as we have shown and thus there is a competitive market of sorts here. The market has oligopolistic features but it is somewhat efficient in price.
Tier 1 Transport	The Tier 1 transport is the facility or set of facilities we have been discussing. They take the packager's electronic storefront and allow it to be spread out over a large area.	The Tier 1 carriers generally have agreements with packagers on one end and local Transport on the other. The local transport agreements are transit agreements and again since there are many Tier 1 players, there is somewhat of an efficient market at work.

Player	*Function*	*Relationships*
Distributor	The distributor is a role which may or may not be played. For example, the CATV company is a local distributor of video content. It puts a local package together, and it is the distributor with whom the customer relates to the facilitation of the services. In the physical world, this may actually best be seen as the shopping mall operator.	The distributor may have customer agreements, such as with a CATV company. The agreement may be for bundling. The distributor may add substantial value, as in the case of a CATV company which packages video channels, or it may not.
Local Transport	Local transport is like the Tier 1 carrier; it is indeed a common carrier. It carries requests back and forth and charges a fee based solely on total volume, speed, and quality of service. In many ways, it is the UPS or USPS for local contact. In fact, there may be Tier N carriers in this category as well.	This is the entity which gets the consumer from where they are to the Internet backbone and then to the world. It may also facilitate local networking. It is a network company with which the consumer enters into a contract to provide interconnection. The contract is implied under common law as a common carrier. Common carriage protects the carrier from significant liability which would apply if this were a bailment.
Hardware	In the case at hand this is a computer, mobile phone, PDA, or other end device.	There are multiple ways to get hardware. I can buy it from Dell, Apple, etc. or get it from Verizon wireless, or buy it from Amazon....or many other options, all of which are evolving over time.
Software	This is the software operating on the hardware.	Customer buys hardware and bundled software. The bundling may be done by the hardware provider or the local distributor, or any third party.
User	This is the customer, the one paying for all the stuff we just described!	

The key observations to be made here are as follows:

1. There are multiple players at all levels so there is some form of competition. Markets exists and they are changing all the time.

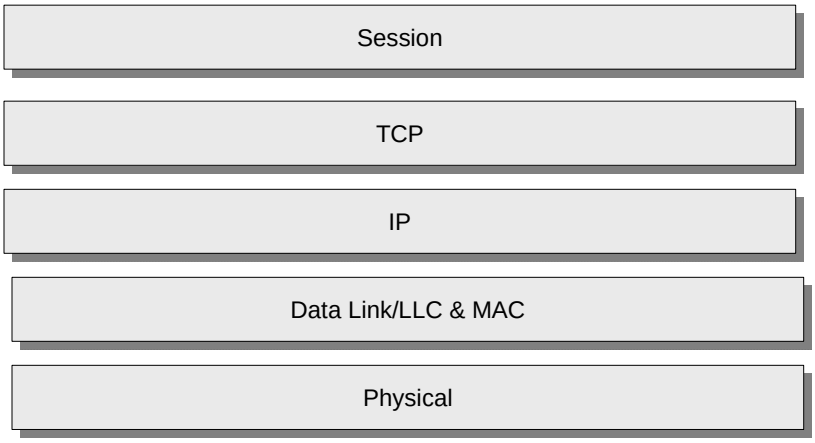
2. There are multiple players along the chain. All or most of them must be available for the process to work.

3. The goal is to get a transaction between supplier and customer (user).

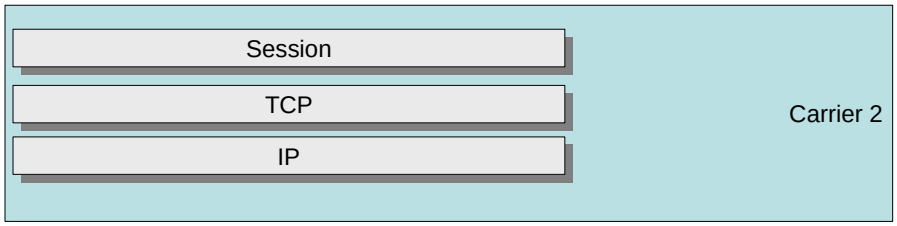
4. The transport players have common analogs in the world of physical marketing and sales; they are UPS, FedEx, USPS. They are carriers, and as we shall show, common carriers when viewed under common law principles.

Now one can look at a sub-variant of this process. Namely look at local transport. It can be viewed in several ways. One is that the local transport is just that, transport. But there is another local transport player who does the IP work. Consider the following figure showing the bottom layers of the protocols required. They are Physical through Session.

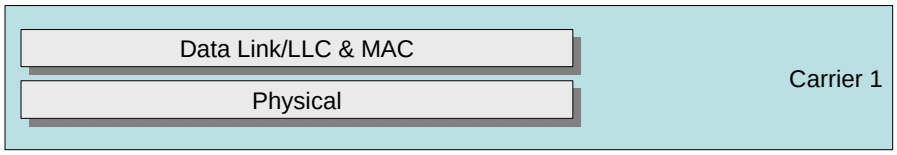
The bottom five layers in a TCP/IP based network are shown below. The Physical layer is the local transport which may be supported by the MAC layer as well. The TCP/IP layers are in between. All of these must be in place to function. Both TCP and Session are end to end.



Now, we could say that there are two players who provide parts of these layers. They are Carrier 1 and Carrier 2 as shown below. This was the old dial up ISP model. However, no one unbundles the layers as shown below anymore. One ,ay ask should the Government force such unbundling? The clear answer is no since it has demonstrated its gross incompetence in doing such with the FCC and the 1996 Act.



Here we assume that there may exist two separate carriers who provide portions of the service, namely an IP carrier, ISP, and a telco or cable transport entity



Now we can ask, does the analysis we performed above apply? Is there some reasons why the consumer buys from Carrier 1 and then Carrier 2. This is what happened in dial-up ISPs. This is the world view used by Yoo in his analysis of Internet Neutrality[273]. Yoo uses this schema to analyze the Internet neutrality problem by focusing on the potential externalities that Carrier 1 brings to Carrier 2. We argue herein, however, that the existence of this model, never truly explicated by Yoo, no longer exists. What exists is a local carrier which provides IP connectivity from the customer's computer to the Tier 1 backbone. The consumer gets to choose and select that carrier in an open market framework. Namely the consumer can choose telco DSL, telco FTTH, municipal networks, WiFi (municipal and private), WiMax, and even satellite. There is a market for local IP connectivity.

9.3.7 General Observations

Based upon the above review and analysis of the Internet and its relationships, we can reach a set of key observations which will be important going forward:

1. Existence of an Internet Backbone Market: The Tier 1 carriers are multiple and they have a limited form of competition. It is somewhat of an oligopoly market, but with limited competition. A customer may seek access and interconnection is a reasonably well established equitable market. There does not appear to be excess profits as one would find a pure monopoly.

2. Lack of Openness in Incumbent Local Networks: The cable operators and the incumbent monopolists have network architecture for local access which are all inherently closed and hierarchical. They are not open networks and deliberately prohibit open on net access and interconnectivity. This establishes a barrier to entry for what they may perceive as competitors seeking to disintermediate their services.

3. Openness is obtainable in Certain Wireless Networks: In the municipal and private non-incumbent wireless architecture, there is inherent openness in the networks. This may allow for significant change in market positioning and entry.

4. Existence of Multiple Players and Competition in All Elements of the Channel is Clear: The distribution channel composed of all market elements and players shows considerable existence of multiple alternatives. There are many Tier 1 players, there is an evolving market for local access players, wire and wireless, and there, of course, are many content providers. The consumer has the potential for choice. The consumer has potential choice in many local carriers; cable, DSL, fiber, wireless, municipal, and others. There is a free market. The concern, however, is such choice is not pervasive, it may at

[273] See Yoo, Mandating Broadband Neutrality, 2004, p. 38. Yoo approaches this without clearly understanding the technical details and like many attorneys and economists, looks backward rather than looking forward. In fact, DSL and Cable modems provide a bundled set of layers so there is no Carrier 1 or Carrier 2. In fact, the technology has changed so that the economics of having the multiple set of players which cause this problem to arise is no longer viable. Thus one is solving a non-existent problem.

best exists in 30-50% of the markets. How does it get to all markets? The very markets themselves will perform that act.[274]

[274] This does raise the question of what if we had a 10 Gbps backplane, backbone network, what would that gain us. This means that we could have totally different computer architectures; memory would be at other locations, as would be much of our software. Could we achieve this with an integrated fiber and wireless, perhaps, we have argued this elsewhere. The content would also be dramatically different as well. The question of what would the computer look like if one had ubiquitous 10 Gbps fully interconnected and open backplanes all over, begs an interesting architectural question for the computer scientist. Things would change, and change dramatically.

9.4 Cable versus Telco Versus Wireless

9.4.1

In this section we provide a general overview of the difference in cable, FTTH, and wireless last mile. We have assumed that DSL will be slowly eliminated as these other options arise.

9.4.2

9.4.3 Services Offered

There are a wide variety of services that can be deployed. The first focus is Internet access. However, video such as cable TV, telephony, emergency signaling, meter reading, medical monitoring, library access, enhanced school, services are just a few extra. The local broadband system may provide, at a minimum, the following general services:

***Voice*:** The system may provide toll grade quality voice service. The voice quality must be telephone toll grade or better and there may be no delays in speech that are perceptible to the user. The telephony service may be IP based voice or any other "toll grade" acceptable voice technology.

Very Low Speed Data: This service is 100 bps to 50 Kbps types of service and may be used for such applications as meter reading and other types of services which require low speed, polling, or other similar techniques. This may include such services as meter reading and the like.

***Low Speed Data*:** The system may be able to provide data at the rates of 1.5 Mbps to 10 Mbps on a transparent basis and have this data stream integrated into the overall network fabric.

***Medium Speed Data*:** The network may be able to handle medium speed data ranging from 10 Mbps to 100 Mbps.

High Speed Data: Data rates at and in excess of 100 Mbps and frequently in excess of 1 Gbps may also be provided on an as needed basis and a dedicated basis. The data rates may be between 1 Gbps and a maximum of 10 Gbps. Included in this class would be any and all municipal support service provided on a intra-net network.

Video: The network may be able to provide the user with access to analog and digitized video services. This may also enable the provisioning of interactive video services. This would also support High Definition TV (HDTV). The video service should be capable of supporting both analog and digital video distribution. The video services would be analog and digital video, video on demand, HDTV and other video premium services.

Wireless: The services considered here are the application of an integrated WiFi type network using a strand or more of the trunk and feeder fibers. This would be a fully integrated service platform providing 802.11, 802.16, or like type services.

Cellular Support: This is a service which allows cellular carriers to have capacity and coverage expansion using the fiber trunks and feeder networks. It would deploy a distributed cell site technology and again would be fully integrated from an operational perspective.

Other Wireless: This service would entail any other wireless access capability for the access to and from the end users.

Dark Fiber Services: These services would be a compilation of any and all potential uses of the dark fiber for commercial applications.

A Municipal Broadband Network (MBN) is best characterized as Fiber to the Home (FTTH) providing 100 Mbps capacity or higher to the home or local business, open to all service providers, but financed and controlled by the municipality. This type of network is uniquely different from the current DSL or cable modem networks, which use older technologies. DSL utilizes copper wires, or "twisted pair". The technology of copper wires dates to before the founding of the Bell System by Alexander Graham Bell in 1875, actually originating with the telegraph. The physical attributes of the copper medium severely limit both speed as well as range of broadband capabilities.

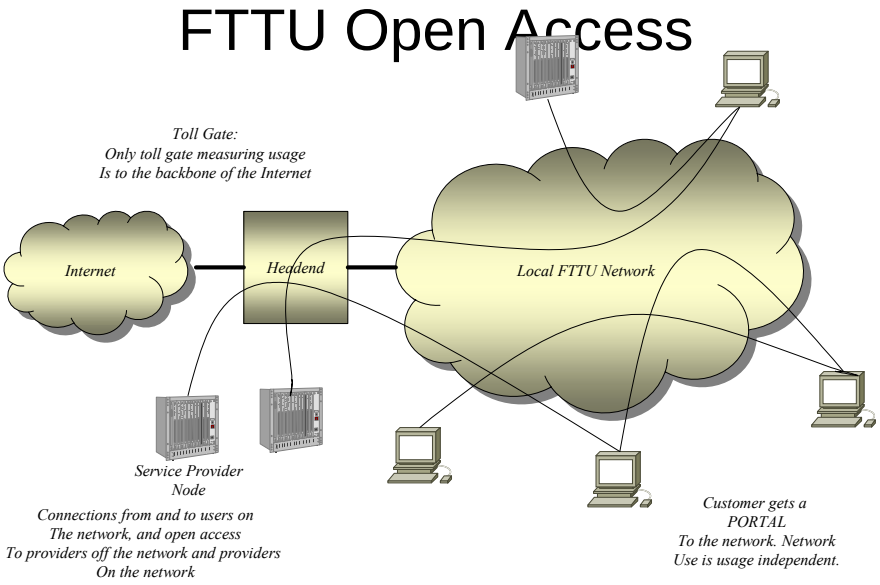
The overall network can be perceived in three steps; local network with generic boundaries, local network as an open infrastructure, interconnected open networks.

9.4.4 Local Network Interconnection

The MBN can be depicted as below. One end of the MBN, the head end, has an open interface suitable for interconnection to a variety of service providers. The interface is open to any and all, and is not proprietary in any fashion. The other end of the MBN has an interconnection to the home. The interconnection may also be to educational institutions, fire, police, libraries, municipal facilities, and to commercial entities as they may request. The network in-between the two interconnecting points is an optical fiber network with drops of fiber to each subscriber. The fiber drops are provided on an as-requested basis. The network does not have to be deployed fully day one. It can be built out as demand warrants.

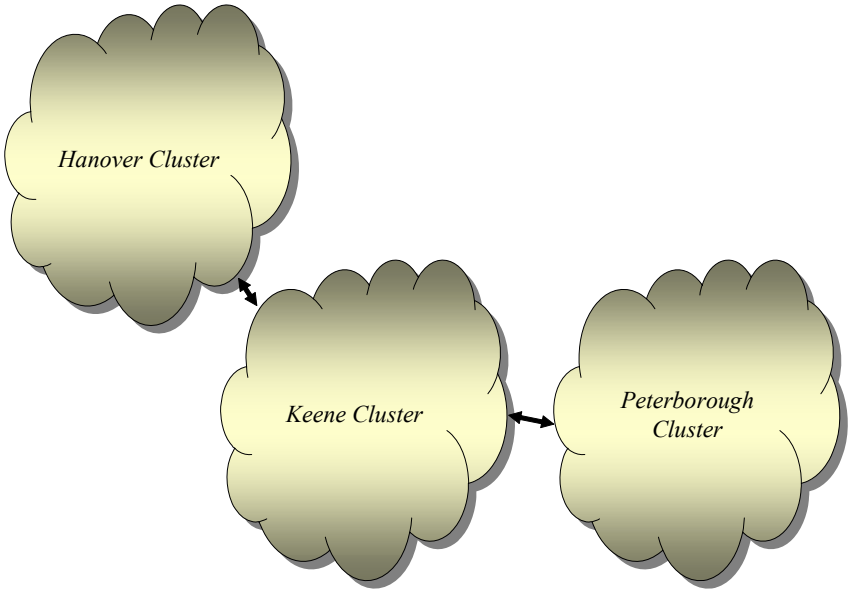
9.4.4.1 Local Open Networks

The following depicts the local openness of the network. Each user of the network can connect to any and all other local users via the IP capabilities of the network. Each connection to the network has an IP or IP addressable port. The connection is via ports, elements which can enable communications and interconnectivity between any user. The network is flat and open not hierarchical and closed. This is a key fundamental difference in network architecture design and implementation.



9.4.4.2 Interconnected Open Networks

The following depicts the interconnection of three regional MBNs. This interconnection is readily achievable via the use of the IP standard interface. Clearly some form of DNS, Domain Name Servers must also be employed and naming and address management will be an issue however the ability to interconnect at layer 3 is critical.



9.4.4.3 Network Elements

The network infrastructure that allows more bandwidth, quick provisioning of services, and guaranteed quality of service (QoS) in a cost-effective and efficient manner is now required. Today's telephone access network, the portion of a public switched network that connects CO equipment to individual subscribers, is characterized by predominantly twisted-pair copper wiring.

The following Figure depicts the generic approach to the deployment of broadband electronics in a FTTH or a CATV system. It is composed of four elements:

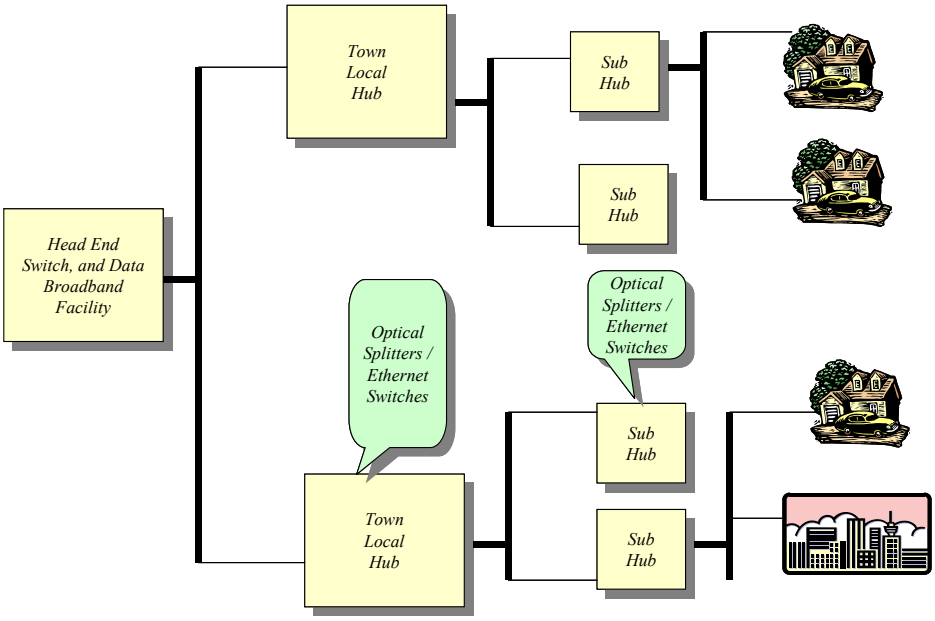
1. Head End: This may or may not be in a town and can serve one or several towns. There is significant scalability in head ends and these are point of presence or interconnection for service providers or the backhaul systems which connects to service providers.

2. Hubs: These are town located and generally central facilities which represent the specific town's point of presence. It may be at some convenient town location such as a police facility, fire department location, town hall or the like. It is the point at which the backbone fiber network connects to the system

3. Sub-Hub: These are the units in the field which allow for branching. There may be one or several levels of sub hubs. The sub hub provides a 1:N branching or splitting of the signal, and this may be done at several points allowing for a $1:N^m$ multiplication of backbone fiber to customer connection. This splitting is a key factor in the reduction of bandwidth available to the end user. In CATV there may be multiple 750 MHz fiber bundles which go to a sub-hub and then from there only one

750 MHz channel goes by each home. In contrast the fiber goes to each home but there may be some sharing at a hub, for example on a 1o Gbps backbone then going 100 Mbps to each home.

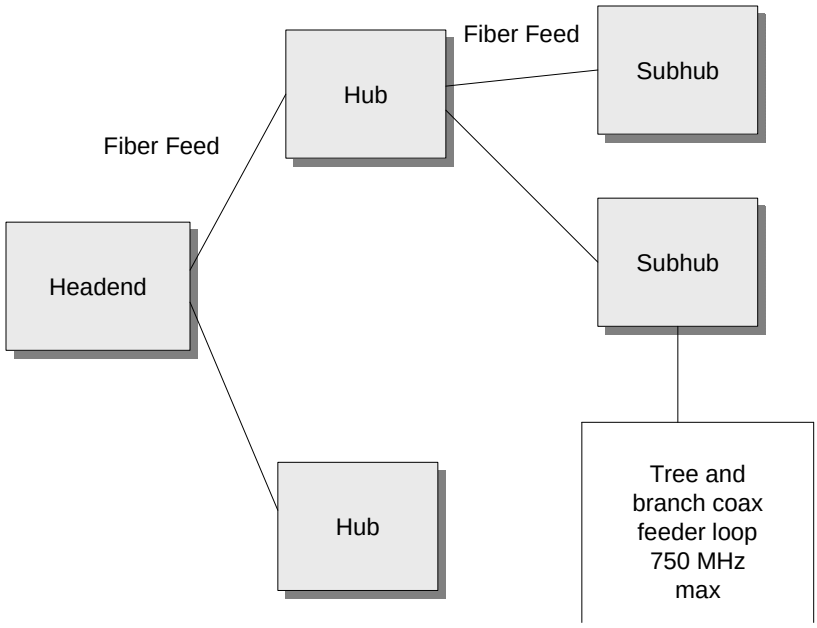
4. Home Unit: This is the device in the home. It provides for a broadband internet connection of 10-100 Mbps, a telephony connection and a CATV or digital video connection, using all existing home wiring.



The above architecture is common in most systems.

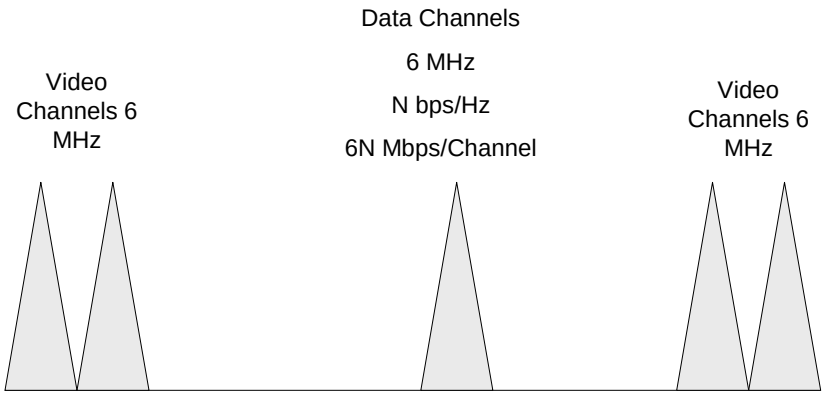
9.4.5 CATV

The CATV design is shown below. The first Figure depicts the typical general architecture we have just described above. The Headend, hub, subhub and feeder design. Most cable systems use fiber frequently upon to the subhubs. Then from there to the homes they use co-axial cable. The coax has a maximum bandwidth of 750 MHz.



Now passing each home is the same 750 MHz bandwidth coax. As shown below the CATV company uses the coax by segmenting it into 6 MHz sections for analog video distribution. Digital cable is slightly different. However they also use a channel or two for data. The channel has a limited bandwidth. That bandwidth, say 6 MHz, can support N bits per second per MHz. Say we use an very efficient modulation technique with 6 bits per second per MHz. The we have a 24 Mbps channel which is shared amongst many homes. Say there are 200 homes on this system and each home has a wireless router with 3 computers. This is 600 computers sharing 24 Mbps. There will be the issue of peak congestion.

CATV Bandwidth Channelization. The CATV system passes a single coax cable by each home and the group of home on the same coax share the same bandwidth and in turn the same maximum data rate.



Now in the CATV world, there is limited data rate due to the limited bandwidth. This means that CATV has limited capacity inherent in this design. We shall see that this is not the case of fiber. In fact no matter what fiber does it has near unlimited capacity. CATV could remedy this by expanding from the subhubs to the home with fiber. That is nothing more than an incremental economic decision. When we complete the analysis of the fiber design we shall see what that incremental cost could be.

9.4.6 FTTH

The FTTH, fiber to the home, designs are currently still in flux. We have chosen for analysis one which we have worked with in actual implementation and one which we believe will be sustained.

9.4.6.1 Architecture

The basic architecture for local PON or Gigabit Ethernet is shown below. The elements are:

1. Central Unit or Hubs: This is at a headend or some similar central location and provides for central management and interface.

2. Field Units or Sub Hubs: These units are the n:1 splitting devices, active or passive, which take a backbone signal and share it amongst several home units. In GigE the backbone rate is 1 Gbps down and up using two fibers, in ATM PON it is a single fiber using several wavelengths, one up and one down, using SONET and ATM formats. SONET is a layer 1 protocol.

3. Home Units: These are the devices in the home made to support data, voice, and video.

In general, the optical section of a local access network can either be a point-to-point, ring, or passive point-to-multipoint architecture.

As these components are ordered in volume for potentially millions of fiber-based access lines, the costs of deploying technologies such as FTTH, FTTH/C, and FTTH/Cab become economically viable.
One optical-fiber strand appears to have virtually limitless capacity. Transmission speeds in the terabit-per-second range have been demonstrated. The speeds are limited by the endpoint electronics, not by the fiber itself.

Telecommunications equipment vendors offer service providers a number of broadband access technology platform choices, but an access technology solution must be capable of providing:

1. Multiple voice, data and video services

2. Reliability consistent with expectations of customers

3. Low cost and price-competitive operations

4. Network scalability to meet expanding demands for bandwidth

5. New, differentiable services that enable high margin revenue sources

The proliferation of fiber combined with advances in optical technology positions GigE technologies as an ideal broadband access platform. This is particularly true for serving small to medium business customers. GigE offers ILEC/PTT service providers a cost effective and virtually unlimited bandwidth access platform capable of supporting legacy voice and data services.

In addition, because GigE supports multiple Ethernet/IP, ATM, and/or TDM services, GigE delivery platforms can uniquely support the introduction of new, bandwidth intensive enhanced services without costly upgrades.

The other issues are about whether the fiber cables should be pole-mounted or buried (trenched). Pole-mounted is generally less costly, but is potentially subject to delays in obtaining access depending on current configuration of existing telecom, cable TV and power system cables on the poles. However, in most cases, this “make-ready” process of reconfiguring existing cables on poles may not be an issue. Buried fiber may be more expensive but could be less of a delay depending on pole “make-ready” requirements, and has somewhat less life cycle maintenance.

The above electronics shows the element breakout. From the Hub Remotes the end derive is the in home element. These are individually installed and require interconnection in the home.

We use Ethernet protocol as the down link and up link. Down link is TDMA with each user having as much capacity as it may demand at any one time, and on the up link from the ONU each user can demand as much but must contend with Ethernet like collisions. IP sits atop of this layer 2 protocol.

We can now apply these models to a E PON example. The following is an expanded version of the basic architecture applied to the E PON solution. We have detailed the fixed and variable elements.

The fiber costs are based upon a per foot cost element for comparable market deployments. The following table summarizes the key input assumptions to those cost elements, which are used in the model. The details of the model have been show previously.

9.4.6.2 FTTH CAPEX

The cost elements for an E PON are summarized in the following charts. These are representative costs for the total network elements. Also shown are the capacities, maximum and minimum and the fixed and variable costs factors.

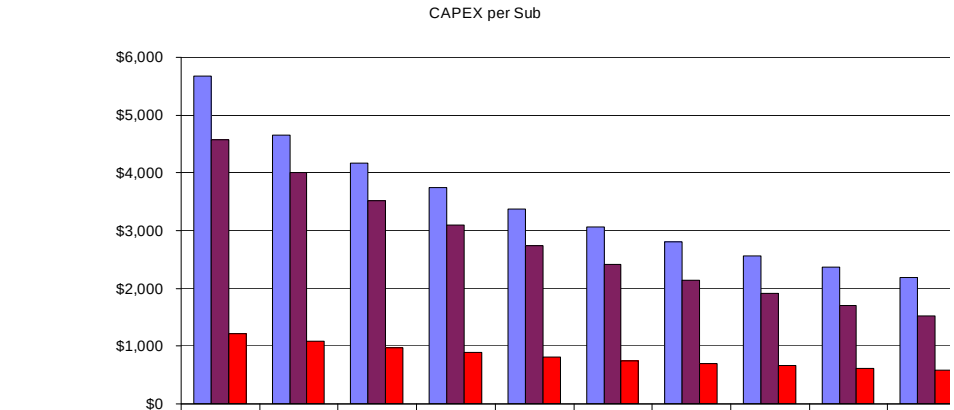
Cost Element	Description	Cost Metric	Cost / User 10 Subs/Mile	Cost / User 40 Subs/Mile	Cost Changes
Equipment:					
CPE	Customer Premise Equipment	$500 per CPE	$500	$407	5% decrease per year
Passive Field Elements	Passive optical splitters (1x4, 1x8), cabinets to house splitters in field; includes installation	Various	$79	$66	Scale + 5% decrease/yr
Headend: Internet	Optical Line Terminals, Switch Card Modules, chassis, racks, EMS, power, installation.	Various	$160	$151	Scale + 5% decrease/yr
Headend: Video	Video Headend Elements, fully loaded; includes install costs	Apprx. $1M per Headend	$109	$11	Scale
NOC	Equipment for Network Operations Center	Various	$22	$8	Scale
Misc. Equipment	Interfaces, backup power, etc.	Various	$22	$6	Scale
Digital Set Top Box	Digital set top box required for premium programming, VoD	$200 Per Box	$230	$201	5% decrease per year
Outside Plant:					
Fiber Plant Engineering and Construction/Labor	Design, engineering and installation of fiber network, including cables & hardware	$2/ft aerial, $5/ft trenching	$1,393	$343	Scale
Make-Ready	Preparation of poles to accommodate new cables	$4.00/ft	$332	$82	Scale
Fiber Material	Fiber strands, cables, connectors and hardware	$0.75/ft for 64 strand cable	$449	$154	Scale
Home Drop	Fiber drop to home, material and labor	$150/user, $0.25/ft fiber	$181	$183	None
Total			**$3,476**	**$1,612**	

We have performed multiple detailed analyses on over 35 towns and cities and the following Figure shows the capex per sub as a percent penetration[275]. There are several key observations which must be made:

1. These costs do not include any franchise costs which increase the per sub number by up to $1,000 per sub.
2. The do not include head end costs.
3. They do not include multiple video converters, there is only one video converter per HH

[275] See www.telmarc,com where we have placed detailed feasibility studies for 20 of the towns used in this analysis.

4. They assume a mostly aerial design, 85% or greater and they assume only about 15% make ready costs. Any change in either of those variable could dramatically increase the capex.
5. Our net experience is that the capex per subscriber is generally between $2,000 and $4,500. This is a great number and when one adds the franchise costs, obtaining and complying with the franchise, then one readily sees $5,000 capex equivalent per subscriber. This is dramatically greater than any costs ever to be incurred by cable!
6.



	4.50%	7.00%	9.06%	11.23%	13.29%	16.05%	19.46%	22.38%	25.74%	29.60%
Total CAPEX per Sub	$5,673	$4,653	$4,172	$3,750	$3,380	$3,065	$2,799	$2,565	$2,364	$2,188
Fiber CAPEX per Sub	$4,570	$4,006	$3,520	$3,099	$2,734	$2,417	$2,144	$1,907	$1,700	$1,521
Elec CAPEX per Sub	$1,209	$1,079	$975	$889	$809	$748	$705	$663	$621	$580

Penetration

9.4.7 Wireless

Wireless has become an emerging and potent competitor in broadband.[276] Wireless broadband has at least three major and dietetic varieties:

1. WiFi : The WiFi world is an unlicensed world. It is also a consumer product world. These two elements are very powerful factors. Anyone can be creative and the prices are commodity prices. One can obtain a WiFi router at any retail store for less than $30. Consumers can install them and many of them are software upgradeable. The price curve is already down dramatically in this technology. It is shorter range but not really that short. The FCC Part 15 regulations limit power transmitted but this limit is not that low. The problem can be one of interference but ultimately signal processing can help here as well. This platform is evolving into mesh architectures with 802.11 s.

2. WiMax: Wi Max is a licensed and much more expensive band. It has recently attracted attention with the McCaw-Intel-Motorola arrangement. However, we have experimented with this and the risks are that the technology is still quite

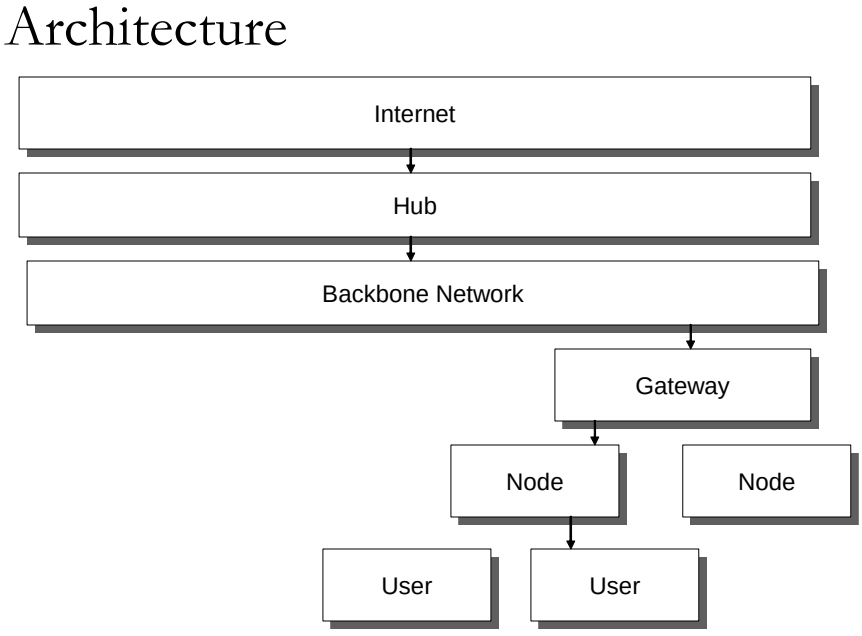
[276] See Lee et al 2006. This section presents an excellent overview of all of the emerging broadband mesh standards.

costly and further it requires a license. Plus, and this is a big risk, it follows on the heels of cellular with no strategic sustainable advantage.

3. Cellular: The cellular carriers have for several years now provided data. They provide Internet access and the use of CDMA plus OFDM offer significant spectral capacity expanding features. However it is costly, technology evolves centrally from the carriers and the usage fees can be quite high. Also since most of the cellular carriers are owned by the incumbent RBOCs one can envision the same set of issues we see with the wireline carriers as regard the Internet.

In this section we look at an overview of the WiFi mesh technologies. We believe that they offer the most organic consumer opportunity for broadband at this time.

The overall architecture for a wireless service deployment is shown below. At the top level is the Internet backbone. This connects to a local hum. The Hub then uses a fiber backbone network as a high speed data plane to extend to a set of Gateways. The gateways cover regions whose traffic demands can be serviced by the fiber backbone and wireless network elements. The Gateway then connects to Nodes which act as repeaters in the wireless network. These Nodes are highly interactive repeaters establishing a meshed IP network using 802.11 or similar technology. In this plan we use initially 802.11b as the connection system at a peak of 11 Mbps per Node. However any newer 802.11 system such as 802.11n can be employed when readily available. The Nodes then connect to the users. Security is employed to make this a subscription only network which is also secured for end user use as well.



The network elements in the wireless side are composed of three parts as was discussed above. This section presents those pats in some further detail.

9.4.7.1 Backbone

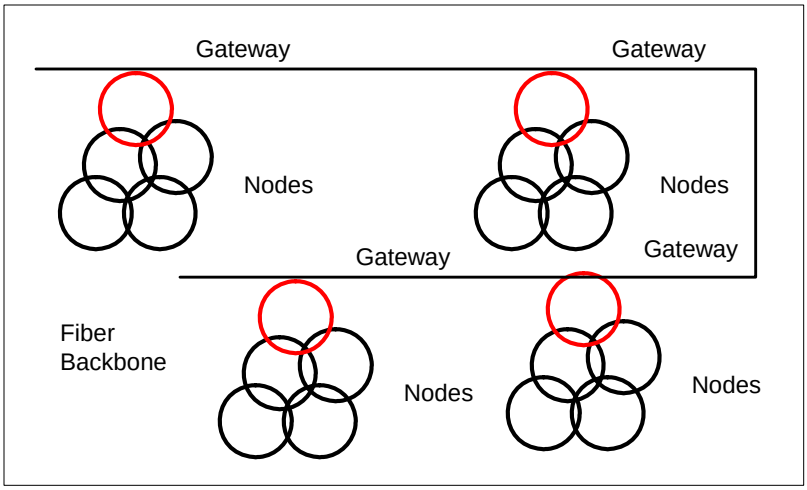
The backbone is that portion of the network which connects the Internet backbone to the gateways. We also call the collection of gateways and nodes a cluster. The backbone can be fiber or wireless.

There are two types of backhaul which can be used; fiber and all optical. We have performed tests and we believe that the all wireless is the best design. We consider both here.

9.4.7.2 Fiber Network

The fiber network connects the hub to the gateways. The fiber allows for a high speed backplane for communicating over the network. The typical format for such a design is shown below. The use of limited amounts of fiber allows for choosing the least cost routes and allows for expanding capacity and upgrading to a 802.11 n system when available. The overall topology is shown below.

Elements



9.4.7.3 All Wireless Backhaul

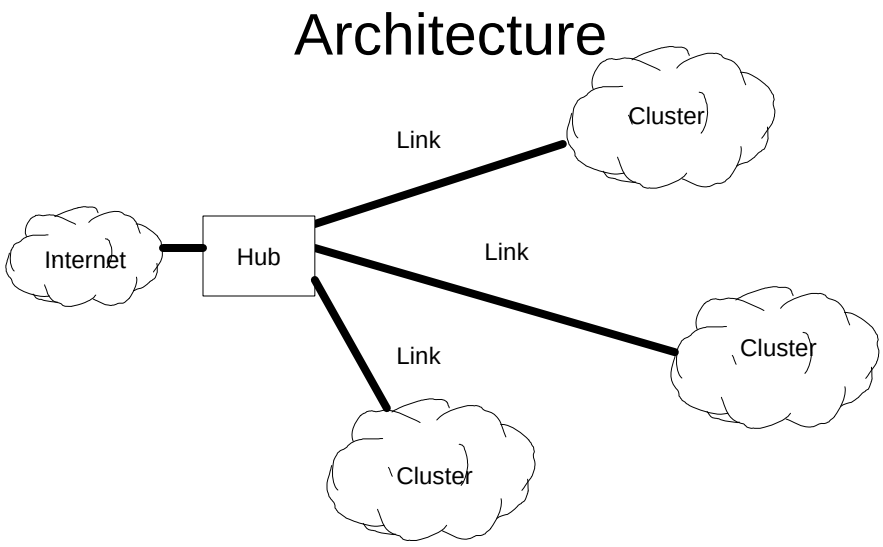
A detailed field data analysis was performed. The team used a Belkin router connected to a PC as a source and it was roof mounted on one vehicle called the base station. A second 802.11 PCMCIA card was used in a second vehicle with a PC and a signal strength

monitor. The second element was called the sample site. The data collected is detailed below.

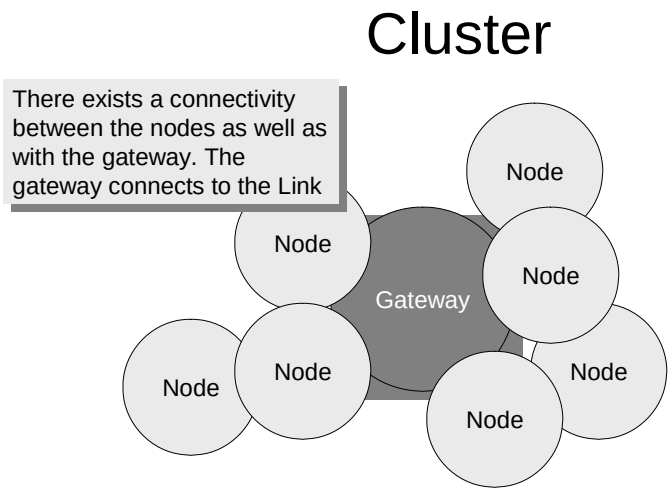
The field tests led to the following observations:

1. 30-54 Mbps can be achieved if >-65dbm
2. If follow FCC Part 15, max power is 125 mw and with 6 db antenna
3. However, can use directional antenna, for each 3 db antenna gain reduce power by 1 db
4. So use 30 db parabola reduce power 24 db. 6 mw.
5. Range now is easily 2500 ft, 0.5 mile

The overall architecture is shown below. It consists of links, clusters (gateways and nodes), and a hub connecting to the internet. We now use wireless for the links. From our experimentation we believe that this is doable.



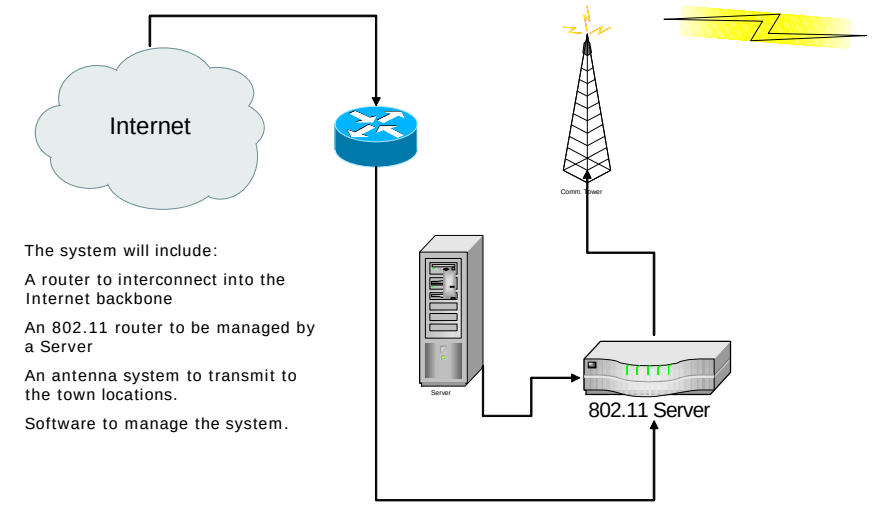
The cluster is shown below. We have performed detailed traffic loading analysis on these for streaming environments.



9.4.7.4 Gateway

The gateway is an element which interconnects to the Internet backbone via a fiber connection to a hub location. Each gateway is fed by a separate strand of fiber allowing 1 Gbps or more of data to flow to the gateway. The gateway then connects via a 802.11 router to a server which supports the Roofnet software and also to an antenna which is used to interconnect to the local mesh.

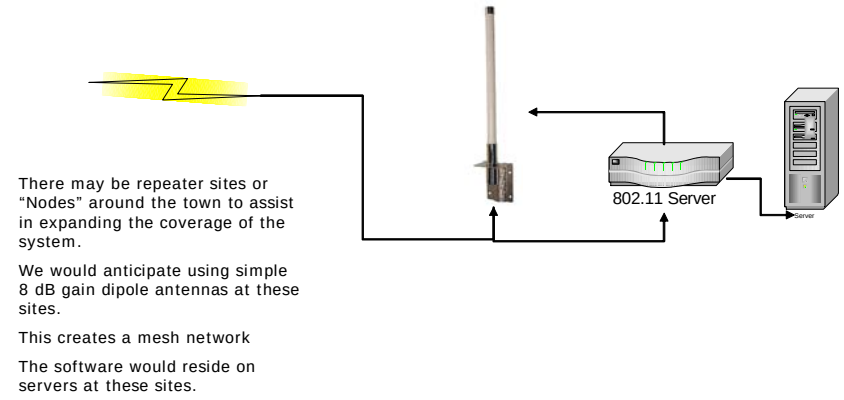
The Figure below depicts a typical mesh. The antenna may be modified to improve coverage and capacity. Using an 802.11b approach we can achieve up to 11 Mbps per beam of the transmit antenna. The initial configurations are composed of omni beams but using direction beams one can achieve higher gain and thus better capacity for grater coverage. This is permitted under Part 15 of th FCC regulations.



9.4.7.5 Node

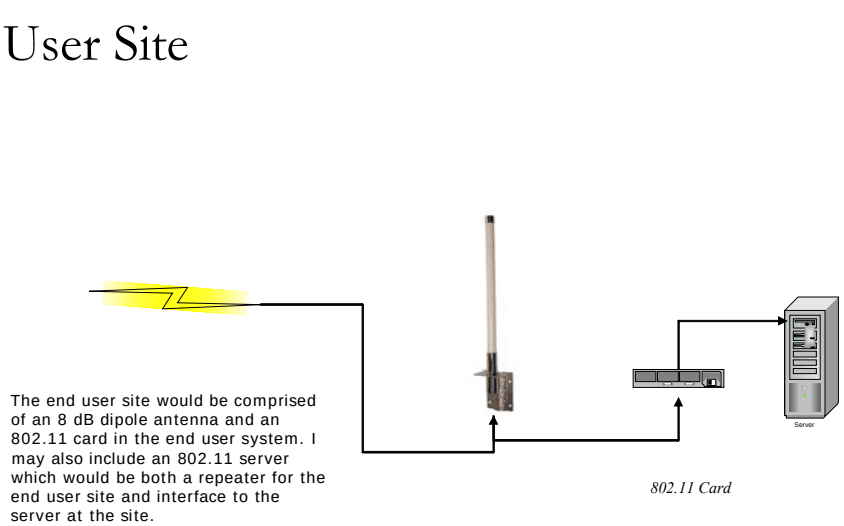
The node is an element in a mesh which connects to the gateway and is most likely at a customer site. It is provided to the customer and the customer agrees to have a node participate in the network connectivity. Nodes connect to gateways and all users connect to nodes and then to the gateway. The odes may be one or multiple hop elements in a mesh.

The figure below depicts a typical node.



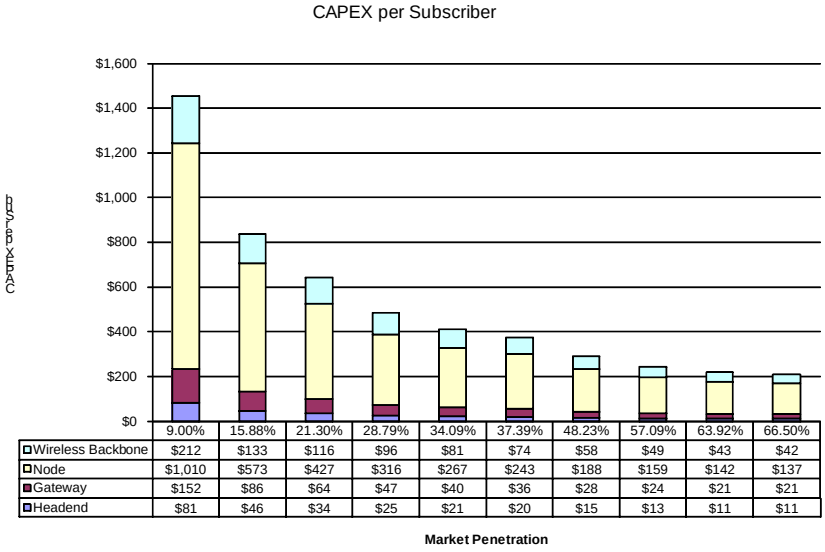
9.4.7.6 User Site

The User site is simply an 802.11 card in a customers PC. The Figure below depicts a user site.



9.4.7.7 Wireless CAPEX

The capex per sub using an 802.11 type system is shown below. As with the FTTH design we have used the same towns in this analysis. It is clear that the capex is orders of magnitude lower.



	9.00%	15.88%	21.30%	28.79%	34.09%	37.39%	48.23%	57.09%	63.92%	66.50%
Wireless Backbone	$212	$133	$116	$96	$81	$74	$58	$49	$43	$42
Node	$1,010	$573	$427	$316	$267	$243	$188	$159	$142	$137
Gateway	$152	$86	$64	$47	$40	$36	$28	$24	$21	$21
Headend	$81	$46	$34	$25	$21	$20	$15	$13	$11	$11

9.4.8 Comparison of Options

We summarize the options in the following Table. This is a critical analysis of where the market could go. Let us describe the options first and then we summarize.

1. Cable: In this case we assume the Cable company either uses its existing network or expands to a final 1,000 for fiber plant effectively providing a FTTH solution.

2. FTTH: This scenario is what we discussed above. It is a green field FTTH design. One should note that an incumbent telco has a strategic advantage of no make ready costs. However, this is a small part of the total. It must be remembered that all telco networks as wit cable networks are closed designs.

3. FTTH Municipal: In this case we assume a municipal design such as those in UTOPIA and other systems. These are open networks.

4. WiFi: This is a commercial WiFi. The costs are low but there is always the issue of interference and of potentially limited coverage and capacity.

5. Wi Municipal: This is WiFi but one owned and operated by a municipality.

6. WiMax: This is the WiMax networks. They are yet to be deployed but our costs estimates are based upon vendor numbers.

Option	*CAPEX/Sub*[277]	*Maximum Data Rate*
Cable	$500-750	50 Mbps not change in coax and it is shared
FTTH	$2,000-5,000	100 Mbps in low end designs, 1 Gbps in standard E PON and 10 Gbps in upgrade E PON or active networks.
FTTH Municipal	$2,200-6,000	100 Mbps in low end designs, 1 Gbps in standard E PON and 10 Gbps in upgrade E PON or active networks.
WiFi	$75-500	Based upon operational experience an average rate of 5-10 Mbps can be achieved per cluster assuming a broadband 108 Mbps backbone. This assumes a true mesh WiFi like a roofnet design.
Wi Municipal	$500-2,400	Due to fundamental design differences the data rate are between 250 Kbps and 5 Mbps. The systems are in public spaces and thus do not have the penetration density of true mesh WiFi.
WiMax	$1,200-2,700 for equipment alone $2,200-5,000 with license allocation.	This is a dedicated and non shared spectrum approach. It requires a license which will add substantially to CAPEX.[278]

[277] Again, see the Telmarc web site. We have direct first hand deployment and operational knowledge in actually designing, deploying and operating the systems. Unlike most other analyses, which are done by academics or consultant with no business experience, the number contained herein reflect detailed experience and designs.

[278] The senior author has been tin the process of obtaining license in many international markets and the costs will be substantial.

9.5 Access and Interconnection

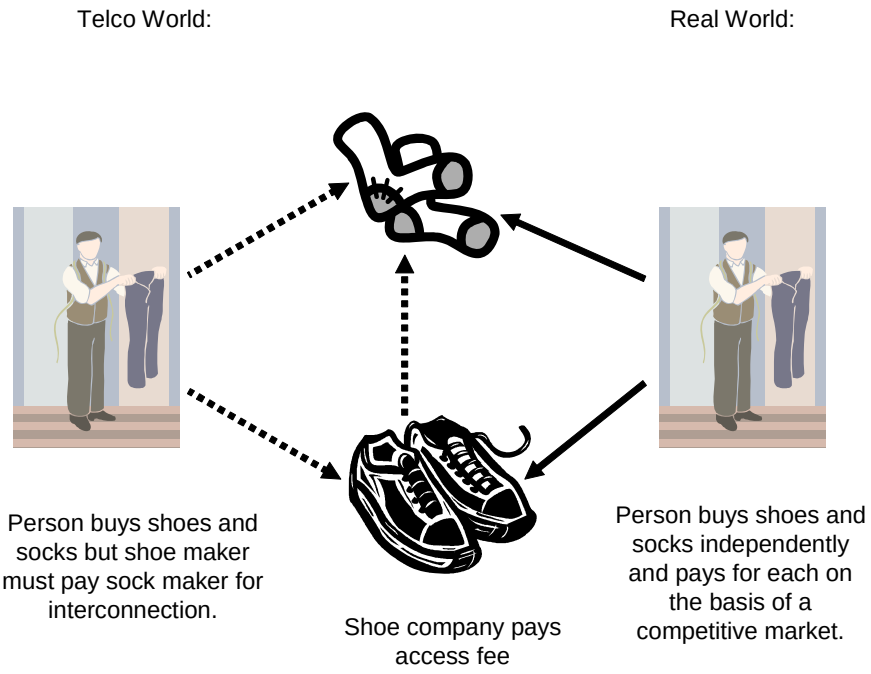
Interconnection of networks in an economic sense has been a concern of regulators, economists, entrepreneurs, and customers for many years. All too typically, the regulators rely upon the economists to create models to justify certain regulatory decisions. The entrepreneurs try and find ways around these artifacts that allow competitive markets to thrive. The customers really just want to buy a price-competitive quality service. The consumers are also even willing to put their total end-to-end service together by purchasing the elements separately.

At the time of the breakup of the Bell System in 1984, the press had many articles as to how difficult it was for the poor consumer to deal with the purchase of a physical telephone, the purchase from their local telephone monopoly, and the selection of one of two or three long distance carriers. Now, almost twenty years later, we change long distance carriers at the drop of a hat, we have more phones in our homes, cars, briefcases than electrical outlets in our houses, we have ten digit dialing just to keep up with all of the growth; we have Internet carriers, cable carriers, DSL lines, and a panoply of other disaggregated services and suppliers. The cries have been muted by the benefits provided. The only thing that has not changed has been the dominance of the local monopoly carrier.

Interconnection, oftentimes also termed access, is the process of connecting one network to another and transferring traffic of some form. It may be voice traffic, IP traffic, data traffic, video content, or whatever. A central issue is that each network owner wants to ensure that the other is not is getting a free ride. Thus, there is a great deal of effort developing access or interconnection pricing schemes. These have taken a life of their own in the economic literature, and, as we shall demonstrate, the life typically revolves around a view dictated by the incumbent. It almost always ignores the subscriber. Perhaps a reason for this is that this issue was originally faced in the 19th century with railroads, where the tracks were owned by many separate companies and rates to traverse such tracks were developed, and the mindset focused on the 19th century capitalist railway owners as consumers were not even invented then.

Interconnection can be stated in a very broad context. Consider any type of network providing services to end users. The networks may be local telephone networks, long distance networks, IP networks, CATV networks, or wireless networks. Let us assume that each provides a selection of services such as voice, video, data, IP transport. Let us assume that each supplies services directly or indirectly to end users, and that the end users can identify the provider and the service, either by a market presence or via some billing mechanism. Let us assume that there is a meet point, some artifact that allows one network to interconnect with any other and allows for the transparency of service provision from one end user to another. The question then is: what should one service provider, network operator, or ultimately any end user pay at the meet point to the other network for the services provided to effect completion of service provision? How does one pose the problem so that it benefits the consumer in the long run and in the short run?

Before we begin, let us consider a simple thought experiment. Consider a consumer in New York who chooses to call his friend in California. The New York consumer has chosen the lowest cost local telephone carrier to get him to the lowest cost long distance carrier. His choices up to this point have determined the "cost" of the call. However, his friend in California has no interest in cost savings, and he has selected the highest cost carrier. One of two things could happen: i) if incoming calls to California are charged to the caller, then the New York penny pincher will be forced to pay an exorbitant rate for the final part of the call; ii) if, however, the "meet point" for the service is where the long distance company meets the California local carrier and the California friend pays for everything to and from this meet point, then the costly selection will remain a cost of the California friend and will not burden the New York penny pincher. This simple experiment is from the perspective of the consumer, who cares little, if at all, about the economics of the carriers. This is not how economists generally think; they are still focused on railroad barons of the 19th century and the lack of selection by end users.



In the remainder of this chapter, we present a brief chronology of interconnection in telecommunications - its implementation and its theoretical alternatives. The book by Coll is still the best standard to read to understand the context in which this issue evolved; namely, the development of MCI and the struggles of Bill McGowan against the entrenched monopolist AT&T. The following are merely highway markers along the road of opening the network. They apply to all elements of information interconnectivity.

Consider first what was written by a Bell System scientist in 1977 at the 100th anniversary of the Bell System at MIT. The author was John R. Pierce, Executive Director at Bell Labs, who stated:

" Why shouldn't anyone connect any old thing to the telephone network? Careless interconnection can have several bothersome consequences. Accidental connection of electric power to telephone lines can certainly startle and might conceivable injure and kill telephone maintenance men and can wreak havoc with telephone equipment. Milder problems include electrically imbalanced telephone lines and dialing wrong and false numbers, which ties up telephone equipment. An acute Soviet observer remarked: "In the United States, man is exploited by man. With us it is just the other way around." Exploitation is a universal feature of society, but universals have their particulars. The exploitation of the telephone service and companies is little different from the exploitation of the mineral resources, gullible investors, or slaves." (de Sola Pool Ed, Pierce, pp 192-194).

The reader should note that this was written nine years after the Carterfone decision and five years before the announced divestiture. Pierce had a world view of an unsegmented telephone network. The current view is of a highly segmented communications system. The world view of the architecture has taken us from "exploitation" of Pierce to the freedom of the distributed computer networks of today. This, however, was the way the most enlightened viewed networks twenty five years ago.

9.5.1 A Brief History of the Courts' and Regulators' Views on Competition and Interconnection

The motivation behind antitrust and anticompetition law in the US is to guard against restrictions and impediments to competition that are not likely to be naturally corrected by competitive forces. Regulation in the US has also traditionally been employed if at least one of the following three, admittedly vague, criteria are met, see Economides:

"(i) for those markets where it is clear that competition cannot be achieved by market forces; (ii) where deviation from efficiency is deemed socially desirable; and (iii) where the social and private benefits are clearly different."

In Faulhaber, the author presents an alternative, but still vague, taxonomy of two types of scenarios in which regulatory intervention in the market may be necessary: essential facilities situations and network effect situations. The famous *United States vs. Terminal Road Association (1912)* case set an important precedent in which an essential facility – a facility that could not be feasibly duplicated – must be shared among competitors. Indeed, this was the precedent invoked in the breakup of AT&T in the early 1980s. However, according to Faulhaber, such scenarios are not likely to appear very frequently in the New Economy of high-technology:

"Looking forward to a world of inexpensive and readily available capital, temporary technology-based monopolies that could be overturned by next-generation systems, customers with lots of options, it is difficult to see a justifiable essential facilities case being successfully prosecuted."

This lends credence to the argument that market forces should be allowed to take their natural course in determining pricing in future high-tech markets, as a credible essential facilities problem is unlikely to arise. Having said this, Faulhaber argues that the essential facilities argument was tacitly (although perhaps unwisely) invoked in the AOL-Time Warner merger in 2000 when the Federal Trade Commission imposed the condition that "open access" to the IP channel be provided on Time-Warner's cable systems to ISPs. Thus, it appears as though essential facilities issues may indeed arise in the New Economy.

The second issue that has been prominent in the New Economy is how to deal with network effects (also known as network externalities) – access via interconnection to customers, and the consequent increasing returns to scale in consumption[279]. It can be simply stated by referring to the following figure. Consider the case of an incumbent who has built a market which in some way is universal. Consider now a new entrant, who now is competing with the incumbent, and now the two carriers must interconnect. Since the new entrant, in order to provide services, needs the universal connectivity, that capability has value and thus the incumbent must interconnect. But if the government mandates that connection there is the argument that the government under the US Constitution cannot take from the incumbent and give to the new entrant without just compensation. Specifically, the Fifth Amendment states:

Amendment V *"..... nor shall private property be taken for public use, without just compensation."*

Network effects actually predate the New Economy as they first arose about a century ago in the context of the telephone and railroad industries when large incumbents refused to interconnect with smaller competitors in order to drive them out of business. This aggressively anticompetitive behavior prompted regulators to require interconnection of the different competitors in these industries, and to also determine the prices at which they must interconnect (which was no simple task). The intervention in these two markets, however, did not result in the subsequent indiscriminant interference in US markets exhibiting network effects. The absence of overwhelming market power by any one of the players in the wireless telephony and internet markets, for example, obviated a strong regulatory presence in these markets[280]. It should be noted, however, that internet backbone providers forged their own interconnection (also known as peering) agreements, noting that this would be a common good for all parties involved.

A study of how the US government treated AOL in regard to its instant messaging technology is rather telling of the American government's position in enforcing

[279] Network effects are obviously present in concrete networks such as the telephone network and the internet, but they are also present in *virtual* networks where users are not physically connected but are indirectly linked by, for example, common standards (e.g. VHS standard, computer operating systems).

[280] Regulatory abstention was supported by Faulahaber's analytic, though simplistic, treatment of broadband markets in Faulhaber. In this work, he showed that oligopoly competition was likely to arise in an unfettered broadband market.

interconnection among competitors[281]. By 1999, AOL possessed the majority of the instant messaging market and refused to interoperate with its much smaller competitors, such as Microsoft and Yahoo!, and US regulators did not interfere. However, upon the announcement of the AOL-Time Warner merger, the FCC imposed a condition requiring AOL to interoperate its instant messaging software with that of competitors prior to offering advanced messaging services. This position is actually consistent with traditional American regulation on monopolies: earned monopolies are permitted, but monopolies as a result of mergers (or anticompetitive practices) are forbidden. Furthermore, it has been argued that the New Economy operates at such a fast pace that monopolies, even if prevalent, are temporary, "soon to be overtaken or at least disciplined by the Next Big Thing." Such arguments make a case for unfettered markets in the New Economy[282].

Owing to the economic complexities inherent to markets which exhibit network effects, an argument can be made that regulatory intervention will always be fraught with inequities to the parties involved. Indeed, this is evidenced by the decades spent by the FCC in regulating pricing first in the context of wireline telephone communication, and subsequently in wireless telephone communication. Thus, the argument goes, the only equitable and efficient way for the government to handle these complicated markets is to abstain from them altogether and to let market forces run their natural course[283]. Indeed, Darby presents a plethora of examples of markets exhibiting network effects in which private agreements among the parties involved have led to functional, competitive markets. Darby further emphasizes that the architectures of these pricing agreements follow no common principles and are idiosyncratic to the market. This argument, though perhaps convincing from a purely economic perspective, sidesteps the issue of how the US government may honor its mandate of protecting the greater social good in such markets.

A closer look

The position of US regulators on network externalities is actually more nuanced, and even contradictory. We will restrict our attention to common carriage, which, roughly speaking is a blanket term for infrastructure industries, such as letter post, railroad, telephone, and the internet. Note, however, that the boundary between common carriage and no common carriage industries is still a nebulous one. Common carriage industries, owing to their close relationship to social welfare, are subject to extensive regulation.

Though the history of common carriage law and regulation may appear contradictory at times, a general rule that has been respected is that interconnection is not a right, but discriminating against traffic that previously traversed a competitor's network (hand-off) is prohibited see Candeub. To be more specific, a network has no right to impose

[281] See Faulhaber.

[282] See Faulhaber.

[283] See Darby

another network to spend money on special equipment to interconnect with it. However, should a network present customers to a second network in a manner which is identical to that of the general public, then the second network may not discriminate against these customers. Thus, if regulators, for reasons of fostering competition within an industry, mandate interconnection, then compensation for the interconnecting networks is required since interconnection constitutes a taking. This rule has generally held for the last century, with the exception of the long-distance telephone industry in which local exchanges were required to interconnect with long-distance companies.

9.5.2 *Recent FCC Thinking*

The FCC OPP in September 2000 issues one of its working papers entitled "Connecting Internet Backbones". This section states that interconnection of IP backbones should be open, open meaning that they will allow local interconnection and local peering without any connection via an Internet transit. This is driven not by any new breakthrough of economic theory or policy but due to the fact that the ILECs are getting hit by ISPs dumping traffic on them via Internet schemes. For example, if a CLEC gets an ISP as a customer, all the CLEC then has to do is collect the interconnect fees from the RBOC since all the ISP customers will be calling that number. This then places great cost on the ILEC. Under the guise if IP interconnectivity, the FCC moves. It will need a second shoe to drop to make it final.

December 2000. FCC OPP Section on "Bill and Keep at the Central Office As the Efficient Interconnection Regime". The FCC OPP issues a second working section and this is the second shoe. It now recommends that bill and keep is really the best way to go. Now the ILECs will not have to pay the CLECs and the bill and keep approach accrues to their benefit. This now is consistent with the McGarty (1993) request and totally rejects others. So much for consistency. It really is about whose ox is gored and who has the regulatory muscle to influence results.

In November 2001[284], Verizon states that it "is worried that saboteurs masquerading as technicians from competing company could gain access to and damage a large central office" This is a restatement of the Pierce complaint at the 1977 symposium. Namely there are great dangers from the likes of CLECs and they must be banned. The corollary is that all ILEC employees are better and more trustworthy than CLEC people. This was a totally uncalled for use of the tragedy of the September 11, 2001 attack on the United States. It was another step in attempting to eliminate unbundling.[285]

9.5.3 The Externalities View

[284] NY Times, p. B5, "Attacks at Hubs Could Disrupt Phone Lines", Simon Romero.

[285] Again Hausman has written recently on the unbundling of CATV assets. McGarty had addressed this in a TPRC Section on the Gilder Conjectures in 1994. In that section it was shown that the Gilder conjectures, relating to wireless or CATV were false in part and the conclusion that either bandwidth for wireless or CATV could be treated as disaggregatable utility element were false.

We begin by quoting Demsetz[286]:

"Externality is an ambiguous concept. For the purposes of this section, the concept includes external costs, external benefits, and pecuniary as well as nonpecuniary externalities. No harmful or beneficial effect is external to the world. Some person or persons always suffer or enjoy these effects. What converts a harmful or beneficial effect into an externality is that the cost of bringing the effect to bear on the decisions of one or more of the interacting persons is too high to make it worthwhile, and this is what the term shall mean here. "Internalizing" such effects refers to a process, usually a change in property rights, that enables these effects to bear (in greater degree) on all interacting persons.

A primary function of property rights is that of guiding incentives to achieve a greater internalization of externalities. Every cost and benefit associated with social interdependencies is a potential externality. One condition is necessary to make costs and benefits externalities. The cost of a transaction in the rights between the parties (internalization) must exceed the gains from internalization. In general, transacting cost can be large relative to gains because of "natural" difficulties in trading or they can be large because of legal reasons. In a lawful society the prohibition of voluntary negotiations makes the cost of transacting infinite."

Economides uses the following definition for externalities[287]:

"We start with a simple model in expectations. Suppose that the expected size of sales in the market is S. Let the network externality function f(S) measure the increase in the aggregate willingness to pay because of the existence of the network externality. Thus, the aggregate willingness to pay for quantity Q increases from P(Q) to P(Q; S) = P(Q) + f(S). We place the following restrictions on f(S).

- *(i) f(0) = 0, so that no expected sales produce no network externality. This is a normalization of the f(S) function and it could have been done at a different level of S.*
- (ii) *f(S) is a continuous function of S.*
- (iii) *f□(S) □□0, so that higher expected network sales do not produce a lower externality.*
- (iv) $\lim_{S\to\infty}$ *then* $\_ f'(S) \le \theta$, *so that eventually, for large expected sales, the marginal network externality, created by an increase in the expected sales by one unit, does not exceed a constant □. This rules out fulfilled expectations equilibria with infinite sales."*

Using the Economides model one obtains profit as:

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[286] See Demsetz, Property Rights, p. 1

[287] See Economides, Monopolist's Incentive, p 4.

$$P(Q;S) = R - C + f(S)$$

Then one can perform various economic analyses including this externality. The challenge is how to actually measure and model this. Let us consider a simple example. There exists a large monopoly telephone company. It has access to all the customers in the US. A new company comes along. It wants to interconnect. The monopolist says no, not unless you pay me for the externality I have. Who owns this externality? In reality, without the customers the monopolist has nothing. Thus, one could argue the customer has ownership of the externality not the monopolist. In fact, the monopolist was granted the monopoly at no cost by the government. Does the government own it since it may have transferred the right? In fact, it transferred an additional right, namely of not being subject to Antitrust laws, then it seems the monopolist has no right to the externality at all. This conundrum is the essence of externalities.

9.5.3.1 Utility Functions and Externalities

If we consider, as an example, the utility to an individual of owning a word processing program. It has to me the user a certain utility or value given by two factors, the first it helps me write a letter or report and second it has the utility or value in that I may share that letter or report with someone else who then could edit or manage that document. Thus the utility of a word processing program has a utility which is composed of two elements; self utility and utility as a result of external use. This utility can be modeled as follows:[288]

$$U(n,t) = b_0 + k_0 f(n,t)$$

Where U is the utility and n the number of other people having the same word processing package and t some specific time. The constant b is the value or utility to me alone, assuming no other person has the word processing package and the function f is a measure of how much more it has utility if there are n other people with this same word processing program.

This simple idea can be expanded to state that if a company has a telephone network with N users and another company has a network with M users, and M<N, then the larger network has more value than the smaller. There are in addition certain constraints on the elements of the utility function.[289]

Now we define a broader function:

$$U(N_{External}, N_{Internal}, t) = k_1 + f_1(N_{External}, N_{Internal}, t))$$

[288] We use the approach of Mason as well as Economides (June, 2003) for this development.

[289] See Economides, 1995 pp-6-7 for externality structure.

where we have separated internal and external users. This expression begs the question: is utility dependent on internal and external users or just on the sum of the two?. An argument can be made that there is substantially different value depending on the user class, so that network externality utility will be dependent on the number in any class of users.

For example, if I have an accounting program, then the utility is clearly much more reliant on the number of accountant who use the program not just the total number of users, those of my peers and all others. Thus the analysis of utility of externalities are based upon both external users as well as internal users. We call this latter class the *internalities* of a network as contrasted to its externalities.[290] The question is which of these factors is the most valuable; externalities or internalities.

9.5.3.2 Determination of the Demand Function

Demand can be determined by a simple maximization. Namely, we can maximize the utility subject to some price constraint. Let us first relate a quantity q purchased to the number of entities connected to a network, namely:

$$q_{on} = h_{on}(N_{on}), q_{off} = h_{off}(N_{off})$$

Here the function h is monotonic for both relationships. Furthermore we assume there exists an inverse:

$$\exists h_k^{-1}(N_k) = q_k \forall h, N, q$$

Then we have:

$$U = U(N_{on}, N_{off}, t) = U(h_{on}^{-1}(N_{on}), h_{off}^{-1}(N_{off}), t) = U(q_{on}, q_{off}, t)$$

Assume a price per quantity, p, for each quantity, q, and assume some fixed total expenditure amount for the purchase of both quantities. The we can pose the constrained optimization equation as:

$$V = U(q_{on}, q_{off}) + \lambda(y^0 - p_{on}q_{on} - p_{off}q_{off})$$

Consider a simple example:

Let

[290] One can note that the restrictions as discussed by Economides can be expanded to this argument for the two classes. In addition the consideration of $\frac{\partial U}{\partial N_{Internal}} \geq \frac{\partial U}{\partial N_{External}}$ is also of concern.

$$U(q_{on}, q_{off}) = k_0 q_{on} q_{off}$$

Then simple optimization yields:[291]

$$q_{on} = \frac{y^0}{2p_{on}}$$
$$q_{off} = \frac{y^0}{2p_{off}}$$

This is a simple demand equation for the two network quantities. The actual demand is more complex.

Several additional observations are important:

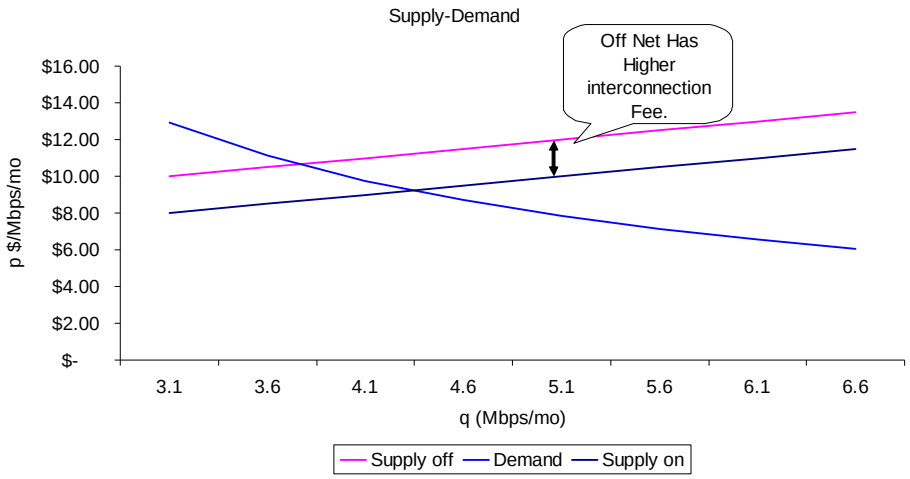
First, in this simple supply-demand world, the higher the price the lower the demand. That means that increased demand will move supply from the off net world to the on net world. Namely there is a disintermediation resulting from the basic economic structure of a MBN architecture. This is a critical observation.

Second, the time dynamics have not been included. It is essential to have them as part of the economics. This will further shown a rapid dynamic flow from off net to on. Namely it will be economically more efficient depending on the cost of interconnection, to place servers via private networks on net rather than to use Tier 1 ISPs!

We can observe these facts in the following supply demand analysis. This is the long term industry supply demand curve. We have justified the demand curve and the supply curve is based upon an industry analysis. They are separated by a difference due to the cost of Tier 1 interconnection. This is a curve as appears to the consumer. Clearly there is greater demand for on net services than off net.

Now one of two things can occur. First, there is greater demand for on net thus driving the off net base down and further increasing its cost. Then the cost to on net providers can actually be reduced thus driving down their costs. This cycle ends with the dramatic reduction of off net connections if the costs of access is not reduced to zero.

[291] See p. 19 of Henderson and Quandt.



We can then also address the issues of marginal substitution of "access" from the Internet backbone to the local point of presence. The issue can be simply stated; if a users has two alternative access modes, via the Internet and a Tier 1 ISP at a price and via a local on net node, what will be the dynamics of market substitution.[292] Using the standard microeconomic tools of substitution based on costs, one can see that there will be a drive to migrate suppliers from the Internet backbone via a Tier 1 interconnect to the local "costless" on net interface. Namely there would be a economic advantage to provide a video server at local clusters of MBN on net interfaces and avoid the costs of the Tier 1 carriage. This can have a potentially unstable effect on the Internet architecture.

9.5.4 The Pigou vs. Coase View

The issue of externalities, if they exist at all, can be phrased as a contrast between Pigou and Coase. This has been done by Candeub[293]:

" The choice between intercarrier payments and these new interconnection approaches mirrors the great debate on social cost between A.C. Pigou and Ronald Coase. The traditional, social welfarist approach—espoused by A.C. Pigou in the early part of the last century, thus "Pigovian,"—would be to tax one party for the cost "imposed" on the other party. Thus, the polluter would pay the landowner. Intercarrier payments are Pigovian: the regulator attempts to calculate the cost imposed by interconnection (the Pigovian "externality") and to assign them to one party, in the case of long-distance access charges, the long distance company; in the case of the Telecommunication Act of 1996's reciprocal compensation, the originating carrier.

On the other hand, Ronald Coase's famous critique of Pigou would suggest an entirely different approach. Coase would likely view mandatory interconnection as an externality of production—a cost of production—like the air pollution from a factory that invades an

[292] See Henderson and Quandt, p. 73 or Pindyck and Rubinfeld pp. 131-132.

[293] See Candeub, Network Interconnection, pp. 24-25.

adjacent private party's home. As Coase observed, given the regulator's limited information, there is a good probability that damages would be calculated incorrectly, creating an inefficient result. More important, however, Coase pointed out that it was arbitrary to choose the polluter automatically to bear the cost of its pollution. Consider the example of a factory that had manufactured its goods for years without complaint, until a kennel for highly sensitive, neurasthenic Pomeranian dogs moved next door, and the dogs got sick from the emissions. As Coase pointed out, externalities are a joint product of "polluter" and "aggrieved party": both the manufacturer and the hypochondriacal Pomeranians are "responsible" for the externality.

Applying this insight to interconnection, it seems absurd to assign the cost to one network. Both networks benefit from interconnection; both are "responsible" for the creation of the cost or externality of interconnection. Therefore, the assumption of intercarrier payments that one party should "pay" for one call's interconnection cost is not tenable. Rather, the cost must be shared in some fashion."

The Coase argument is simple. There exists some property right. There are two players and each has some potential economic gain based upon some action it can take. Then Coase says that given this game, the result is the same no matter who has the property right as long as the Government stays out of the way. An example is a fisherman and a factory. There being a lake which the fisherman uses and which the factory may dump into. There is a property right to the lake. The fisherman may have it or the factory may have it. The Coasian result is that no matter who has the right the parties will enter into a negotiation and their positions will be the same at then end of the negotiations.

Pigou says that there is a role for the Government to decide and to do so via a tax to maximize the overall public benefit.

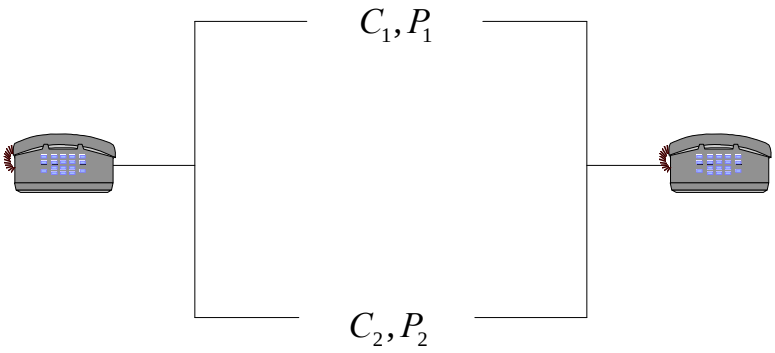
9.5.5 Efficient Component Pricing (ECPR) View

In the context of the AT&T network with the presence of the then small MCI, regulators and economists were working on ways to "price" this right to interconnect. One of the landmark players in this was Willig, who in 1979 presented a theorem for Efficient Component Pricing (ECPR). Simply, the theory goes as follows, let us assume that there is a consumer and that that consumer has some welfare function, say keep as much money as possible. Then, assume that there is an incumbent who has things called network externalities, valuable things resulting from his monopolistic position. Assume that a new player comes into the market. What should the new player pay the incumbent to keep the consumer happy, while assuring the incumbent adequate return on its assets. In the case where the incumbent, such an incumbent RBOC who has had a monopolistic return for years, then the answer is nothing.

The constraint is on the incumbent getting a return, not the new entrant. The new entrant must make money by being much more efficient than the incumbent, despite the fact the allegedly the incumbent was a monopolist because they had tremendous scale economies. This section started off the mathematical binge on enhancing on extending this theorem.

The work of Willig was formalized in conjunction with Baumol and became the bulwark for many interconnection schemes. It was an extension of what had been created in 1979. The Baumol Willig Theorem can be stated as follows[294]:

Consider a local carrier and two long distance carriers, one of which is owned by the local carrier. What should the new entrant pay the local incumbent for access to that network? The network is drawn below:



From La Font and Tirole p. 101

In the above example, which can and will be used again for Internet interconnectivity, the theory states that the new entrant, who has costs C_2 and price P_2, as compared to the incumbent with costs C_1 and Price P_1, should pay the incumbent a fee, α, for access. Note all fees and costs and prices are per minute of access. The Baumol Willig approach is as follows: Assume that there is a consumer surplus, or welfare function, that measures consumer benefit; that is $S_0(p_0)$ for the local loops and $S(p_1,p_2)$ for the long distance. Assume that the profit of the incumbent is measured as π (p_0, p_1, p_2). Then the access fee should be that which maximizes:

$$\max_{\{p_0, p_1, p_2\}} \{S_0(p_0) + S(p_1, p_2) + \lambda\pi(p_0, p_1, p_2)\}$$

subject to

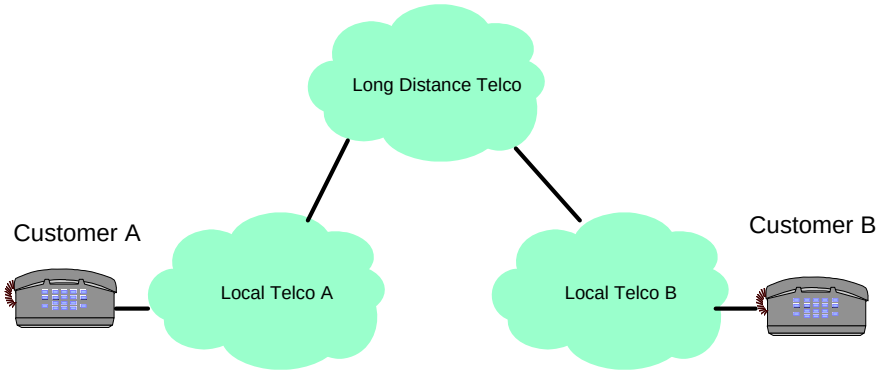
[294] This is taken from Laffont and Tirole, p. 102. It is presented by those authors in the context of Ramsey pricing. It essentially reflects the Baumol Willig rule.

$$\pi(p_{0,}p_1, p_2) \geq 0$$

Namely, choose the access which benefits the consumer subject to ensuring the incumbent is always profitable. It states that, quite frankly, we needn't care about the new entrant. This is what all interconnection theory states up until late 2000, other than that of a few writers who were strongly opposed.[295]

If we followed Baumol or Tirole we would tax the consumer to the level where the local on net carrier would pay the Tier 1 ISP a fee to compensate for the fact that the local network is more efficient than the backbone, actually the prices are extortionary and unrealistic, and it would sustain the backbones oligopoly. This logic can only come from academics who have little to no understanding of the business or little or no regard for the consumer. However, this logic enters the regulatory fray due to the panache of academia.

The issue of access and interconnection fees has also been discussed at length by others. One view is to look at this problem a one which is a Coase Conjecture problem. Simply stated the Coase conjecture is that any monopolist, such as an ILEC or collection of Tier 1 ISPs will be forced to marginal cost pricing in a dynamic fashion. [296]



Interconnection and Access: Customer A wants to communicate with customer B. Customer A pays Local Telco A for local access. Customer B pays local Telco B for local access. Customer A pays LD Carrier for transport between Local Telco A and Local Telco B. However Local Telco A and Local Telco B charge LD Carrier for access or interconnection a both ends. Why?

[295] See McGarty papers on access; 1993-1996.

[296] See papers by Inderest or that by McAfee and Wiseman. Both address the issue of the Coase Conjecture and the issue of interconnection and access.

9.5.6 Paradigm Summary for Interconnection

There are many views for establishing interconnection. We present here three. Before we commence we remind the reader to consider this whole process in terms of what we would do in our normal life. Consider also the reality of externalities in competitive markets. If one bakes a cake, one needs flour, sugar, salt, and each is essential, but frankly non have externalities, they are all commodities. It is clear than externalities do not exist for any single player in a commodity market. Externalities are artifacts of monopolistic structure of Governments establishing property rights.

9.5.6.1 Free Market Interconnection

The Free Market Interconnection model assumes the consumer, or any entity whom the consumer enters into a purchase with, can purchase the elements required for the service desired in a free and open market. Thus if I need to purchase the following:

1. Software
2. Hardware
3. Local IP Connection
4. Local Layer 1 and 2 connection
5. Tier 1 Backbone
6. Service or Content

then each of these is a separate transaction. I may decide to bundle and the market should permit many options. There should be no concept of externalities here. I can transact with any one of multiple suppliers in each market and the price is then set. If any player in any element of the market sets a price that I do not desire to pay and there is an option then I seek out that option. As a consumer I have a welfare function which simply stated means that I get to keep more if I have a higher welfare, unlike taxation.

The Free Market school is exemplified in the bill and keep concept used in interconnection. It is what the Tier 1 carriers do between each other. Namely as a provider of some element in what the consumer needs I charge the consumer a market price for my element of the service and the consumer can decide to buy or not buy.

9.5.6.2 Baumol Willing Interconnection

Interconnection and access fee pricing is a key elements in the overall process of network evolution. [297] The major work here is the classic tautology of Baumol and Baumol and Willing. Namely the form as describes as follows.[298] Let us assume a consumer surplus

[297] See Mason, Internet Telephony, for the application to IP traffic. Also see Economides and Lopomo on issues relating to Reciprocity of Interconnection Pricing.

[298] See Economides and White and their discussion of the Efficient Component Pricing Rule, ECPR, which is the Baumol Willig Theorem. Simply stated the ECPR states that the access fee to a new entrant should be adequate to compensate the inefficient old incumbent for their inefficiencies. Since Baumol and Willig consulted for the incumbent one could wonder why the result would ever be anything else but pay the incumbent.

for using a network as S. Let us assume that there is a local service and two long distance services, one being an incumbent. That is S is the consumer surplus. Let:[299]

Let the consumer surplus for local telephone calls be: $= S(p_0)$

and:

Let the consumer surplus for long distance with carrier 1 and carrier 2 be: $= S(p_1, p_2)$

Then we want to maximize overall consumer surplus:

$$\max_{\{p_0, p_1, p_2\}} \{S_0(p_0) + S(p_1, p_2) + \lambda\pi(p_0, p_1, p_2)\}$$

Subject to the constraint that the incumbents profit is always positive

$$\pi(p_0, p_2, p_2) \geq 0$$

If we followed Baumol or Tirole we would tax the consumer to the level where the local on net carrier would pay the Tier 1 ISP a fee to compensate for the fact that the local network is more efficient than the backbone, actually the prices are extortionary and unrealistic, and it would sustain the backbones oligopoly. This logic can only come from academics who have little to no understanding of the business or little or no regard for the consumer. However, this logic enters the regulatory fray due to the panache of academia.

The issue of access and interconnection fees has also been discussed at length by others. One view is to look at this problem a one which is a Coase Conjecture problem. Simply stated the Coase conjecture is that any monopolist, such as an ILEC or collection of Tier 1 ISPs will be forced to marginal cost pricing in a dynamic fashion. [300]

9.5.6.3 Multi Sided Market Interconnection

Multisided market theory is espoused by Rochet and Tirole and by Darby. Multisided markets theory simply is as follows[301]:

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[299] See Laffont and Tirole, pp 102-103. This is a classic ad hoc propiter hoc argument. They state "plus subject to the constraint that the incumbent breaks even" Who cares about the incumbent in a competitive market. Adam Smith desires to clear the market by efficient production means. The authors have a clear continental socialistic bent on retain incumbents and having the consumer pay for their inefficiencies.

[300] See papers by Inderest or that by McAfee and Wiseman. Both address the issue of the Coase Conjecture and the issue of interconnection and access.

[301] See Rochet and Tirole and Darby. It should be noted that Darby is affiliated with a consultancy supported by the RBOCs.

I assume that there are several players as necessary to make a market. Say they are the list we have shown above. Then assume that one element in this list cannot deliver at a competitive or market acceptable price. Let us assume that Verizon builds FTTH and it costs too much and they cannot price it to compete with cable, but someone, say the Government, or some other deus ex machina, decided that the FTTH approach is better. Then in a multisided market world, this deus ex machina charges other providers a fee based upon the assumption that they will benefit if Verizon has the FTTH and that their benefiting should be used to pay Verizon. Thus we take from the other players and give to the inefficient competitor so that they will become profitable.

This argument is socialism if ever there was one[302].

9.5.7 Conclusions

In the event of interconnection, the following important questions remain:

1. Which costs are to be compensated?
2. How are these costs to be compensated?

Regarding the first question, some feel that only the costs incremental to interconnection should be compensated for since it believed that by virtue of interconnection all parties benefit see Candeub, DeGraba, and Atkinson. If only the costs incremental to interconnection need to be compensated, then these costs can be simply split in some fashion among the interconnecting networks and no further inter-network payments are necessary. A criticism of this model is that it cannot be generalized that every network benefits from interconnection. As a counter-example, recall that the reason that Bell, after its patent expired in the late 19th century, refused to interconnect with the smaller carriers because it was clearly not in their best interest do so. More generally, any network with market power is better off not interconnecting. Thus, mandating interconnection may constitute a taking and it is insufficient to only compensate for the incremental cost of interconnection. A proposed method of compensating incumbent networks for the opportunity cost of interconnecting is known as Efficient Component Pricing Rule (ECPR), and its effectiveness is analyzed in Economides (disadvantages of EPCR is that it acts as a guardian for the incumbents future inefficiencies and possible nefarious motivations with respect to pricing). Another criticism of paying only for incremental interconnection cost is that its fairness hinges on the assumption that a network's cost is independent, or a weak function, of the volume of traffic it carries. It is debatable whether this is a good assumption for the internet, and whether it will be in the future.

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[302] For Reference the senior author's grandmother was head of the New York Socialist party in the early 1900s and as a result of may lectures and debates understands socialism better than most historians. http://memory.loc.gov/cgi-bin/query/r?ammem/mnwp:@field(DOCID+@lit(mnwp000296)) The writings of Tirole and his associates, The French Telecom School, all contain elegant but generally anti competitive and socialistic approaches to managing telecommunications. The Tirole approach appears to be that some unseen central hand has all wisdom and that this unseen hand using a plethora of mathematics and with no input from reality shall decide what is best.

A different response to the first question leads to a different approach. The present model for interconnection compensation involves an originating carrier paying the interconnecting carrier for access to it. This paradigm, known as Pigovian, leads to a complicated set of inter-carrier payments on a per-call or per-minute basis. The Pigovian approach to telephone yields many problems: inter-carrier payments can be gamed through regulatory arbitrage, inter-carrier payments confer a termination monopoly on local exchanges, per minute rates recover flat costs, creating intractable problems for cost allocation, and they require one party to pay when both clearly benefit see Candeub.

I am in agreement with the authors that market forces should determine the details of the agreements, including the rates charged, among network players – but I do think that the Coasian alternative is grossly simplified in that it does not consider the usage dependence of the network and does not allocate compensation for opportunity cost. I suspect that what the FCC did with telephone is half correct in that they tried to embrace the economic complexities of interconnection (e.g. rate dependence), but since they are ill-equipped to measure and understand the distribution of benefits among all parties involved, they should have refrained from imposing their rates for the parties to abide by.

9.6 Common Carriage and Common Law

In this section we review the concepts of common carriage and its history and related legal precedents. To understand common carriage we must first take a step backwards and better understand the concepts of property, possession, contract and bailments. The question may be why we must understand these issues as regard to common carriage and why is common carriage an important element of the issue related to the Internet. Why ones, for example, understanding the transition from Salic law to the way we perceive our current rights under the use of the Internet have any bearing on current reality. The answer is quite simple, we are a country of laws, despite what we may see from time to time in the press and blogs, and as a country of laws we must best understand them.

Our laws are of a varying nature but simply put they are of a form based upon laws passed by our Legislatures and laws based upon common law. The latter holds for countries based upon English law. Common Law is the basis of key elements in our legal system. For example in the Supreme Court Case of Western Union v Call Publishing[303], the Court stated:

"But this question is not a new one in this court. In Interstate Commerce Commission v. Baltimore & O. R. Co. 145 U.S. 263, 275 , 36 S. L. ed. 699, 704, 4 Inters. Com. Rep. 92, 96, 12 Sup. Ct. Rep. 844, 847, a case which involved interstate commerce, it was said by Mr. Justice Brown, speaking for the court:

"Prior to the enactment of the act of February 4, 1887, to regulate commerce, commonly known as the Interstate Commerce Act (24 Stat. at L. 379, chap. 104), railway traffic in this country was regulated by the principles of the common law applicable to common carriers""

Thus common law was used to enforce the concept of common carriage. We shall discuss the history of common carriage as well. But what is key about this case and what the Court stated over a hundred years ago is: (i) as a country of laws we make our decisions based upon the law, both statutory and common; (ii) common law is an accepted part of the precedent base we use to ascertain the validity of our claims, (iii) the Court accepts those claims and has done so since the commencement of our legal system, (iv) common carriage is a well established element of our common law system and it is a key element in how we look at and expect our telecommunications systems to function.

We will also see that statutory law can precede and dominate any common law claims. But we will argue herein that common law was a key element in regulating our rights under common carriage before the 1934 Telecommunications Act, and since the 1996 Act they may very well become key again, especially as we see the changes potentially developing under the new proposed legislative changes.

[303] 181 US 92, Western Union v Call Publishing, 1901. In this case Call was charged a significant amount more than a competing new section and the sued Western Union claiming under the concept of common carriage, that they had been harmed. The basis was the existence of common carriage and its ensuing rights under common law. There was limited statutory laws at the time for such protection. Call won the case at the Court.

Our argument will progress as follows. Let us assume that we desire to perform a transaction over the Internet. We create a transaction composed of bits, packets, which we transfer across an Internet connection facilitated by a transport entity. We have entered into an agreement with the transport entity to carry our bits to a third party not necessarily related in any manner to the transport entity. Then we desire to complete a transaction by handing our packets to a third party who will accept them and convert them into some good or service which we have selected. We may even encrypt our transaction to ensure both privacy and security. We do not want the transport carrier to carry our packets in the clear, if you will. Let us now consider the steps:

Property, intangible property such as our information in data bits or packets, is both property and personal, our personal intangible property. We possess it and in fact we may even create it so it becomes our intellectual property. But let's not go down that road yet. It is clearly property and our property.

We then enter into an agreement with a third part, the carrier in this case, whose service is to transport the property between us and some third party. Indeed there is a contract, all elements are present; offer, acceptance, and consideration. The third party is some data carrier. There may be multiple other third parties some of which we could enter into an agreement with separately subject to some set of transactions costs which we shall discuss separately.

The third party we have "contracted" with then transports the bits from place A to place B for a price and in transporting them takes possession of them. In taking possession they become in a certain way a bailee and we are the bailor, and the bits are bailment. This concept dates back to at least 1315 under Edward II. It will become a key concept which we will build upon.

Common carriage is a special type of bailment and a certain specific economic relationship between the parties.

9.6.1 Common Law

I[304] once had a dinner in Vienna Austria with executives from Telkom Austria, Telcom Italia and my partners from Prague. During the course of the meal the question, or perhaps observation, came up as to why the United States has so many lawyers. I had the opportunity to explain to my European brethren the difference in the legal systems, which frankly is also a difference in world view; centralized power versus distributed power. I said that in the United States we have three major ways to make law. The first way is via our elected legislatures. Most of our written and codified laws originate in this arena and this is the generally well understood manner in which we believe our laws are made or

[304] This is the senior author (McGarty) speaking.

created[305]. The second way is when the Supreme Court decides what has been made law is not, and they then take it upon themselves to rewrite the law based upon their personal understandings of what it should be.

That shocked my Austrian colleagues, because it was very European, bodies of unelected jurors deciding what is in the best interest of all, classic Napoleonic law. The third way I told them is suing under common law principles. I said that having access to the courts and to common law we can always have recourse when we have been aggrieved to the courts, and sue another party, the one damaging us, and from that process come precedent in many cases. The precedent then becomes law. Thus even the least of us in a common law society has the right to redress our grievances in the courts, and with a jury seek a remedy. In this third case the judge is not making the law, the jury, namely our peers, is the judgment maker. The Europeans had never understood that principle, people having individual rights and the uneducated and untrained, namely a plaintiff and jury, having the direct right of redress. Furthermore the redress process was a collection of rules and precedents of the very culture we were living in. It becomes a time averaging process[306].

Let us begin by defining what common law is. Posner defines common law in terms of three elements[307]:

"Common law ... can be conceived ... as having three parts:

1. *the law of property, concerned with creating and defining property rights to the exclusive use of valuable resources*
2. *the law of contracts, concerned with facilitating the voluntary movement of property rights into the hands of those who value them the most;*
3. *the law of torts, concerned with protecting property rights..."*

Now we can state the Internet problem in Posnerian terms of Common Law. Specifically:

1. We have created a valuable personal property right in a packet or collection of packets we wish to exchange with a third party for something of value. This is the exchange between the Internet user and the third party for a specific transaction to occur.
2. We have entered into an agreement with a carrier to transport those packets back and forth and we have agreed to compensate the carrier on the basis of some form

[305] It should be noted however that in the United States the actual writing of the laws may in reality reside in the hands of lobbyists and their attorneys, in "support" of the Legislative staff. This has been a pandemic exercise when it comes to the development of the telecommunications law. Frequently the law becomes what the last lobbyist "in" managed to get into the word processor.

[306] The point of English common law and the use of English as the language should not be overlooked. Clearly as precedent the use of a term, word, phrase has great historic meaning. We could not easily if at all admit the use of multiple languages into our legal system because it would then demand the rewriting and reinterpretation of all our common law elements.

[307] See Posner, *Economic Analysis of Law*, p. 31.

of common carriage. The common carriage construct facilitates the transport of the personal property in the exchange between the user and the third party in the transaction. It does not in any way involve a transfer of property rights to the carrier, since we view the carrier as a bailee.

3. We retain our tort rights to see remedies for any damages done us by the carrier in the event that they interfere with the transfer of the property rights between the user and the third party.

The Posnerian view is one of ongoing economic relationships. The view accepts the existence of rights and works from this concepts of accepted rights. All interactions are in his view economic transactions devoid of good and evil. Common law then is a means to balance economic interests and bargaining powers between parties. Specifically Posner views every interaction as an economic transaction and each of these has a cost or return associated. Thus all claims at common law are claims with some underlying economic model.

Another view of common law is that of Eisenberg. Specifically he defines common law as[308]:

"the common law is heavily concerned with the intertwined concepts of injuries and rights....the task of common law is not to determine what is an injury or right but to explore ... the extent to which that are perceived by the community as inflicting wrongful injuries should give rise to remedies at law..."

The Eisenberg view appears to be more expansive. It admits rights but further looks also looks to societal norms which may or may not be reflective of some underlying economic transaction. There would be admitted the societal good in this view.

Eisenberg goes on to state[309]:

"the common law is heavily concerned with the intertwined concepts of injuries and rights, and moral norms largely shape our perception of what constitutes and injury and a right."

Practically speaking common law is a compendium of prior cases and the principles which have devolved from them. The three areas of property, contract, and torts all relate to people and things and their daily interactions. As we have argued herein the data elements we create are property. The relationship we have with a common carrier is in essence a form of contract to transport our property, and the damages we suffer under the actions of the carrier constitute the tort. The common law is clearly the body of law which allows us remedies at law.

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[308] See Eisenberg, Common Law, p.15.

[309] See Eisenberg. Common Law, p. 43.

The concept of *stare decisis* is key to common law[310]. The principle is simply that once decided by a court henceforth to be accepted. We all know that this concept is frequently stated but as frequently ignored, especially by US courts, including the Supreme Court. However it does have some standing and can be used. The true strength of common law is the building of a strong basis of equity. For example[311]:

"... built up as it has been by the long continued and arduous labors, grown venerable with years, and interwoven as it has become with the interests, the habits, and the opinions of the people. [Without the common law a court would] in each recurring case, have to enter upon its examination and decision as if all were new, without any aid from the experience of the past, or the benefit of any established principle or settled law. Each case with its decision being thus limited as law to itself alone, would in turn pass away and be forgotten, leaving behind it no record of principle established, or light to guide, or rule to govern the future." (Hanford v. Archer, 4 Hill, 321.)

Common law is also a methodology as well as a set of precedents. It is a way of approach a set of claims of rights and a set of claims against injuries. It is critical to understanding that the injury element is key to any common law claim; it is an economic injury in the Posner view or a moral injury in the view of Eisenberg. Whatever the view, injury or loss is a key element and restitution is one of the remedies.

Common law works along side of the administrative law which we see in the working of our regulatory system In the case of the Internet, the Government in its wisdom may remain silent and the FCC in its wisdom may enter the fray. However we are arguing that the common law as regards to property, contract and torts is an alternative and powerful element to see remedy and redress.

9.6.2 Property

The concept of property is key. We understand in our legal system two types of property; real and personal. We will argue herein that the packets that we use in communicating with third parties on the Internet are indeed personal property. They are closed packages of information, whether they are going to or returning from a third party. They are our personal property. Evidence of this belief is even in the CALEA laws which apply the fourth amendment protection of unlawful search and seizure. We may not have a right to privacy expressly in the Constitution, despite what many may believe, but we clearly have rights to property. We shall argue that if viewed in this manner we can then look upon our communications to, from, between, and amongst other Internet players as transfers of our property, and that by applying the theory of property to such communications we now can use the extensive body of well developed common law to seek understanding and protection. The use of the common law element applies only to

[310] One should be careful in using common law and even in using any precedent since in almost all cases where precedent is used it must be Shepardized, namely it must be looked at again against all subsequent rulings to see if the court's changed their minds. see www.lectlaw.com/files/lwr17.htm

[311] See: http://www.blupete.com/Literature/Essays/BluePete/LawCom.htm#Tradition

English law countries, where the establishment of case law and the acceptance of stare decisis is an accepted tradition. To those countries using the more classic types of law, such as Napoleonic statute law, none of this applies. It would have to be written into statutes. The advantage of common law is that it has become a basis for using the development and experience of our culture and society in interpreting and extending the law.

The right to personal and individual property was well established in the writings of Locke, specifically in his Second Treatise, Chapter V, Of Property. Written at a time when there was still a residual belief, and often compelling that the sovereign permitted property usage, but that ultimately the sovereign was the owner of the property, Locke established the view which we see in most of our current understandings of property. We in essence take something which is of a common element of nature and through our hard work we add value and thus obtain a natural right, a right which conveys to us the individual, in that property. For example, we cultivate a field and grow a crop, then the crop is ours, in fact the acreage is our. We create a packet of information pursuant to an electronic transaction, then the packet is ours, and no right conveys as we have that packet transmitted to a third party as party of a transaction. It is clear that the carrier adds no value to the packet. In fact he is paid for service. It would be like the movers of Michelangelo's Pieta claiming ownership and creation rights for all eternity because they pushed the statue from one end of the room to the other. The property we create is transferred and we and a third party exchange it for value, we then receive another element of personal property in return. At no time do we convey any rights to our property to the carrier.

The first question we pose is what is property and the second question is what is the basis of this definition of property. The third question then extends the first two to the domain of information and the Internet; namely what property rights do we have when we are interacting on the Internet. Let us commence with the definition.

Cunningham et al use the Bentham approach to defining property[312]:

...property is a legally protected "expectation...of being able to draw such and such an advantage from a thing" in question. "according to the nature of the case"[313].

Cunningham goes on to state the consequence:

"if property is a legally protected expectation of deriving certain advantages from a thing it follows that property is comprised of legal relations between persons with respect to things..."

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[312] See Cunningham et al, p. 1.

[313] See Cunningham et al. Property, p 1 and the authors' references to Bentham and his work Theory of Legislation. Bentham had developed his theory of property on the basis that property is a manifest expression of the law as compared to Locke who postulated property rights as being inherent to the human, as a result of their labors.

The Bentham school of thought, which is a major basis of the laws of property as we understand them in the English law world. Sprankling defines property as follows[314]:

"the law defines property as rights among people that concern things....the legal definition ...has two parts: (1) rights among people (2) that concern things...while property is discussed in terms of "rights' perhaps "relationships" would be a better term...law is the foundation of property rights in the United States..."

As Pipes has stated[315]:

"The whole concept of privacy derives from the knowledge that we can withdraw, partly or wholly, into our own space; the ability to isolate oneself is an important aspect of property rights. Where property does not exist, privacy is not respected."

Pipes goes on to define property as follows[316]:

"Property refers to the right of the owner...formally acknowledged by authority both to exploit assets to the exclusion of everyone else and to dispose of them by sale or otherwise... "property" has come to encompass everything that properly belongs to a person...including life and liberty...under the influence of Marx...define "property"...not as a right over things but as relations among persons in respect to things."

The approach to property of Pipes establishes an important distinction between what the law does in interpreting property and what society does in interpreting property. To Pipes the Sprankling definition has Marxian overtones. True property is what I own and as a result what I control. Property is not just the relationships between myself and others regarding some thing. The distinction is a critical distinction.

There have been many limitations on the rights to property. Pipes relates two Supreme Court cases, Dolan v City of Tigard (1994) and Lucas v South Carolina Coastal Council (1992) wherein the Court ruled for the plaintiff and their rights in property. However, the most recent case relating to eminent domain, Kelo et al. v. City Of New London et al (2005), and the Court in the Kelo case stated:

"Two polar propositions are perfectly clear. On the one hand, it has long been accepted that the sovereign may not take the property of A *for the sole purpose of transferring it to another private party* B*, even though* A *is paid just compensation. On the other hand, it is equally clear that a State may transfer property from one private party to another if future "use by the public" is the purpose of the taking; the condemnation of land for a railroad with common-carrier duties is a familiar example. Neither of these propositions, however, determines the disposition of this case."*

[314] See Sprankling, Understanding Property Law, Chapter 1.

[315] See Pipes, Property and Freedom, p. 76.

[316] See Pipes, Property, p xv.

The statement of the State having the power and authority to transfer private property from one private owner to another is a striking comments without basis. Clearly the Constitution has been taken to mean that the Government, with just compensation, may take property. The Constitution does not seem to say that the Government has the right to reassign property rights. The Court in this case seems to be saying that. However the Court does go on to state:

"As for the first proposition, the City would no doubt be forbidden from taking petitioners' land for the purpose of conferring a private benefit on a particular private party. See Midkiff, *467 U. S., at 245 ("A purely private taking could not withstand the scrutiny of the public use requirement; it would serve no legitimate purpose of government and would thus be void");* Missouri Pacific R. Co. *v.* Nebraska, *164 U. S. 403 (1896)."*

Thus the Court rephrases its statement of transferring from a private entity to another. It does now state that it cannot do this for a particular private party. Thus the Court reaffirms the position that the Government cannot take property to be given to another. Finally the Court states:

"In affirming the City's authority to take petitioners' properties, we do not minimize the hardship that condemnations may entail, notwithstanding the payment of just compensation.[21] We emphasize that nothing in our opinion precludes any State from placing further restrictions on its exercise of the takings power. Indeed, many States already impose "public use" requirements that are stricter than the federal baseline. Some of these requirements have been established as a matter of state constitutional law,[22] while others are expressed in state eminent domain statutes that carefully limit the grounds upon which takings may be exercised.[23] As the submissions of the parties and their amici *make clear, the necessity and wisdom of using eminent domain to promote economic development are certainly matters of legitimate public debate.[24] This Court's authority, however, extends only to determining whether the City's proposed condemnations are for a "public use" within the meaning of the Fifth Amendment to the Federal Constitution. Because over a century of our case law interpreting that provision dictates an affirmative answer to that question, we may not grant petitioners the relief that they seek."*

Specifically, they have chosen to allow New London to take the property in light of the towns preparation of a plan and in light of an overriding public interest. However as stated above they clearly indicate that the States may delimit the powers ever more strictly, and that the States have the powers to do so.

Justice Thomas in his dissent states:

"Long ago, William Blackstone wrote that "the law of the land ... postpone[s] even public necessity to the sacred and inviolable rights of private property." ..... The Framers embodied that principle in the Constitution, allowing the government to take property not

for "public necessity," but instead for "public use." ... Defying this understanding, the Court replaces the Public Use Clause with a "'[P]ublic [P]urpose'" Clause, ... a restriction that is satisfied, the Court instructs, so long as the purpose is "legitimate" and the means "not irrational,"... This deferential shift in phraseology enables the Court to hold, against all common sense, that a costly urban-renewal project whose stated purpose is a vague promise of new jobs and increased tax revenue.... The most natural reading of the Clause is that it allows the government to take property only if the government owns, or the public has a legal right to use, the property, as opposed to taking it for any public purpose or necessity whatsoever. At the time of the founding, dictionaries primarily defined the noun "use" as "[t]he act of employing any thing to any purpose." .... The term "use," moreover, "is from the Latin utor, which means 'to use, make use of, avail one's self of, employ, apply, enjoy, etc." ...When the government takes property and gives it to a private individual, and the public has no right to use the property, it strains language to say that the public is "employing" the property, regardless of the incidental benefits that might accrue to the public from the private use. The term "public use," then, means that either the government or its citizens as a whole must actually "employ" the taken property."

The Thomas dissent clearly harkens back to the original interpretation of the Constitution and the Fifth Amendment. Takings and rights go hand in hand. If one has property, then one has a right to the property, its use, its sale, its very survival. The Government cannot transfer that property, even with just compensation, to a third party, unless for a "public use". However in the New London case, the Court in its wisdom has watered this down to a public purpose and has further placed a broad arms length to that purpose as being nothing more than a plan which says another private owner can make better use of the property in the opinion of the town and as such is a public purpose, and in the Courts eyes, is a public use in accord with the Fifth Amendment.

What does this have to do with the Internet and data transfer. We argue that the packets are our property, the property of the creator of the packets. They thus have protection as property and the Government, even under the wide interpretation of the New London case, still have a modicum of protection under what is left of the Fifth Amendment. The Government cannot transfer that property from the owner to a third party without just compensation, except under the case as defined in New London. Thus I would have a right to my packets, and the right conveys as I move it across the Internet.

Thus we have argued that we have a property right in the packets we send across the Internet. The packet is a real "thing" and we have a right of ownership because we created this thing; this is a clear statement of the Locke view of property. Specifically Locke states[317]:

"....the improvement of labor makes the far greater part of the value (of the property)..."

[317] Locke, Two Treatises, Chapter 5 Paragraph 40.

Specifically in a Lockeian world if we take something, labor over it to increase its value, then that something is our property. Locke in this part of his work incorporates two ideas; (i) labor as creating value of property, (ii) labor creating the very property in and of itself, and (iii) labor creating a clear and definable nexus of the property to the person performing the labor. Thus we, when laboring creating the packet we do to send over the Internet, are clearly according to Locke, adding our labors and creating property which is ours.

In 444 US 164 Kaiser v US the Court ruled that property is characterized by the right to exclude others, as follows[318]:

"For over a century, a long line of cases decided by this Court involving Government condemnation of "fast lands" delineated the elements of compensable damages that the Government was required to pay because the lands were riparian to navigable streams. The Court was often deeply divided, and the results frequently turned on what could fairly be described as quite narrow distinctions. But this is not a case in which the Government recognizes any obligation whatever to condemn "fast lands" and pay just compensation under the Eminent Domain Clause of the Fifth Amendment to the United States Constitution. It is instead a case in which the owner of what was once a private pond, separated from concededly navigable water by a barrier beach and used for aquatic agriculture, has invested substantial amounts of money in making improvements. The Government contends that as a result of one of these improvements, the pond's connection to the navigable water in a manner approved by the Corps of Engineers, the owner has somehow lost one of the most essential sticks in the bundle of rights that are commonly characterized as property - the right to exclude others."

Indeed, when we send our packets from our computer to Google or whomever we have a right and the power to exclude others, we can encrypt as we do with the transaction itself. The carrier by precedent does not add any value to the packet. A ship carrier, for example, does in no way add value to some precious work of art. The are merely third parties whose duty is to move it. Would the people who move Michelangelo's marble have the claim to his art on the same basis as he did, we think not.,

Cole and Grossman state further:

"According to the predominant view, if person X holds a "right" to something, at least one other person must have a corresponding duty not to interfere with X's possession and use. If X claims a "right," but cannot point to a corresponding "duty" that is enforceable against at least one other person, then what X possesses may not be a "right" at all but some lesser entitlement such as a privilege, liberty, or mere use..... In Hohfeld's system, to claim that an industrial facility has a right to emit noxious substances into the air would necessarily be to claim that others have an enforceable duty not to interfere with their polluting activity. A legally enforceable "right" presumes a corresponding legally enforceable duty."

[318] See the discussion in Cole and Grossman, Meaning of Property, p 10.

Thus in furtherance of the argument, to have a property right in say a data packet, and there is there a duty; yes indeed, we argue that the carrier has a duty equivalent to a bailee, a duty of care, both to indiscriminately sent the packet anywhere or permit anyone access to it, and to the supplier to protect the transaction[319]. We expect that in our Internet transactions. A duty exists and from that the property right.

9.6.3 Possession

Possession is an extension of the concept of property. We will focus here on the concept of possession under common law as presented by Holmes. As Holmes states in Chapter 5:

"The test of the theory of possession which prevails in any system of law is to be found in its mode of dealing who have a thing within their power, but not own it, or assert the position of an owner for with regard to it, bailees, in a word. It is therefore, as a preliminary to understanding the common-law theory of possession, to study the common law with regard to bailees."

We will be focusing on the issues related to a third party possession of information, bits, packets, the essence of Internet communications.

"I may here return to the case of goods in a chest delivered under lock and key, or in a bale, and the like. It is a rule of the criminal law, that, if a bailee of such a chest or bale wrongfully sells the entire chest or bale, he does not commit larceny, but if he breaks bulk he does, because in the former case he does not, and in the latter he does, commit a trespass./ The reason sometimes offered is, that, by breaking bulk, the bailee determines the bailment, and that the goods at once revest in the possession of the bailor. This is, perhaps, an unnecessary, as well as inadequate fiction. The rule comes from the Year Books, and the theory of the Year Books was, that, although the chest was delivered to the bailee, the goods inside of it were not, and this theory was applied to civil as well as criminal cases. The bailor has the power and intent to exclude the bailee from the goods, and therefore may be said to be in possession of them as against the bailee."

9.6.4 Bailments

We can begin with the definition of bailment. From Dukeminier we have[320]:

"a bailment is a rightful possession of goods by one who is not the owner"

[319] This duty of care is as we have stated on multiple times herein based upon common law and the use of common carriage therein.

[320] Dukeminier et al, Propret, p. 66.

Bailments go back quite a way in English law. Bracton discussed them at length in his works in the thirteenth century. They were already understood and were a key part of what would become a growing economy based on trade and the transport of goods. The concept of bailment was one which was critical to commerce. The owner or merchandise, goods or property often accompanied the goods as they were shipped from place to place, since he had no way to transfer temporray control until the construct of bailment was developed. Bailment allowed a third party to transport the goods without the owner being present and did not transfer ownership from the owner to the buyer, or the new owner. The bailor would then be the merchant and the bailee would be the captain of the ship transporting the goods. The ship captain never took title to the goods, but moreover, the captain had a high level or duty of care as regards to the goods, namely if they were stolen it was the captains fault. Bailments became the corner stone upon which our economy of commerce was to be built. Markets could become distributed, goods made in one location could be sent out to others without the manufacturer travelling personally from market to market. Third parties, the bailees were permitted to make these transfers.

Remember where we are going, we are looking at our packets, and the packets we have already argued are our property, in effect our goods, and we want to get them from one place to another. Thus we would need the use of the bailment principles so well developed over the past thousand years.

Why discuss bailments? Because the have historical import, because they lead to common carriage, because the establish precedent, and because the have over a thousands years of legal precedence from which we can learn about the transports of property.

What are the responsibilities of a bailee? One of the best and probably still current discussion of bailment is the work by Holmes on Common Law[321]. We shall rely upon Holmes to provide insight to the issue.

One of the classic cases was the Marshall case, where the jailor was holding a prisioner as a bailment and had a duty of care.[322] This occurred under the reign of Henry IV in

[321] See Holmes, Common Law, pp. 130-162. Also see Emanuel, Property, pp. 12-16 for a simple explanation. In Emanuel presentation the bailee has a duty during the possession and a duty to redeliver. During possession the duties depend on who is benefiting and as a result there may be varying levels of care required. If there is a mutual benefit, say the bailor get the property delivered and the bailee gets paid for the transport, then the level of care is ordinary diligence; if the bailor is the sole beneficiary, say the transporter is doing a favor, then gross negligence is the standard; if it benefits the bailee only, this requires extraordinary care; and if it is involuntary bailment, say the packet just ends up on my network and nobody pays me and I agree to just hand it off, there is a standard of slight care, namely I can't just throw it away.

[322] See Pluncknett, Common Law, p 478 and Holmes, Common Law, p. 140. Pluncknett provides a more up to date analysis and Pluncknett also integrates bailment with common carriage. We shall discuss that issue next. Holmes when he discusses Marshal has preceded it with the case of the locked chest, in 1315 under Edward II. The locked chest case was one where the bailee had a chest which was locked and the goods or property was in the locked chest. The chest was stolen but while locked. If the goods had been stolen with the chest open the bailee was liable but since the chest was closed when stolen then the bailee had kept his duty and was not liable. Thus in the Internet world one could say if I encrypted my packet and a third party intercepted it the carrier was not liable unless he decrypted the packet. However it does not release the bailee or carrier from a duty. The next case was once under Edward III which we leave to the reader. http://www.law.harvard.edu/library/collections/special/online-collections/common_law/index.php

1455. The case is fairly simple and gets to the issue of liability. The jailor was being sued for having lost a prisioner. The court ruled that if the prisoner was let loose by the French or as a result of the jail having burned down for some reason, the jailor would have no recourse under law and thus having no recourse would have no liability. But in fact the prisoner was let loose by a subject of the King, and the jailor had recourse against these subjects and thus was liable. The issue is that as a bailee the responsibility is great to hold the package of goods.

In today's world we still have many cases of bailment. A simple case is when we take our car and place it in a garage where it is parked for us. The bailment is the car, the bailor is ourselves and the bailee is the garage. The garage has a duty of care. Both we and the garage benefit; we obtain a parking space and the garage gets paid. Also the garage may have a claim against us and use the care as a means to collect if we do not pay.

Thus bailment is a long standing concept in which one party having a property, personal property, such as a chattel, establishes a bailment with a bailee to transport or hold the property for a period of time. This results in multiple duties of care and also bailment has a history of over a thousand years and is a key element of our common law system.

Most importantly, bailment was a means to allow commerce. It allows the ideas of property law, possession and contract to be combined to have goods move from one point to another. We will argue that the principles of bailment are key to understanding the Internet.

9.6.5 Carriage and Common Carriage

Common carriage has been around since at least 1601[323]. However the name "Carryer" was first seen in 1563, thus we know that there may have been a presence of such at that time. In fact Pluncknett notes that the actual term common carrier was earliest found in 1392. Thus we know that the concept of a common carrier has been around for quite a long time. Common carriage was developed to limit the liability of the bailment concept. Ships were to be treated as common carriers and their liability was limited by Acts of God, a termed allegedly coined just for that purpose. Pluncknett further notes:

"...in Forward v Pittard (1785) he (Lord Mansfield) treated the words literally....held a (common) carrier liable for what was certainly an inevitable accident....he(Lord Mansfield) used a striking phrase..."a (common) carrier is in the nature of an insurer""[324]

Noam defines common carriage as follows[325]:

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[323] See Pluncknett, Common Law, p.480.

[324] See Pluncknett, Common Law, p. 482.

[325] See Noam, Beyond Liberalization II, 1994.

" .... "[w]hether a carrier is a common carrier ... does not depend upon whether its charter declares it to be such, ... but upon what it does."[326] The following factors are important in determining common carriage: service is regular, customers are not readily predictable and are changeable, the carrier solicits business from the general public, for example by advertising, law and regulations define the responsibilities of the parties."

Holmes then goes and defines what he means by common carriers:

"... who are common carriers...Besides, hoymen and masters of ships were not originally held because they were common carriers, and they were all three treated as co-ordinate species...We do not get a new and single principle by simply giving a single name to all the cases to be accounted for. If there is a sound rule of public policy which ought to impose a special responsibility upon common carriers, as those words are now understood, and upon no others, it has never yet been stated. If, on the other hand, there are considerations which apply to a particular class among those so designated,--for instance, to railroads, who may have a private individual at their mercy, or exercise a power too vast for the common welfare,--we do not prove that the reasoning extends to a general ship or a public cab by calling all three common carriers."

Namely Holmes is cautious in extending the term too broadly. He then continues;

"If there is no common rule of policy, and common carriers remain a merely empirical exception from general doctrine, courts may well hesitate to extend the significance of those words. Furthermore, notions of public policy which would not leave parties free to make their own bargains are somewhat discredited in most departments of the law. Hence it may perhaps be concluded that, if any new case should arise, the degree of responsibility, and the validity and interpretation of any contract of bailment that there may be, should stand open to argument on general principles, and that the matter has been set at large so far as early precedent is concerned."

Finally Holmes states:

"I have treated of the law of carriers at greater length than is proportionate, because it seems to me an interesting example of the way in which the common law has grown up..."

Now we will use what is currently accepted definition of common carriage. The law defines a common carrier as follows:

***"47 USC 5, I, 153, (10) Common carrier** The term "common carrier" or "carrier" means any person engaged as a common carrier for hire, in interstate or foreign communication by wire or radio or interstate or foreign radio transmission of energy,*

[326] *United States v. Brooklyn Eastern Distr. Terminal,* 249 U.S. 296 (1919).

except where reference is made to common carriers not subject to this chapter; but a person engaged in radio broadcasting shall not, insofar as such person is so engaged, be deemed a common carrier."

This is a classic, but somewhat circular, definition and it is an artifact of the Interstate Commerce Commission ("ICC") legislation which predated the FCC. In fact it was the ICC which managed telecommunications until 1934. Thus physical commerce was, and to many a degree is, the paradigm against which common carriage in telecommunications is viewed.[327]

The FCC has from time to time attempted to provide more clarity on the term and more importantly the Courts have intervened and assisted in this process. In one attempt in the NARUC v FCC decision (1976, 533 F.2nd 601 D.C. Circuit) the Court stated[328]:

"...we set forth our understanding of the common carrier concept...we concluded the circularity and uncertainty of the common carrier definitions set forth in the statute...an examination of the common carrier law reveals the primary sine qua non of common carrier status is a quasi-public character, which arises out of the undertaking "to carry for all people indifferently...this done not mean that the particular services offered must be practicably available to the entire public...a second prerequisite...it is the requirement...that the system be such that customers" transmit intelligence of their own design and choosing"."

The D.C. Court in this case provides two requirements: (i) carrying in an indifferent manner, (ii) customers choose what the want to send. There is the stare decisis issue here by having the Courts define what Congress did not. More importantly, there is a long list of common law interpretations which are the basis for the Court's decisions.

This then leads to the final issue. Under a common law regime, as we shall discuss i this section, is the telecommunications carrier who provides broadband a common carrier? The answer is clearly yes, it is in their very nature to carry in an indifferent manner and allowing the buyer to assemble the communications. The elements are there mainly because the elements are at the heart of the Internet. The Internet pushes the intelligence to the edge of the network, not in the center, and the ability to discriminate any packet from another is non-existent.

Recall from the bailment discussion, the bailee is given a locked packet, in this case an encrypted packet, and the duty of care incumbent on the bailee, in this case the common carrier, is to keep the package closed. Open the packet and look and the bailee has many liabilities. As we shall also see, this may not be a fact under administrative code, namely

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[327] See Brenner, *Law and Regulation of Common Carriers*, Westlaw 1992; this provides an excellent summary of the field. The work by Huber, Kellogg and Thorne. *Federal Telecommunications Law*, Aspen, 1999, is a bit biased in the opinion of the author since Thorne is a General Counsel of Verizon and has taken public polemical positions in favor of Verizon.

[328] See Brenner, Common Carrier, p.40. Brenner has developed a detailed analysis of common carriage prior to the 1996 Act changes. The work of Brenner is an excellent historical overview of the issues at that time.

the FCC can declare something a common carrier for regulatory reasons. The declaration for common law reasons is different and stands on its own. Thus it is in the nature of what any Internet transport providers that under the aegis of common law they are by precedent a common carrier, albeit cable is expressly by administrative law not one[329].[330]

As we have noted above Common Carriage law has been in place in the English speaking world since 1250 AD, at the least.[331] It is a part of common law and tort law.[332] The reasons for its institution are several fold and many are based in the process of transporting property from one point to another. One of the first reasons for having to establish common carriage was that it establishes a legal relationships between three parties; the sender of some property, the receiver of some property and the transporter of that property between the two parties. Thus I may want to send a package from Oxford to Cambridge and I do not want to go there myself. I thus hire a third party to whom I entrust my package. The third party takes the package, but does not own it or take any rights in the package, transports it to the destination and then hands it over to the party in Cambridge.

Simple idea, but like so many things in Common Law, it took many years and centuries to work through the common law legal system and work out the details. These ideas focused on all the issues relating to the sending of "my" property to another by using a third party, without changing title of the property and while having the third party carrier of my property having a certain degree of responsibility. The third party never took legal possession of my property. It was mine and remained mine even though I gave it to that third party for transport only. The third party did however assume a duty and responsibility.

Second, it affects smooth and effective commerce. It means that transporters of goods from docks pay a going rate and that the transporter does not take any liability for what is inside the container. Lloyds of London was established to insure the cargo. It was not the owner of the ship who inspected and took responsibility for the cargo. It was a separate entity which got involved in what was inside the packages. In fact the ship owners were

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329 See Huber, Telecom Law, p. 1165.

330 This argument does raise an interesting issue. If one accepts the construct: common law, leads to property, leads to bailment, leads to common carriage leads to tort protection, then what of the cable company. We argue the telco is protected by a common carriage position. Is the cable company then liable under bailment, namely are they liable not for the common carrier liability of the cost to carry, but the cost of the loss. We believe that indeed that may very well be. They have accepted the property, transported, eschewed common carriage, and are acting as a bailee. They have substantial liability unless then can argue exemptions under contract law, which may be the case.

331 The term common carriage was originally understood as bailment. Bailment is the delivery of goods or personal property of one person to another. The person doing the delivery is did not won the property but was in trust of the property. Oliver Wendell Holmes, in *The Common Law*, 1881, Chapter V spends the entire chapter o this concept. Bailment dates back to Salic Law and the legal ownership and property provisions for cows wandering fields obtaining feed.

332 See Pluncknett, *A Concise History of the Common Law*, 1929. In Plunckett, p. 482 he notes that the first recorded time in English history there was a family called Carryer, whose trade was carriage, and this was in 1563. He also relates a statement in 1392 also relating to carriage. The concept was well founded at that time in Common Law. Edward III in both 1368 and 1373 (Plunckett p 481) also establishes a common carriage.

held harmless for the packages based upon the fact that the transported sealed goods and had no control of the contents.

Third, is the issue of efficient interconnection between common carriers. In 1816, in New Hampshire, there was a case typifying such interconnection, between two horse carriage lines.[333] The courts in New Hampshire ruled in favor of efficient and open interconnection of these two separate carriers. Thus the many elements of common carriage that we know and accept are the retention of ownership, the anonymity of the contents to the carrier and the ability and requirement to interconnect between carriers.

There is an important issue to be discussed in the context of common carriage. The issue is the one relating statutory common carriage as defined in 47 USC and the common carriage under common law. We have been discussing the latter. However. the former has changed for Verizon and expectedly the other incumbents. In December 2004 Verizon requested forbearance under 47 USC 160 from statutory common carriage requirements. Those requirements would require Verizon to list a tariff, to provide an interface, possibly unbundle, and many of the other requirements of common carriers.[334] The FCC looked at the petition and did not act. By not acting the FCC tacitly gave Verizon the forbearance. It was a two to two deadlock that had the two Republicans in the Verizon camp and the two Democrats in the people's camp.[335]

Verizon used 47 USC 160 requirements as follows:

"§ 160. Competition in provision of telecommunications service

(a) Regulatory flexibility

Notwithstanding section 332 (c)(1)(A) of this title, the Commission shall forbear from applying any regulation or any provision of this chapter to a telecommunications carrier or telecommunications service, or class of telecommunications carriers or telecommunications services, in any or some of its or their geographic markets, if the Commission determines that—

***(1)** enforcement of such regulation or provision is not necessary to ensure that the charges, practices, classifications, or regulations by, for, or in connection with that telecommunications carrier or telecommunications service are just and reasonable and are not unjustly or unreasonably discriminatory;*
***(2)** enforcement of such regulation or provision is not necessary for the protection of consumers; and*

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[333] Refer to 10 N.H. 481 (1839) as noted in an unpublished section by Adam Candeub, *Common, Carriage at the Crossroads*, TPRC 2004.

[334] See Verizon Petition to FCC December 20, 2004 for forbearance under 47 USC § 160.

[335] See FCC News Release March 20, 2006.

(3) *forbearance from applying such provision or regulation is consistent with the public interest."*

The FCC forbearance was based upon the Commissioners view that the three conditions were met. Let us look at them:

1. No regulation needed to ensure proper and fair charges, practices or classification. Clearly this whole debate goes to the heart of charges and practices! One would have to ask what was in the mind of the FCC in this failure to decide.

2. Not required for protection of consumers: Clearly what we have been discussing herein is only consumer protection. We have argued property rights and consumer protection. Why has the FCC foresworn this duty. The Whitacre Conjectures were already well publicized at the time of the FCC's failure to act.

3. Consistent with the public interest. The public interest is best serviced by having a vibrant and competitive Internet. The FCC's actions clearly have destroyed that option.

However. we have argued herein that common carriage at common law is preserved. It is common law litigation by the consumers to seek their own protection.

9.6.6 Statutory Law and Transport

There are many statutory laws, rule, regulations as regards to telecommunications and its impact on the Internet[336]. The law in this area is 47 USC, the code which has been developed predicated on the law itself. This is administrative code law. When we discuss the issues of common carriage we are doing so under the rubric of common law not necessarily the administrative law as administered by the FCC.

9.6.7 Summary of Issues

In this section we have addressed multiple issues. Let us summarize our arguments and conclusions:

1. Property rights convey to a persona Internet traffic. The packets are the personal property of the individual under the understanding of common law.
2. The historical common law concept of bailment provides a basis for understanding the duties and obligations of the transporters of the data packets in

[336] See Huber et al, Federal Telecommunications Law. The authors, especially Thorne, as a Verizon executive, bring a clearly biased view to this text but notwithstanding the text represent one of the more comprehensive accumulations of telecommunications law. There are however views and interpretations which one must be careful to place in context because of the author's relationships and loyalties.

an Internet environment. More specifically, we as the creators and owners of the Internet packet property retain ownership as the bailor and the bailee, namely the carrier, has duties based on over a thousand years of common law.

3. Common carriage is both a legal administrative law construct and a constructed accepted at common law. In fact the current administrative law construct, as stated in 47 USC, the rules of the FCC, being circular should be interpreted primarily at common law. Thus we can look to the transporter of our packets as a special type of bailee, namely a common carrier. This means that we can then use the duties of common carriers at common law for remedies and recourse.
4. Common law, as separate from administrative law, provides us individually with remedies in the invent of damages. Damages may result by the carrier applying an unlawful tax, a separate surcharge, on our packets. To do this clearly the carrier must open the packets and thus violating the duties of a bailee. Common law then is the proper ground for redress.
5. Administrative law is a way for the Government to view its relationship to the carrier. Common law is the way the individual view their relationship. Thus there may, and frequently is, a variance between the two.

9.7 Regulatory Changes

In 1996 the Congress passed a new Telecom Act to update the FCC Act of 1934. This was one of the largest changes in the history of the Act. However over the past ten years the FCC has made drastic changes as well as the Courts making similar changes. In this section we outline those changes and how they relate to the Internet. The FCC's approach is to encroach more and more on the Internet and where possible make it look more and more like the old regulated telephone world. One could expect such a change but one is surprised as to how quickly this occurred. The collapse of the Telecom Market in 2001-2202 was just a opportunity for the FCC and the incumbents to create barriers to entry and establish new burdens while at the same time shedding burdens that the incumbent had to bar under the new Act. We review some of the recent changes as regards to the Internet in this Section and then attempt to analyze their impact.

9.7.1 FCC Decisions

The following eight decisions by the FCC to further clarify and implement the 1996 Telecom Act actually do more to demonstrate a severe regressive move from deregulation to regulation. In the more than seventy two years of the existence of the FCC these rulings have established the base for what may be viewed a regressive policy, one which we will attempt to show will slow broadband growth more than anything else.

9.7.1.1 FCC 02-77 Broadband over Cable Declaratory Ruling (March 2002)

The following summarizes the FCC decision making a cable modem an information service rather than a telecommunications service.

"In considering the issues before us we are guided by several overarching principles. First, consistent with statutory mandates, the Commission's primary policy goal is to "encourage the ubiquitous availability of broadband to all Americans."... we seek "to preserve the vibrant and competitive free market that presently exists for the Internet and other interactive computer services, unfettered by Federal or State regulation.".

Second, we believe "broadband services should exist in a minimal regulatory environment that promotes investment and innovation in a competitive market." In this regard, we seek to remove regulatory uncertainty that in itself may discourage investment and innovation. And we consider how best to limit unnecessary and unduly burdensome regulatory costs.

Third, in this proceeding, ... we seek to create a rational framework for the regulation of competing services that are provided via different technologies and network architectures. We recognize that residential high-speed access to the Internet is evolving over multiple electronic platforms, including wireline, cable, terrestrial wireless and satellite. By promoting development and deployment of multiple platforms, we promote competition in the provision of broadband capabilities, ensuring that public demands and

needs can be met. We strive to develop an analytical approach that is, to the extent possible, consistent across multiple platforms.

For the reasons discussed below, we conclude that cable modem service, as it is currently offered, is properly classified as an interstate information service, not as a cable service, and that there is no separate offering of telecommunications service."

To better understand this we present the definitions of information and telecommunications services as used by the FCC[337]:

"(*41) INFORMATION SERVICE- The term information service means the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service....*

(*48) TELECOMMUNICATIONS- The term telecommunications means the transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received.*

(*49) TELECOMMUNICATIONS CARRIER- The term telecommunications carrier means any provider of telecommunications services, except that such term does not include aggregators of telecommunications services (as defined in section 226). A telecommunications carrier shall be treated as a common carrier under this Act only to the extent that it is engaged in providing telecommunications services, except that the Commission shall determine whether the provision of fixed and mobile satellite service shall be treated as common carriage...*

(*51) TELECOMMUNICATIONS SERVICE- The term telecommunications service means the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used."*

The key to understanding the FCC is that one starts with the definition of Telecommunications and that the form or content is changing. This is clear. The Telecommunications Carrier and the Telecommunications Service follow from the fist definition. Now as to Information Service, it is not everything but Telecommunications Service, it does not say a change must occur, it was historically related to wars between the telephone companies and newspapers. This definition was to protect the newspaper industry in the context of the world in the 1980s. It was not designed to deal with the Internet world. In the 1995-1996 time period Congress and more particularly the FCC had not yet seen no less understood what the Internet would do. Thus one could argue

[337] See 1996 Telecom Act, Definitions.

that the service is clearly not Telecommunications due to the change clause but it begs the question if it is Information. The FCC says so for two reasons.

To free up the cable companies from cable regulation, another part of the code which the FCC rules over, but also to enable the FCC to have dominion over this technology. In reality the FCC in its wisdom could have reached an altogether different decision, Namely it could have decided that a cable modem was not a Telecommunications Service, was not controlled as a cable service under the Act, and the FCC had no interest in it at all. If a cable company wanted to run an amusement park, why should the FCC care. However this decision represents the continuing attempt to regulate everything despite the words of intent as shown above.

9.7.1.2 FCC 04-179 Unbundling of Incumbents Order (August 2004)

The 1996 Telecom Act had an unbundling clause. Namely it required the incumbent monopolist to unbundle essential elements of the network to permit competition. Such an element would be a local copper wire from the central office to the customer's premise. The monopolist would be required to provide a meet point, provide the element in a timely manner and at a reasonable price. Needless to say this never occurred and the FCC never even tried to enforce it. However certain large carriers such as AT&T did manage to obtain via litigation unbundled service elements, and the collection of these elements became a fully bundled local service (called a UNE, unbundled network element, or simply a fully equipped local loop). Thus AT&T could compete head to head with the monopolist and via the litigation rout could bundle their service elements at a competitive price....for a time. However the litigation resulted in the FCC being requested to deal with the issue. This ruling is the FCC's response.

The FCC states:

"Although we initiate a new proceeding to craft final unbundling rules that address the requirements of USTA II, we find that the pressing need for market certainty until we issue final unbundling rules warrants the implementation of a plan that will preserve for six months certain obligations as they existed on June 15, 2004, and then, during a subsequent six-month period, permit competitive LECs to access from incumbent LECs certain network elements at increased rates. Specifically, we conclude that the appropriate interim approach here is to require incumbent LECs to continue providing unbundled access to switching, enterprise market loops, and dedicated transport under the same rates, terms and conditions that applied under their interconnection agreements as of June 15, 2004.... We emphasize at the outset that the twelve-month transition described herein is essential to the health of the telecommunications market and the protection of consumers.

While carriers can address short-term instability through negotiated modification of interconnection agreements, it appears that the change of law provisions found in carriers' interconnection agreements vary widely. While some agreements provide for

periods of renegotiation in which parties would work to amend them, others immediately invalidate the affected provisions while renegotiations are proceeding...

There is credible evidence before us that some incumbents have informed competitive LECs of their intention to initiate proceedings to curtail their UNE offerings, and that at least one BOC has announced its intention to withdraw certain UNE offerings immediately. While such actions are permitted under the court's holding in USTA II, they would likely have the effect of disrupting competitive provision of telecommunications services to millions of customers.

Moreover, whether competitors and incumbents would seek resolution of disputes arising from the operation of their change of law clauses here, in federal court, in state court, or at state public utility commissions, and what standards might be used to resolve such disputes, is a matter of speculation. What is certain, however, is that such litigation would be wasteful in light of the Commission's plan to adopt new permanent rules as soon as possible. Therefore, consistent with our statutory mandate to protect the public interest, we adopt the following interim and transition requirements.

***.....** 18. Our plan to issue revised unbundling rules on an expedited basis does not alone provide the requisite market stability in the near term. The absence of clear rules, as stated above, threatens to disrupt the business plans of competitive carriers and their service to millions of customers that rely on competitive service offerings. This is a risk to the public interest too great to bear unheeded.*

The public interest is best served by clarity with regard to the rates, terms and conditions under which network elements must be made available to requesting carriers. Specifically, we require that... incumbent LECs shall continue providing unbundled access to switching... In order to allow a speedy transition in the event we ultimately decline to unbundle switching, enterprise market loops, or dedicated transport, we expressly preserve incumbent LECs' contractual prerogatives to initiate change of law proceedings to the extent consistent with their governing interconnection agreements..."

9.7.1.3 FCC 04-290 Unbundling of Incumbents Order on Remand (February 2005)

"3. This Order imposes unbundling obligations in a more targeted manner where requesting carriers have undertaken their own facilities-based investments and will be using UNEs in conjunction with self provisioned facilities. By adopting this approach, we spread the benefits of facilities-based competition to all consumers, particularly small- and medium-sized enterprise customers. We believe that the impairment framework we adopt is self-effectuating, forward-looking, and consistent with technology trends that are reshaping the industry. As we recognize below, the long distance and wireless markets are sufficiently competitive for the Commission to decline to unbundle network elements to serve those markets. Our unbundling rules are designed to remove unbundling obligations over time as carriers deploy their own networks and downstream local exchange markets exhibit the same robust competition that characterizes the long distance and wireless markets. ....

6. 5. The executive summary of this Order is as follows:

> • ***Unbundling Framework.*** *We clarify the impairment standard adopted in the Triennial Review Order in one respect and modify our application of the unbundling framework in three respects. First, we clarify that we evaluate impairment with regard to the capabilities of a reasonably efficient competitor. Second, we set aside the Triennial Review Order's "qualifying service" interpretation of section 251(d)(2), but prohibit the use of UNEs exclusively for the provision of telecommunications services in the mobile wireless and long distance markets, which we previously have found to be competitive. Third, in applying our impairment test, we draw reasonable inferences regarding the prospects for competition in one geographic market based on the state of competition in other, similar markets. Fourth, we consider the appropriate role of tariffed incumbent LEC services in our unbundling framework, and determine that in the context of the local exchange markets, a general rule prohibiting access to UNEs whenever a requesting carrier is able to compete using an incumbent LEC's tariffed offering would be inappropriate.*
>
> • ***Dedicated Interoffice Transport.*** *Competing carriers are impaired without access to DS1 transport except on routes connecting a pair of wire centers, where both wire centers contain at least four fiber-based collocators or at least 38,000 business access lines. Competing carriers are impaired without access to DS3 or dark fiber transport except on routes connecting a pair of wire centers, each of which contains at least three fiber-based collocators or at least 24,000 business lines. Finally, competing carriers are not impaired without access to entrance facilities connecting an incumbent LEC's network with a competitive LEC's network in any instance. We adopt a 12-month plan for competing carriers to transition away from use of DS1- and DS3- capacity dedicated transport where they are not impaired, and an 18-month plan to govern transitions away from dark fiber transport. These transition plans apply only to the embedded customer base, and do not permit competitive LECs to add new dedicated transport UNEs in the absence of impairment. During the transition periods, competitive carriers will retain access to unbundled dedicated transport at a rate equal to the higher of (1) 115 percent of the rate the requesting carrier paid for the transport element on June 15, 2004, or (2) 115 percent of the rate the state commission has established or establishes, if any, between June 16, 2004 and the effective date of this Order.*
>
> • ***High-Capacity Loops.*** *Competitive LECs are impaired without access to DS3-capacity loops except in any building within the service area of a wire center containing 38,000 or more business lines and 4 or more fiber-based collocators. Competitive LECs are impaired without access to DS1-capacity loops except in any building within the service area of a wire center containing 60,000 or more business lines and 4 or more fiber-based collocators. Competitive LECs are not impaired without access to dark fiber loops in any instance. We adopt a 12-month plan for competing carriers to transition away from use of DS1- and DS3-capacity loops where they are not impaired, and an 18-month plan to govern transitions away from*

dark fiber loops. These transition plans apply only to the embedded customer base, and do not permit competitive LECs to add new high-capacity loop UNEs in the absence of impairment. During the transition periods, competitive carriers will retain access to unbundled facilities at a rate equal to the higher of (1) 115 percent of the rate the requesting carrier paid for the unbundled loops on June 15, 2004, or (2) 115 percent of the rate the state commission has established or establishes, if any, between June 16, 2004 and the effective date of this Order.

• ***Mass Market Local Circuit Switching.*** *Incumbent LECs have no obligation to provide competitive LECs with unbundled access to mass market local circuit switching. We adopt a 12-month plan for competing carriers to transition away from use of unbundled mass market local circuit switching. This transition plan applies only to the embedded customer base, and does not permit competitive LECs to add new switching UNEs. During the transition period, competitive carriers will retain access to the UNE platform (i.e., the combination of an unbundled loop, unbundled local circuit switching, and shared transport) at a rate equal to the higher of (1) the rate at which the requesting carrier leased that combination of elements on June 15, 2004, plus one dollar, or (2) the rate the state public utility commission establishes, if any, between June 16, 2004, and the effective date of this Order, for this combination of elements, plus one dollar."*

What this decision did was to gut any attempt by a new entrant to obtain unbundled back haul networks. Thus, for example, if a small CLEC wanted to interconnect towns with dark fiber and wanted to obtain a dark fiber from say Verizon, this order prohibited that practice. Now, on a going forward basis, if one wanted to have a fiber backbone one needed to build the total facility. This in one way creates a potential for gross overbuilding if it were economically viable, and on the other hand it re-enforces the monopoly strength of the RBOC.

9.7.1.4 FCC 05-78 Un-regulating Broadband Order (March 2005)

The issue in this order is the fact that DSL competitors wanted to have DSL elements covered under the unbundling regulations. The Commission in its wisdom in this order totally deregulates DSL, and further the FCC takes sole and total control over the DSL market. Thus companies like Covad and others are placed in a less economically favorable position on a going forward basis. Specifically the FCC states:

"16. On December 9, 2003, BellSouth filed its request for a declaratory ruling requesting that the Commission preempt state commission decisions that require incumbent LECs to provide DSL service to end users utilizing competitive LEC UNE voice lines. Specifically, BellSouth bases its request on three grounds. First, BellSouth asserts that the state decisions conflict with, and substantially prevent the implementation of, the Commission's unbundling rules in the Triennial Review Order. Second, BellSouth argues that the state commission decisions are an unlawful regulation of information services. Third, BellSouth avers that the state commission decisions conflict with the Commission's jurisdiction as the exclusive regulator of the provision of interstate DSL services..."

The following is the rather less than clear statement of the FCC that they will not force unbundling of the loop for DSL. Namely if a competitor wants the loop they must pay for a fully bundled loop at the then going rate even though they want a portion of it. The FCC states that the loop, albeit dividable into frequency bands, must be sold as a non-disaggregated element. The FCC states this as follows:

"24. As an initial matter, we find that the state commission requirements that BellSouth provide DSL Internet access service over the high frequency portion of a competitive LEC's UNE loop establish unbundling requirements that are properly evaluated under section 251(d)(3)(A). .... We find that state decisions that require BellSouth to provide DSL service over the HFPL while a competitive LEC provides voice service over the low frequency portion of a UNE loop facility effectively require unbundling ....Although a competitive LEC officially leases the entire loop, state commission requirements that require BellSouth to provide DSL over the same loop effectively take back the HFPL from the competitive LEC, thus leaving the competitive LEC with only the remaining LFPL. In effect, therefore, this scenario requires an incumbent LEC to provide unbundled access to only the LFPL, an element that the Commission expressly declined to unbundle....

26. Specifically, state commission decisions that require BellSouth to provide DSL service over the high frequency portion of a competitive LEC's UNE loop violate section 251(d)(3)(B) because such decisions directly conflict and are inconsistent with the Commission's rules and policies implementing section 251. The Commission concluded in the Triennial Review Order that unbundling the LFPL "is not necessary to address the impairment faced by requesting carriers because we continue (through our line splitting rules) to permit a narrowband service-only competitive LEC to take full advantage of an unbundled loop's capabilities by partnering with a second competitive LEC that will offer xDSL service." Importantly, the Commission supported its determinations with rules that enable a competing carrier that does not provide all of the services a customer may want, to team with another competing carrier in order to provide other complementary services over the same loop facility. This determination directly addresses incumbent LECs' 251(c) unbundling obligations relating to the provision of DSL service. We note that the D.C. Circuit affirmed these conclusions.

27. State requirements that impose on BellSouth a requirement to unbundle the LFPL do exactly what the Commission expressly determined was not required by the Act and thus exceed the reservation of authority under section 251(d)(3)(B). Indeed, a U.S. District Court recently held that a state commission requirement for an incumbent LEC "to continue to provide all existing data services in the [HFPL] . . . to any customer that chooses [the competitive LEC] as their local service carrier for voice . is functionally identical to compelled unbundling of the HFPL and LFPL and therefore cannot be sustained as consistent with federal law." State decisions that require BellSouth to provide its DSL service over a competitive LEC's leased UNE loop facility impose a condition on the UNE facility that effectively unbundles the LFPL, and is therefore inconsistent with federal law.....

30. As stated above, the Commission based it decision not to unbundle the LFPL on the availability of line splitting between competing carriers in order to advance the goals of the Act by spurring "innovative arrangements between voice and data competitive LECs and greater product differentiation between the incumbent LECs' and the competitive LECs' offerings." Under these state commission decisions, incumbent LECs and competitive LECs would face a decidedly different set of incentives for the deployment of broadband facilities. Thus, these state requirements undermine the effectiveness of the incentives for deployment, including the advancement of section 706 goals that were at the heart of the Commission's mass market loop unbundling rules, and therefore do not pass muster under section 251(d)(3)(C) of the Act."

9.7.1.5 FCC 05-150 Universal Service Order (September 2005)

The issue of universal service is one which has seen a significant amount of debate[338]. Universal Services is the mandate to provide services by any carrier to any person not individually financially able to obtain the service in the area in which the inhabit. Namely the low income and rural customers. The universal services provisions are as follows from FCC:

" (b) UNIVERSAL SERVICE PRINCIPLES- The Joint Board and the Commission shall base policies for the preservation and advancement of universal service on the following principles: (1) ***QUALITY AND RATES.....****-(2)* ***ACCESS TO ADVANCED SERVICES****- ..... (3)* ***ACCESS IN RURAL AND HIGH COST AREAS****- ..... (4)* ***EQUITABLE AND NONDISCRIMINATORY CONTRIBUTIONS****.....*

(c) DEFINITION (1) IN GENERAL- Universal service is an evolving level of telecommunications services that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services..... such telecommunications services; (A) are essential to education, public health, or public safety; (B) have, through the operation of market choices by customers, been subscribed to by a substantial majority of residential customers; (C) are being deployed in public telecommunications networks by telecommunications carriers; and (D) are consistent with the public interest, convenience, and necessity....."

Universal service has been in effect de facto since the Kingsbury decision of 1913.[339]This implicitly allowed AT&T to retain its monopoly subject to the agreement to provide, ultimately, universal service. The universal service would mean that there would be access to all people to telephone services and that for poor people that service would be subsidized. The state PUCs then followed up on this and embodied this in state

[338] See McGarty, Universal Service, 1996. In this section the author looks at the universal service issue from a historical and a going forward basis. It was the authors view that this funds was a form of taxation and that in reality for every dollar the monopolist collected only ten cents actually went to provide true universal service. The remainder went into the pockets of the management of the monopolist not even to the shareholders.

[339]See Weinhaus, p. 9.

regulatory requirements. In effect, AT&T and the BOCs were transferring wealth fro the "rich" to those who could not pay for such services, either because of their income or because the costs to provide services to that individual would be prohibitive. This was then an enforced payment, established and managed by the BOCs, for the purpose of collecting moneys from the haves for redistribution by the BOCs to what was perceived as the have nots. Needless to say this is per se taxation. From a Constitutional perspective such rights inure solely to the states and the Federal governments and under the Commerce Clause it is highly problematic that any independent third party has any right to tax especially as regards to interstate commerce. Needless to say there has never been a challenge her.

The Universal services fund was and still is a taxation by the BOCs to redistribute income. It also is a pool of funds to be used by them as a vehicle to bar competition. The universal services issue however goes to the heart of the interconnection issue. The RBOCs have used this ruse as a means to control competition in two ways. First, in interexchange access they have charged an access fee disproportionately higher than costs since it was then used as a basis for universal services. This was the taxation issue. Second, they have used a unilateral fee for any other interconnect player. Thus cellular companies, arguable providing local services, pay for initiating ad terminating calls. This has been changed by the new Act.

The Act has mandated a separate Universal Services fund to be managed by the Government, and thus the Governments powers to tax are valid and this is a legal act in contrast to the arguably illegal actions of the RBOCs in the pursuit of taxation. Second, the Act mandates balanced interconnection.

In late 2005 the FCC mandated that Universal Service now cover the Internet segments as well, namely VOIP. Their ruling walked a narrow line. On one hand they tried to justify their calling cable modems an information service and then call VOIP one subject to Universal service fees.

"5. In accordance with our responsibilities under the Act, and in light of the competitive and technical characteristics of the broadband Internet access market today, we take the following actions to establish a comprehensive regulatory framework for facilities-based providers of wireline broadband Internet access service:

• Consistent with the Supreme Court's opinion in NCTA v. Brand X, we determine that facilities-based wireline broadband Internet access service is an information service.

• Facilities-based wireline broadband Internet access service providers are no longer required to separate out and offer the wireline broadband transmission component (i.e., transmission in excess of 200 kilobits per second (kbps) in at least one direction) of wireline broadband Internet access services as a stand-alone telecommunications service under Title II, subject to the transition explained below. In addition, the Bell Operating Companies (BOCs) are immediately relieved of all other Computer Inquiry requirements with respect to wireline broadband Internet access services.

• Facilities-based wireline carriers are permitted to offer broadband Internet access transmission arrangements for wireline broadband Internet access services on a common carrier basis or a non-common carrier basis.

• Facilities-based wireline Internet access service providers must continue to provide existing wireline broadband Internet access transmission offerings, on a grandfathered basis, to unaffiliated ISPs for a one-year transition period.

• We affirm that neither the statute nor relevant precedent mandates that broadband transmission be a telecommunications service when provided to an ISP, but the provider may choose to offer it as such. We determine that the use of the transmission component as part of a facilities-based provider's offering of wireline broadband Internet access service to end users using its own transmission facilities is "telecommunications" and not a "telecommunication service" under the Act. 6.

We also address other important areas relating to the provision of broadband Internet access services including:

• We maintain the status quo for universal service during for a 270-day period pending resolution of the USF Contribution Methodology proceeding.

• We ensure no adverse impact on public safety through the continued requirement that voice over IP (VoIP) providers using wireline broadband Internet access facilities comply with E911 obligations.

• We confirm that this Order does not affect disability access obligations the Commission has adopted pursuant to its Title I ancillary jurisdiction, and we will continue to exercise our Title I authority, as necessary, to give full effect to the accessibility policy embodied in section 255.

• Nothing in this Order changes requesting telecommunications carriers' rights to access unbundled network elements (UNEs) under section 251 and our related implementing rules."

This ruling as seen in the writings above takes just another, but very potent element of telecommunications regulation and taxation and applies it to the Internet. The issue is what is IP based voice. The FCC creates a bright line where in the future no such line may exist[340].

[340] See McGarty, IP Telephony and Multimedia Communications. In the IP section the author presents a detailed description of what VOIP is. This section was prepared ten years ago when the senior author constructed and operated one of the first global IP voice networks. The Multimedia section addresses the issue of combining voice in a full multimedia environment. This section was a result of research at MIT in the late 1980s. At that time the issue was that in a true multimedia environment one cannot distinguish voice from video from image etc. Thus we argue that the FCC's ruling is a best a niche ruling and ultimately has no relationship to reality. In fact the ruling we argue is just another step to attempt to regulate the Internet as it has the classic monopolistic telephone network.

9.7.1.6 FCC 05-153 CALEA and Broadband Access (September 2005)

CALEA is the Federal law requiring that all telecommunications service providers permit Federal Agencies to wiretap communications. It actually has been broadened to include any and all Internet communications. In the Fall of 2005 the FCC mandated that CALEA apply to all of the Internet.

"1. In this Order, we conclude that the Communications Assistance for Law Enforcement Act (CALEA) applies to facilities-based broadband Internet access providers and providers of interconnected voice over Internet Protocol (VoIP) service. This Order is the first critical step to apply CALEA obligations to new technologies and services that are increasingly relied upon by the American public to meet their communications needs"

This ruling is another step to control the Internet. CALEA is a burdensome regulation since the carrier must have installed hardware and software in anticipation of the Government seeking whatever it wants. The equipment may sit idle forever, and the cost then come out of the pockets of the carrier, and ultimately from the consumer.

9.7.1.7 FCC 06-56 CALEA on VOIP Order (May 2006)

In mid 2006 the FCC added specific rules that the Internet providers must meet in order to comply with CALEA. Specifically the FCC states:

"1. In the Second Report and Order (Second R&O), we address several issues regarding CALEA implementation raised in the Notice of Proposed Rulemaking (Notice) in this proceeding. In particular, the Second R&O addresses the assistance capabilities required, pursuant to section 103 of the Communications Assistance for Law Enforcement Act (CALEA), for facilities-based broadband Internet access providers and providers of interconnected Voice over Internet Protocol (VoIP). Telecommunications industry standard-setting bodies, working in concert with law enforcement agencies (LEAs) and other interested parties, are developing technical requirements and solutions for these providers, and we conclude that, absent the filing of a deficiency petition under CALEA section 107(b), it would be premature for the FCC to intervene in the standards development process. Additionally, we permit all carriers providing facilities-based broadband Internet access and interconnected VoIP services until May 14, 2007 to come into compliance with CALEA. Further, we require that all carriers providing facilities-based broadband Internet access and interconnected VoIP service to submit interim reports to the Commission to ensure that they will be CALEA-compliant by May 14, 2007. We also require that all facilities-based broadband Internet access and interconnected VoIP providers to whom CALEA obligations were extended in the First R&O come into compliance with the system security requirements in our rules within 90 days of the effective date of this Second R&O.

2. More generally, we herein specify mechanisms to ensure that telecommunications carriers comply with CALEA. Specifically, under the express terms of the statute, all carriers subject to CALEA are obliged to become CALEA-compliant...."

9.7.1.8 FCC 06-94 Universal Service and VOIP (June 2006)

This ruling in mid 2006 finalizes the Universal Service tax on all VOIP carriers.

"2. In this Order, we take two critical actions to ensure the stability and sufficiency of the Fund. First, we raise the interim wireless safe harbor from its current 28.5 percent level to 37.1 percent. Second, we establish universal service contribution obligations for providers of interconnected voice over Internet Protocol (VoIP) service."

9.7.1.9 Summary of Recent FCC Actions

In the following Table we summarize the recent FCC actions.

FCC Ruling	*Action On Internet*	*Implication*
FCC 02-77 Broadband over Cable Declaratory Ruling	The FCC rules that cable modem broadband is an information service and not a telecommunications service	This means that Cable companies were now free from any potential telecommunications service provider regulation per the FCC. It does not mean than under common law that they cannot be held as a common carrier. The Cable companies were free from any duties of a telecommunications service provider such as access. Cable companies are not forced to open their networks. The Cable companies retain closed networks.
FCC 04-179 Unbundling of Incumbents Order	This is the FCC's first step in delimiting the unbundling. The FCC rules that the monopolist is not forced to sell unbundle the UNEs.	This is one of the final nails in the coffin of AT&T. Before this AT&T was trying to sell local access as part of its service offerings. It did so through UNE. This ruling stopped that process.
FCC 04-290 Unbundling of Incumbents Order on Remand	This is the FCC second step in stopping unbundling of broadband elements.	This order was the last unbundling order but the first to be directed at broadband. The monopolists were now allowed to not sell dark fiber to other competitors. This means that anyone who wants to compete with the monopolist must build a totally redundant facility in all its parts.
FCC 05-78 Un-regulating Broadband Order	The FCC takes the step in totally un-regulating the monopolists broadband. It allows them henceforth not to have any duty under the 1996 Act to provide access, interconnection or unbundling.	This was a key element in the monopolists strategy. Before this the monopolists argued that they would not build any broadband because they could be disintermediated by competitors who could get access to prices of their network at a marginal cost. The FCC folded and gave them monopoly power again. This ruling may be seen as a corollary of Kingsbury.

FCC Ruling	*Action On Internet*	*Implication*
FCC 05-150 Universal Service Order	Universal services is a tax applied to monopoly services. In return for the monopoly the carrier agreed to provide service to everyone. The way the carrier did this was not out of its profits but by taxing the consumer and then using the tax itself. Universal service tax is the only tax in the US which is collected and used by a non Government entity. The FCC now burdened the Internet with this tax, specifically VOIP.	This eliminates any cost difference and forces prices up to the consumer. It takes away another advantage to a new entrant. The FCC again plays directly into the hands of the monopolists establishing another barrier to entry for new entrants.
FCC 05-153 CALEA and Broadband Access	The FCC applies the CALEA requirements.	This adds the costs to Internet providers no matter where they are to comply with CALEA.
FCC 06-56 CALEA on VOIP	The FCC specifies CALEA on VOIP.	Now makes VOIP fully compliant with all elements of classic monopolistic telephone service.
FCC 06-94 Universal Service and VOIP	This is the final taxing order on VOIP for universal service.	With this order VOIP now is taxes, it must meet CALEA, it is regulated like a telecommunications service and ultimately will be controlled in detail by the FCC. The FCC takes no note of that fact that such a service can be integrated as one of many mixed and indistinguishable elements in a multimedia communications network. The FCC, under the Martin Chairmanship, is retains a centrally controlled regulatory stranglehold on the Internet.

9.7.2 Supreme Court Rulings

The Supreme Court has had more and more to deal with the way telecommunications functions. Part of that is a result of interpreting the law and part is in dealing with people who have brought suit against the incumbents. We consider a few key ruling herein to provide a perspective of what the Court's recent thinking is.

9.7.2.1 NCTA et al v. Brand X No 04-277 June 27, 2005

The Brand X case was a case where a DSL seller wanted access to unbundled elements pursuant to the 1996 Act. The incumbent argued that the service was information and not telecommunications and not subject to the Act. The FCC held a hearing and went through the regulatory process and came up with the conclusion that indeed it was information and brand X had no rights. The Court's ruling was on the process the FCC used not on the merits of the conclusion. Specifically the Court said;

"Held: The Commission's conclusion that broadband cable modem companies are exempt from mandatory common-carrier regulation is a lawful construction of the Communications Act under Chevron and the Administrative Procedure Act. Pp. 8–32. 1. Chevron's framework applies to the Commission's interpretation of "telecommunications service.... (a) Chevron governs this Court's review of the Commission's construction.... Chevron requires a federal court to defer to an agency's construction, even if it differs

from what the court believes to be the best interpretation, if the particular statute is within the agency's jurisdiction to administer, the statute is ambiguous on the point at issue, and the agency's construction is reasonable. .... The Commission's statutory authority to "execute and enforce" the Communications Act...give the Commission power to promulgate binding legal rules; the Commission issued the order under review in the exercise of that authority; and there is no dispute that the order is within the Commission's jurisdiction...."

9.7.2.2 535 US 467 Verizon v FCC May 2002

This case relates to the methods that the FCC used to establish rates for unbundling. The case like the previous goes through the issues of the FCC's process and authority. The result is that the Court agrees that the FCC has come up with a procedure using and accepted process. The Court holds:

In order to foster competition between monopolistic carriers providing local telephone service and companies seeking to enter local markets, provisions of the Telecommunications Act of 1996... and direct the Federal Communications Commission ...to prescribe methods for state utility commissions to use in setting rates for the sharing of those elements, ... "just and reasonable rates" must, inter alia, be "based on the cost ....define the "forward-looking economic cost of an element [as] the sum of (1) the total element long-run incremental cost of the element [TELRIC,] and (2) a reasonable allocation of forward-looking common costs," ..., "incurred in providing a group of elements that "cannot be attributed directly to individual elements," ... and, most importantly, specify that the TELRIC "should be measured based on the use of the most efficient telecommunications technology currently available and the lowest cost network configuration, given the existing location of the incumbent['s] wire centers.....

Held:

1. The FCC can require state commissions to set the rates charged by incumbents for leased elements on a forward-looking basis untied to the incumbents' investment. Because the incumbents have not met their burden of showing unreasonableness to defeat the deference due the FCC, see Chevron U. S. A. Inc. v. Natural Resources Defense Council, Inc., ...

(A) This Court rejects the incumbents' argument that "cost" ... requirement that "the ... rate ... be ... based on the cost ... of providing the ... network element" can only mean, in plain language and in this particular technical context, the past cost to an incumbent of furnishing the specific network element actually, physically, to be provided, as distinct from its value or the price that would be paid for it on the open market. At the most basic level of common usage, "cost" has no such clear implication. A merchant asked about the "cost" of his goods may reasonably quote their current wholesale market price, not the cost of the items on his shelves, which he may have bought at higher or lower prices. ....”

9.7.2.3 540 U.S. 398 (2004) Verizon Communications Inc. v. Law Offices Of Curtis V. Trinko, LLP

Trinko is a law firm in New York. It tried to get some telecommunications service from a CLEC, in this case AT&T. The CLEC failed to deliver based upon Verizon's refusal to deal. The result was that the law firm sued Verizon on two grounds; violation of the 1996 Act and antitrust violations. The 2nd Circuit dismissed the 1996 Act action based on not having standing. It agreed to the antitrust action.

The 2nd Court starts its discussion on the antitrust claim as follows:

"Generally, a plaintiff can establish that a defendant violates section 2 of the Sherman Act by proving two elements "(1) the possession of monopoly power in the relevant market; and (2) the willful acquisition or maintenance of that power, as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident." Volvo N. Am. Corp., 857 F.2d at 73 (citations omitted); accord Top Mkts., Inc. v. Quality Mkts., Inc., 142 F.3d 90, 97 (2d Cir. 1998)."

The 2nd Court structures the claim as follows:

"Similarly, as a result of the alleged monopoly scheme, the plaintiff in this case had a similar set of choices: (1) stay with AT&T and receive inferior local service; or (2) switch to Bell Atlantic. While the second choice would hurt AT&T as a competitor, the first choice directly injures the plaintiff as a consumer. In this case, the plaintiff made the first choice and suffered the requisite antitrust injury."

The 2nd Court then stated:

"It is unlikely that allowing antitrust suits would substantially disrupt the regulatory proceedings mandated by the Telecommunications Act. In discussing the impact such suits would have on the regulatory process, it is useful to discuss separately suits seeking damages and suits for injunctive relief. Awarding damages for the willful maintenance of monopoly power would not substantially interfere with the regulatory scheme envisioned by the Telecommunications Act. In contrast, injunctive relief in this area may have ramifications that require particular judicial restraint."

However the 2nd Court ruled that the suit and claim survived based on antitrust grounds. This will open up a whole new avenue for litigation against the unbundling rules. It will also further delay broadband.

The litigation by the RBOCs against the FCC and all competitors is akin to slaveholders suing the Federal Government in 1866 for passage of the 13th Amendment eliminating slavery, under the "takings" clause of the Constitution. The RBOCs were and to a great degree are still the monopolists in all markets. They set prices, control who gets what segments, lobby the government to their advantage, and use the courts to protect their monopoly position. All of this is done in spite of the 1996 Act and the antitrust laws.

However the Supreme Court ruled as follows:

"Held: Respondent's complaint alleging breach of an incumbent LEC's 1996 Act duty to share its network with competitors does not state a claim under §2 of the Sherman Act. Pp. 5-16.

(a) The 1996 Act has no effect upon the application of traditional antitrust principles. Its saving clause--which provides that "nothing in this Act ... shall be construed to modify, impair, or supersede the applicability of any of the antitrust laws," ...

(b) The activity of which respondent complains does not violate pre-existing antitrust standards. The leading case imposing §2 liability for refusal to deal with competitors is Aspen Skiing Co. v. Aspen Highlands Skiing Corp.,... the Court concluded that the defendant's termination of a voluntary agreement with the plaintiff suggested a willingness to forsake short-term profits to achieve an anticompetitive end. ...

(c) Traditional antitrust principles do not justify adding the present case to the few existing exceptions from the proposition that there is no duty to aid competitors. Antitrust analysis must always be attuned to the particular structure and circumstances of the industry at issue. When there exists a regulatory structure designed to deter and remedy anticompetitive harm, the additional benefit to competition provided by antitrust enforcement will tend to be small, and it will be less plausible that the antitrust laws contemplate such additional scrutiny. Here Verizon was subject to oversight by the FCC and the PSC, both of which agencies responded to the OSS failure raised in respondent's complaint by imposing fines and other burdens on Verizon. Against the slight benefits of antitrust intervention here must be weighed a realistic assessment of its costs. ....."

What this ruling states is that the Court, although possibly accepting Trinko, felt Trinko too small and insignificant to apply the Antitrust laws and that the FCC and PUCs would be good enough. This clearly shows than any remedies available under even the antitrust laws are unenforceable to an individual.

There are however many options that the Antitrust laws could provide an aggrieved party assuming that one can get around the restrictions of Trinko.[341]

[341] See McGarty, Competition in the Local Exchange Markets (1996).

10 PRIVACY IN THE INTERNET ENVIRONMENT

10.1 Introduction

Privacy is a complex issue and the Internet takes this issue and compounds it in many ways. In this section we take the issue of privacy, examine it in terms of current laws, US and European, and then examine the impact of the Internet on the broadly defined issue of privacy. This section evaluates the various definitions of privacy and at the same time examines how the Internet presents both a threat to these "rights" and an opportunity to expand these rights and to sustain them in a global economy and environment of living. In the United States today, if an individual desires to fly between New York and Boston, then the individual must present their passport at the airport to secure passage. No other country in the world requires that its citizen, or even a foreigner, present "papers" for intra-country transport. The proposal is to do the same for trains. It is already done for auto rentals. At bridges and toll booths in most of the US today, silent monitoring devices which the citizens have paid for and installed in their autos monitor their movement along highways, measuring the speed through toll booths and even measuring the speed on the highway in a silent and unseen fashion. These changes were already in effect or in process before September 11, 2001 when the United States was deliberately and viciously attacked by Muslim forces. The commencement of the war on September 11, 2001, albeit not with Marshal law orders, gives the Government an additional leverage point to seek more control on private lives. But that control is in the context of security, questionable that it may be given the less than sterling performance of U.S. security forces.[342]

Companies such as General Electric are proposing "smart" appliances which would have IP addresses and in effect be elements of the Internet. GE could then monitor, on a real time basis, the opening and closing of refrigerators during TV commercials, could in conjunction with placing such "smart" appliances in conjunction with companies such as @Home, determine who is eating between commercials and how frequently this is done. This then can be correlated with a persons health records, and via a smart appliance in the auto installed by General Motors, the weight of the person may be determined each morning.

Microsoft and Intel has actually placed special codes in software and hardware respectively that allows for IP addressing and for the identification of any user at any time. The placement of "cookies" in anyone's computer allows the placer to monitor the behavior of that erstwhile customer whenever they so desire.

[342] For example, Secretary of Transportation, refuses to apply Bayes analysis on potential threats since such use of a priori data would in his mind constitute racial profiling. Bayesian analysis has a long and successful history in various fields, most notably in intelligence, in fact it is the cornerstone of intelligence. Thus Mineta would potentially infringe on everyone rights rather than use the facts and target the threats. The issue is that the Constitution guards us via probable cause. If we let such probable cause be reduced to nothing by adhering to the principles of non-profiling, then we lessen all our rights.

There are old principles of privacy that go beyond what we now, especially in the US, understand as privacy. The old principles are those of anonymity. That is the "right to be left alone". For many generations in the US one could refuse to identify oneself in any way unless arrested. The first exception to that was the set of laws passed in 1942 in California that made it a crime to fail to provide police identification if approached. This was an outgrowth of Pearl Harbor and the threat of the supposed, and quite real, Japanese invasion of the west coast. The law staid on the books for almost half a century.

Roe v. Wade entered and greatly expanded but also confused the privacy issue by following on Griswold which allowed for private actions, not just the ability to conceal my identity. There was in the eastern part of the US the assumed "right" of anonymity. One could take money, species or any other form, enter a transaction without identifying oneself and consummate the transaction in a totally anonymous fashion. One, in effect, had a "right to be left alone". The United States today, especially in the last seven years, has changed dramatically. The US government is seeking and effecting ways to monitor and have access to all of ones transactions, communications, especially on the Internet, and in many ways all of ones private life, despite Fourth Amendment protections, which have been broadly interpreted to effectively protect non-electronic analogs of what the Government is now invading. In fact, the US Government is proposing insuring that the "right to be left alone" in the Internet be eliminated, that it, and in many cases it alone, has the ongoing ability to penetrate each persons most hidden acts, be it email, Web searches, or electronic transactions. These are all being done in the name of national security.

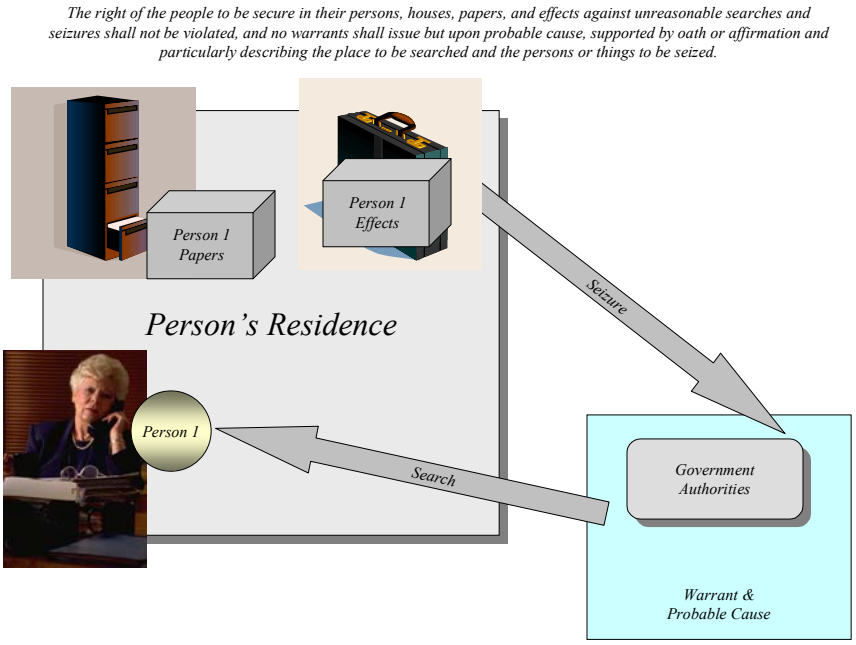
This section addresses three questions: (i) what is the definition of privacy, and (ii) what rights do we have to privacy and from whence are they derived, and (iii) what does privacy mean in an electronic world such as the internet environment and how do we relate what we know in the physical world to the electronic world? These are three simple but at the same time highly complex questions. The Supreme Court only recognizes sexual behavior to be governed by privacy rights. However, privacy is so broad a concept that Justice Brandeis in his famous section with Weaver stated that it was the "right to be let alone". In other dimensions it is viewed as a more fundamental right of natural law, common law, constitutional law, tort law, and actual laws as may be promulgated by the Legislative bodies.

10.2 Privacy and its Legal Elements

Privacy has several legal basis. Each basis has a different definition. We start with the three most common bases; Constitutional, Laws, and Torts. Constitutional basis is what has been granted by the US Constitution, generally the Bill of Rights. The Law or Legal basis is what has been expressly granted by laws passed. The Tort basis is generally what has been granted via litigation.

10.2.1 Constitutional

The Constitution grants certain rights, mostly via the Bill of Rights and the additional amendments to the Constitution. Consider the Fourth Amendment. The following figure shows what is generally accepted under the Fourth Amendment protections. Namely, in one's home, one is safe from "unreasonable searches and seizures", namely those done without a warrant, such warrant requiring probable cause of a crime, and this process is called due process. The Fourteenth Amendment extends this from the Federal Government to the State Governments.



The Constitution does not say that the government cannot search and seize, it says that it must follow a process to do so. That process is carefully controlled and should not be abused. If we take the simple figure shown above, we have several elements; person, person's residence, person's papers, persons' effects. We then also have due process, which is probable cause and a warrant issued thereto. It is real simple. But it is not. If we review the Supreme Court cases, as shown in Appendix B we see that there are many ways to extend or delimit each of these concepts. For example, if I am in my house that is one thing, if I am on a street corner at 3 in the morning looking at a jewelry store that may be quite another. There is also the issue of what constitutes a search and what constitutes a seizure.

Since we do not have a well defined set of terms in the world of tangibles, then how do we expect the world of intangibles to be well understood. The recent Supreme Court ruling on Verizon v. FCC on May 13, 2002 has the Court opining on such issues as TELRIC pricing, Ramsey efficiency, and interconnection and unbundling policy. Since most economists are captives of the incumbent monopolists, one wonders how nine individuals who are unlikely to place their own phone calls can reach any logical conclusion on such an issue. In fact this opinion is a clear example of what one may expect from the Court if it expands to the cyber domain, especially since so many interest are involved.

There are certain Constitutional rights that we have as American citizens, and also possibly as resident aliens, in the United States. The one most favorable to privacy is the Fourth Amendment to the Constitution as follows:

> *Article IV. : The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.*

We can see how these have evolved in four areas.

10.2.1.1 Privacy

The following is a summary of key Opinions in this area:

Griswold v Connecticut 381 U.S. 479 1965[343]*:* Griswold was the Executive Director of Planned Parenthood in CT. CT had a law against selling or prescribing contraceptive devices. PP sued CT to be able to provide birth control methods to the CT citizens, and in this case specifically a husband and wife. The Court first granted that the married couple, part of Griswold et al, had standing to assert a constitutional right and second that the CT law violated the right of marital privacy which was covered by the penumbra of the Bill of Rights. Justice Douglas states*: "In other words, the First Amendment has a penumbra where privacy is protected from governmental intrusion."* and also *"The Third Amendment in its prohibition against the quartering of soldiers "in any house" in time of peace without the consent of the owner is another facet of that privacy. The Fourth Amendment explicitly affirms the "right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures…"*

Roe v Wade 410 U.S. 113 1973: Roe is the classic case. She was pregnant and brought a class action suit against the constitutionality of the Texas law which made abortions illegal. Justice Blackman rendered the opinion. Roe claimed that she had protection under the 1st, 4th, 5th, 9th, and 14th Amendments. The Court stated that the Texas act was unconstitutional The claimant used Griswold and the penumbra theory under the 14th Amendment.

Bowers v Hardwick 478 U.S. 186 1986: Justice White delivered the decision. Charged with violating the Georgia law of sodomy with another adult male in the bedroom of his home, respondent Hardwick (respondent) brought suit in Federal District Court, challenging the constitutionality of the statute insofar as it criminalized consensual sodomy. The court granted the defendants' motion to dismiss for failure to state a claim.

[343] Cantor describes the penumbra theory developed in Griswold as having an origin in law in Cicero and having a general origin in principle in Plato. See Cantor p. 22.

The Court of Appeals reversed and remanded, holding that the Georgia statute violated respondent's fundamental rights. The Supreme Court upheld the Georgia Court. The Court focused on the filed brief and stated that the States have rights to create laws.

10.2.1.2 Search

Boyd v U.S. 116 U.S. 616, 1886: This was a case resulting from a Customs search and subsequent demand by the law authorities for certain documents that The district attorney in New York ordered the defendant to produce invoices showing certain plate glass was imported illegally, against the 1874 Customs Act. The defendants complained about the constitutionality of the law. Ruling summarizes prior cases and laws. States 1789 statute for custom duty collection as stating that searches for Customs violations are permitted. Court used this reference since it was same Congress which passed Bill of Rights (original intent). Court goes o to stress the Colonial opposition to English writs of assistance which empowered English to have warrantless searches. The Court details John Adams opposition to this and further strengthens the original intent of the framers as opposing warrantless searches and seizures. Court refers again to 1789 Custom Act and restates acts restriction “cases and circumstances where they might be compelled to produce…by the ordinary rules of proceeding..” Court further states that “any compulsory discovery…or compelling the production of …books and papers…is contrary to the principles of a free government. It is abhorrent..” Court overthrew the ruling and remanded case.

Carroll v U.S. 267 U.S. 132, 1925: This case concerned the search of a vehicle without a warrant in an attempt by the police to discover liquor in violation of prohibition. The police suspected that the defendant was involved in some form of bootlegging, but the stop occurred some time after their initial suspicions, with no further evidence having been obtained in the interim. In the early days of the automobile the Court created an exception for searches of vehicles, holding in Carroll v. United States 55 that vehicles may be searched without warrants if the officer undertaking the search has probable cause to believe that the vehicle contains contraband. The Court explained that the mobility of vehicles would allow them to be quickly moved from the jurisdiction if time were taken to obtain a warrant. Thus the Court upheld the conviction and made a distinction based upon the auto as the element being searched.

U.S. v Di Re 332 U.S. 581, 1948: This case referred to a defendant possessing illegal gas rationing coupons. The police had prior knowledge that certain persons would be carrying and trafficking in illegal gas ration coupons. The defendant was stopped in a vehicle and one of the passengers held the coupons in plain view to the police officers. DiRe was taken out of the auto and frisked and the coupons were found on his person. The driver, Reed, was the suspect and the police had no knowledge of Di Re. The Court reviewed Carroll and stated that Carroll seemed to imply that warrantless searches were appropriate for an auto. The Court made a distinction here about Carroll allowing an auto search and the DiRe case of a search of the person. The Court states: We are not convinced that a person, by mere presence in a suspected car, looses immunities from

search of his person to which he would otherwise be entitled." The conviction was overturned.

Terry v Ohio 392 U.S. 1, 1968: Police officer sees a group of men acting suspiciously. Based upon that observation he then stops and frisks them. He finds a weapon, upon which discovery they are arrested. The men object on Fourth Amendment grounds of an unlawful search and seizure. The observation lacks probable cause but the "stop and frisk" is not a seizure and a search under the Fourth Amendment. The Court views "stop and frisk" as separate from "search and seizure". The stops based upon police officers experience and the frisk is for the safety of officer and public and limited to the "discovery" of weapons. The Court justifies "stop and frisk" as follows*: "This scheme is justified in part upon the notion that a "stop" and a "frisk" amount to a mere "minor inconvenience and petty indignity…"* The Court stated: "*In our view the sounder course is to recognize that the Fourth Amendment governs all intrusions by agents of the public upon personal security, and to make the scope of the particular intrusion, in light of all the exigencies of the case, a central element in the analysis of reasonableness*." The conviction stood.

U.S. v Ross 456 U.S. 708, 1982: Justice Stevens delivered the Opinion. In this case a police officer obtained a tip stating that a certain person was selling narcotics. In fact the information stated that the individual had just completed a sale. The informant detailed the perpetrator and his vehicle. The police did a check on possible perps and found the defendant. The fund the defendant and then the police took defendants keys and opened trunk. A bag was found in trunk and in the bag was cash and on the bag was narcotics. The Court of Appeals reversed the decision. The Appeals Court used Carroll to stated that the police could search trunk but not the bags. The Court restated the Opinion Carroll that a warrantless search of an automobile stopped by police officers who had probable cause was not unreasonable under the 4th Amendment. In fact the limitation is on "unreasonable" search and seizure. The Court also again reiterated the fact that the Founding Fathers themselves made a distinction of warrants for homes but warrantless for vessels, thus vehicles. The Court ruled that the police could do a warrantless search based upon the long standing fact that the Court had recognized the impracticality of securing a warrant in cases involving a vehicle. The Appeals Court decision was overturned and the search and its fruit permitted.

Wyoming v. Houghton Wyo. 98-184, 1999: This recent case involves a routine traffic stop. At the stop the police officer notices a hypodermic syringe in plain view in the driver's pocket. The driver admitted to taking drugs. The police officer then searched the glove compartment. There he found drugs. The Court upheld the conviction by establishing that the police had probable cause. The cases used were Carroll and Ross as described above.

10.2.1.3 Wiretapping

Olmstead v U.S., 277 U.S. 438, 1928: Justice Taft delivered the decision. Olmstead was a leading conspirator in a bootlegging ring. He moved liquor from Canada to the US. The

police put taps on the telephone lines of all the conspirators. The taps were placed outside of the homes and were done without warrants. The information gathered from the taps were used to convict. The Court stated: "The court held the Act of 1874 repugnant to the Fourth and Fifth Amendments. As to the Fourth Amendment, Justice Bradley said [277 U.S. 459]

"Concurring, Mr. Justice Miller and Chief Justice Waite said that they did not think the machinery used to get this evidence amounted to a search and seizure, but they agreed that the Fifth Amendment had been violated. But, in regard to the Fourth Amendment, it is contended that, whatever might have been alleged against the constitutionality of the acts of 1863 and 1867, that of 1874, under which the order in the present case was made, is free from constitutional objection because it does not authorize the search and seizure of books and papers, but only requires the defendant or claimant to produce them. That is so; but it declares that, if he does not produce them, the allegations which it is affirmed they will prove shall be taken as confessed.

This is tantamount to compelling their production, for the prosecuting attorney will always be sure to state the evidence expected to be derived from them as strongly as the case will admit of. It is true that certain aggravating incidents of actual search and seizure, such as forcible entry into a man's house and searching amongst his papers, are wanting, and, to this extent, the proceeding under the Act of 1874 is a mitigation of that which was authorized by the former acts; but it accomplishes the substantial object of those acts in forcing from a party evidence against himself. It is our opinion, therefore, that a compulsory production of a man's private papers to establish a criminal charge against him, or to forfeit his property, is within the scope of the Fourth Amendment to the Constitution in all cases in which a search and seizure would be, because it is a material ingredient, and effects the sole object and purpose of search and seizure.""

Olmstead v. United States, 32 one of the two premises underlying the holding that wiretapping was not covered by the Amendment was that there had been no actual physical invasion of the defendant's premises; where there had been an invasion, a technical trespass, electronic surveillance was deemed subject to Fourth Amendment restrictions.

Berger v New York 388 U.S. 41, 1967: Justice Clark delivered the Opinion. Berger was convicted in bribery of a government official. A bar owner had complained that officials from NY State Liquor Board had entered his bar and without cause seized his books. The bar owner said it was in reprisal for failing to pay bribe. On this basis an wire tap was authorized by NY court for 60 days on the office of official. Based on wiretap evidence the warrant was extended. Evidence was obtained on two other bars being shaken down. Defendant stated that this information was not legally obtained since the warrant was for evidence on the first case. Court ruled that this was un-constitutional. The warrant was too broad in scope.

Katz v U.S., 389 U.S. 347, 1967: Justice Stewart delivered the Opinion. The defendant was convicted for a violation of the wagering acts. The FBI recorded his calls without a

warrant by attaching a recording device on the outside of a telephone booth. The defendant tried to pose the following two questions: *"A. Whether a public telephone booth is a constitutionally protected area so that evidence obtained by attaching an electronic listening recording device to the top of such a booth is obtained in violation of the right to privacy of the user of the booth. [389 U.S. 350] B. Whether physical penetration of a constitutionally protected area is necessary before a search and seizure can be said to be violative of the Fourth Amendment to the United States Constitution."*

The Court rejected this posing. The Court stated: *"The Government stresses the fact that the telephone booth from which the petitioner made his calls was constructed partly of glass, so that he was as visible after he entered it as he would have been if he had remained outside. But what he sought to exclude when he entered the booth was not the intruding eye -- it was the uninvited ear. He did not shed his right to do so simply because he made his calls from a place where he might be seen…. To read the Constitution more narrowly is to ignore the vital role that* the *public telephone has come to play in private communication."*

Further; *"What a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection. But what he seeks to preserve as private, even in an area accessible to the public, may be constitutionally protected*."

Finally the Court states: "*Wherever a man may be, he is entitled to know that he will remain free from unreasonable searches and seizures. The government agents here ignored "the procedure of antecedent justification . . . that is central to the Fourth Amendment,"{ 24} a procedure that we hold to be a constitutional precondition of the kind of electronic surveillance involved in this case*.."

The Fourth Amendment protects people, not places.

10.2.1.4 Civil Rights

NAACP v Alabama 357 U.S. 449, 1958: The case was about Alabama trying to force the NAACP to disclose its members list as a part of registering in Alabama. The Court said: "*This Court has recognized the vital relationship between freedom to associate and privacy in one's associations. When referring to the varied forms of governmental action which might interfere with freedom of assembly, it said in American Communications Assn. v. Douds, supra, at 402: "A requirement that adherents of particular religious faiths or political parties wear identifying arm-bands, for example, is obviously of this nature." Compelled disclosure of membership in an organization engaged in advocacy of particular beliefs is of the same order.* ***Inviolability of privacy in group association may in many circumstances be indispensable to preservation of freedom of association, particularly where a group espouses dissident beliefs****."*

The key to these Opinions is how do we transfer them from the physical worlds to the electronic world of the Internet and Data world. There is some insight in what we see in the wiretapping cases, this may extend to these new domains.

10.2.2 Laws

The laws on privacy are of recent construction and introduction. They are generally Federal but now there are many state laws in the same area. Mell states the following:

> *"Between 1966 and 1990, several federal statutes dealing with personal privacy were enacted by Congress. These statutes were the Fair Credit Reporting Act of 1970, the Privacy Act of 1974, the Family Education Rights and Privacy Act of 1974, the Right to Financial Privacy Act of 1978, the Privacy Protection Act of 1980, the Paperwork Reduction Act of 1980, the Computer Matching and Privacy Protection Act of 1988,249 and the Video Privacy Act of 1994. While the Freedom of Information Act of 1994251 was enacted to provide access to files held by the government, the parameters of its disclosure provisions and its exemptions from disclosure have operated to provide privacy of sorts to the individual."*

The statutes have had mixed results in defending the individual's privacy. While each of these statutes is diagrammed in the Appendix, a brief overview of their respective purposes is provided here.[344]

The Freedom of Information Act (FOIA) makes federal records available for inspection and copying by the public. Its ostensible policy is that citizens should be able to find out what their government is doing. FOIA has several exemptions, one being that information should not be disclosed when such action would constitute a clearly unwarranted invasion of privacy.

The Fair Credit Reporting Act (FCRA) was the first piece of federal privacy legislation designed to regulate the disclosure of information held by the private sector. FCRA was touted as offering three basic forms of privacy protection to the consumer. First, it limits disclosure of reports on individuals to companies with a legitimate business need for the information. Second, it requires that organizations which provide credit or investigative reports to third parties also make their records available to the subject of the report. Finally, it mandates procedures for the correction of errors in reports.

The Privacy Act (PA) was enacted to protect the confidentiality of individuals about whom a government agency held a file containing personal information. Like FCRA, it provides the individual with access to information stored about him and establishes procedures for the correction and amendment of these files. It also attempts to limit the government's ability to disclose the information to third parties.

The Privacy Protection Act (PPA) limits the procedures by which the government can gain access to the files held by newspaper agencies.

[344] These are due to Mell and are contained in the section referred to.

The Family Education Rights and Privacy Act (FERPA) limits the ability of schools and colleges to disclose student records to third parties. It also requires the school or college to provide the student access to such records and provides procedures for challenging the accuracy of and amending student records. This law has recently come under sever criticism in the light of student suicides, especially the one at MIT. The issue here is the old standard of in loco parentis and what role the University has in replacing the parents, acting for the parents, or in allowing the student freedom to do whatever they like independent of the parents.

The Right to Financial Privacy Act (RFPA) gives bank customers a limited expectation of privacy in their bank records by requiring that law enforcement officials follow certain procedures before any information can be disclosed. Recent Supreme Court cases have stipulated that checks are the banks property and not the individuals and that there is no expectation of privacy, express or implied, in one bank records.

Despite the apparent scope of coverage of these statutes, the actual protection afforded the individual's privacy varies greatly from one to the next. The number of statutes passed, each an attempt at protecting "privacy," partially explains society's failure to design a coherent policy regarding the aspects of personal information needing protection.

In addition, Mell has summarized the Privacy laws in terms of what their attributes are and in terms of comparing one to the other. These are contained in Appendix A. The US Privacy laws summarized are as follows:

Act	*Interest Protected*
Privacy Act of 1974 (PA), 5 U.S.C. § 552a (1994)	Amends Freedom Of Information Act to: 1) give individual right to request access to records about him; 2) prevent agency disclosure of personal information to third parties without subject's consent. Information must 1) be relevant to the agency's use; and 2) must inform the individual whether collection is mandatory or voluntary.
Computer Matching and Privacy Protection Act of 1988 (CMPPA), 5 U.S.C. § 552a(o) (1994)	Amends Privacy Act to limit the collection of information from individuals. Provides guidelines for matching data about the same individual between agencies.
Paperwork Reduction Act (PRA), 44 U.S.C. §§ 3501-3520 (1988)	Limits collection of information from individuals, and saves government money. Relates to information collection requested of government agencies.
Privacy Protection Act of 1980 (PPA), 42 U.S.C. §§ 2000aa - 2000aa - 12 (1994)	Establishes procedures allowing police to obtain information from newspapers.
Right to Financial Privacy Act of 1978 (RFPA), 12 U.S.C. §§ 3401-3422 (1994)	Regulates manner that government gains access to bank records about individuals.
Family Educational Rights and Privacy Act of 1974 (FERPA), 20 U.S.C. § 1232g (1994)	Amends the Privacy Act and limits disclosure of student records to third parties. Records maintained by any educational institution receiving federal funds. Consent generally required before disclosure made to a third party. Denial of federal funding to the institution, but no individual cause of action.
Fair Credit Reporting Act of 1970 (FCRA), 15 U.S.C. §§ 1681-1681t (1994)	Limits the disclosure of "consumer reports" or "investigative consumer reports" to third parties (i.e., "users") by "consumer reporting agencies" (CRAs).
Video Privacy Act (VPA), 18 U.S.C. § 2710 (1994)	Prevents "videotape service provider" from disclosing personally identifiable information concerning individual's tape selection to third parties.
Freedom of Information Act of 1966 (FOIA), 5 U.S.C. § 552 (1994)	Promotes open government by disclosing information relating to the workings of government. Only records indexed in a particular manner need be disclosed.

10.2.3 Torts

Tort law is a complex collection of precedents and processes. It is in many ways uniquely American. To a European it is a mess that reflects the litigious structure of the American legal system. In fact it is an almost unique way in which Americans directly and personally may “change” or “create” new laws, via the process of litigation and precedents. Americans have a republican representative form of government wherein the Congress enacts laws and the President and the executive effect them in practice. The legal system in the United States, via the tort process, allows that each individual may in effect create their own laws, by filing suit, using precedents, and creating new precedents. The new precedents have the full force of law going forward. The process may be complex but it works and again in many ways empowers American citizens with the ability to make small but clearly perceptible changes in the laws and seek and obtain remedies not readily available to them under the law. The tort system fills the cracks of the written law.

In the area of privacy the tort of privacy was not to be found. Torts dealt with land, assault, or some physical interaction between two or more people. The classic start is

considered to be the work of Cooley, his book on Torts, Torts, 2nd Edition, 1888. He established the concept by phrasing privacy as "the right to be let alone".[345]

The classic section by Warren and Brandeis in 1890 established a more detailed framework for privacy, again along the lines of "being let alone".

Prosser has written in his book of Torts extensively concerning privacy. As we have discussed above, Tort protection is based on precedents in the law and not upon specific laws passed by Congress or the States. There is also the standard, used a reference, not precedent, the Restatement of Torts, which gives sum and substance to the torts as if they were laws, which they are not.

Prosser enumerates the following torts as applied to privacy:

Appropriation[346]: This is the appropriation for the defendants benefit of the plaintiff's name or likeness. This is typically the using of the plaintiffs image or likeness to the benefit of the defendant. Thus a person may sue on a tort basis of appropriation and prevent the defendant from using any picture or likeness.

Dobbs discusses how this relates to certain first Amendment rights but generally commercial speech is less protected and the issue of appropriation is related to commercial speech in general.[347] The issue of identity theft however is totally different. This is a criminal offense and is separate from the tort issue.

Unreasonable Intrusion[348]: As Prosser states "*…consist of intentional interference with another's interests in solitude or seclusion, either as to his person or to his private affairs or concerns.."* This typically is a result of someone rifling through another's belongings, trespassing on their property, but has been extended to listening to private conversations, peering in windows, and the like.

This may be a bit more difficult to prove.[349] A classic case was one where a physician brought a non-physician into a delivery room while a woman was giving birth. This tort is beyond trespass or Fourth Amendment rights (limited to the government only). The general rule is that an employer may have access to its employees records. However, certain states have established laws protecting those records. The issue here is that unreasonable intrusion is limited by the personal sphere, which itself may have limits.

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[345] Prosser, p. 849.

[346] Prosser, p. 851.

[347] Dobbs, p. 1198.

[348] Prosser, p. 854.

[349] Dobbs, p. 1200.

Clearly the home is a part of the sphere, the delivery room may be part, but the office may clearly not unless established otherwise by law.

Public Disclosure of Private Facts[350]: This is the telling of private facts about someone to another person or persons. There are essentially four elements; (i) the disclosure must be public, (ii) the facts must be private, (iii) the facts made public must be highly offensive to a reasonable person, and (iv) the public must not a legitimate interest in the information. As Prosser states, " the law is not for the protection of the hyper sensitive".[351]

This is no defamation. The truth of the facts is irrelevant under this claim. The issues are not necessarily at conflict with the First Amendment. Clearly if the information is wrongfully obtained it becomes tainted and cannot be used. In fact, even lawfully obtained public information, may, under this tort be actionable.[352]

False Light in the Public Eye[353]: This tort is the public placing of the plaintiff in a highly unfavorable and possible objectionable light. This may be the entering of the plaintiff into some contest as the ugliest duckling, or as the longest eared person, or some other unfavorable presentation. It may include the statement that the person has stated that he said some statement which is abhorrent.

This has four elements: (i) publication to a substantial group or the public, (ii) the information puts plaintiff in false light, (iii) the false light would be highly offensive to a reasonable person, and (iv) the defendant knew it to be false or acted with recklessness.[354] This may not be defamation, it may be false but may not reach the level of defamation. The Supreme Court has ruled from time to time on this issue of false light and libel. Libel has better standing but false light has remained in most jurisdictions.

In summary, the tort protections protect the individual from intrusions, from misrepresentations, from the telling of private facts, and from the taking of an identity or parts related thereto. The torts relate to the person, and indirectly to the persons property. They reemphasize the concept of the "right to be let alone".

10.2.4 Limitations

The laws have certain protections. These protections range from legal limitations placed by law upon the authorities, Constitutional protections granted in the Constitution such as

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[350] Prosser, p. 856.

[351] Prosser p. 857.

[352] Dobbs, p. 1205, see California Supreme Court ruling on Melvin v Reid.

[353] Prosser, 863.

[354] Dobbs, p. 1208.

due process, and tort protections that act to protect against non governmental entities. One should always remember that the Constitution protects us as citizens from the over reach of the Government, but in no way protects us from the over reach of other citizens. The latter is protected by laws and torts.

10.2.5 Due Process

Due Process means simply that the government cannot invade privacy or person, papers, or effects without probable cause and obtaining a warrant. There are certain exceptions, generally those relating to "inspections" for customs duties. The extent of this due process may vary. In the "*Terry*" search a warrant to "stop and frisk" is not necessary if the officer has reasonable suspicion regarding the person involved.

10.2.6 Substantive Due Process

Substantive due process is a heavy burden, it means that the matter at hand requires the government to go the extra mile. The private lives of people generally fit that category as discussed in *Griswold* or *Roe v Wade.*

10.3 Schools of Thought

This section deals with the several concepts of some key thinker in the area of privacy or the prohibition thereof. Brandeis is the first in the US who with his partner Warren wrote a detailed treatise in the Harvard Law Review on privacy and its meaning and basis in law.[355] Etzioni in contrast takes a communitarian view that we should have no privacy, it is a socialistic or communistic view, called Communitarianism, which propose national identity cards, openness of health records, and the general openness of all private items for the "good" of the state. Etzioni is not as extreme as one can get but he clearly represents the thought pattern of many left wing liberals in the United States. The most recent is the dictates of Ellison of Oracle who is a new proponed of national identity cards after the September 11, 2001 attack on the United States. Despite the fact that all of the attackers were foreign nationals, who had visas and passports, Ellison, for what may appear to be personal gain, wants to issue personal identity cards, using his company's, Oracle, database, to track people at all times.

10.3.1 Brandeis

Louis Brandeis was to become one of the most significant Supreme Court justices. He was a Harvard Law School Graduate, he practiced law in Boston, and was one of the most insightful crafters of Supreme Court Decisions.

In his section with Warren his partner, he begins by saying:

[355] Warren and Brandeis, *4 Harvard Law Review 193 (1890)*

"That the individual shall have full protection in person and in property is a principle as old as the common law; but it has been found necessary from time to time to define anew the exact nature and extent of such protection. Political, social, and economic changes entail the recognition of new rights, and the common law, in its eternal youth, grows to meet the demands of society. Thus, in very early times, the law gave a remedy only for physical interference with life and property, for trespasses vi et armis. *Then the "right to life" served only to protect the subject from battery in its various forms; liberty meant freedom from actual restraint; and the right to property secured to the individual his lands and his cattle. Later, there came a recognition of man's spiritual nature, of his feelings and his intellect. Gradually the scope of these legal rights broadened; and now the right to life has come to mean the right to enjoy life--the right to be let alone, the right to liberty secures the exercise of extensive civil privileges; and the term "property" has grown to comprise every form of possession-- intangible, as well as tangible."*

Brandeis then goes on to describe the specific "privacy" rights and the sources of those rights:

"In every such case the individual is entitled to decide whether that which is his shall be given to the public. No other has the right to publish his productions in any form, without his consent. This right is wholly independent of the material on which, or the means by which, the thought, sentiment, or emotion is expressed. It may exist independently of any corporeal being, as in words spoken, a song sung, a drama acted. ... The right is lost only when the author himself communicates his production to the public--in other words, publishes it. It is entirely independent of the copyright laws, and their extension into the domain of art. The aim of those statutes is to secure to the author, composer, or artist the entire profits arising from publication; but the common-law protection enables him to control absolutely the act of publication, and in the exercise of his own discretion, to decide whether there shall be any publication at all. [...] *The statutory right is of no value,* unless *there is a publication; the common-law right is lost* as soon as *there is a publication…What is the nature, the basis, of this right to prevent the publication of manuscripts or works of art? It is stated to be the enforcement of a right of property; …A man records in a letter to his son, or in his diary, that he did not dine with his wife on a certain day. No one into whose hands those papers fall could publish them to the world, even if possession of the documents had been obtained rightfully and the prohibition would not be confined to the publication of a copy of the letter itself, or of the diary entry; the restraint extends also to a publication of the contents. What is the thing which is protected? Surely, not the intellectual act of recording the fact that the husband did not dine with his wife, but that fact itself. …The copyright of a series of paintings or etchings would prevent a reproduction of the paintings as pictures; but it would not prevent a publication of a list or even a description of them. Yet in the famous case of* Prince Albert v. Strange *the court held that the common-law rule prohibited not merely the reproduction of the etchings which the plaintiff and Queen Victoria had made for their own pleasure, but also "'the publishing ... though not by copy or resemblance, ...".*

Brandeis then goes on to describe the following precedents:

" Abernethy v. Hutchinson*, 3 L. J. Ch. 209 (1825), where the plaintiff…sought to restrain the publication in the* Lancet *of unpublished lectures which he had delivered … Lord Eldon doubted whether there could be property in lectures which had not been reduced to writing, but granted the injunction on the ground of breach of confidence…*

… Prince Albert v. Strange*, 1 McN. & G. 25 (1849), Lord Cottenham…recognizing a right of property in the etchings which of itself would justify the issuance of the injunction, stated, after discussing the evidence, that he was bound to assume that the possession of the etchings by the defendant had "its foundation in a breach of trust, confidence, or contract," and that upon such ground also the plaintiff's title to the injunction was fully sustained.*

… Tuck v. Priester*, 19 Q. B. D. 639 (1887), the plaintiffs were owners of a picture, and employed the defendant to make a certain number of copies. He did so, and made also a number of other copies for himself, and offered them for sale … the plaintiffs registered their copyright in the picture, and then brought suit for an injunction and damages. The Lords Justices differed as to the application of the copyright acts to the case, but held unanimously that independently of those acts, the plaintiffs were entitled to an injunction and damages for breach of contract.*

… Pollard v. Photographic Co.*, 40 Ch. Div. 345 (1888), a photographer who had taken a lady's photograph under the ordinary circumstances was restrained from exhibiting it, and also from selling copies of it, on the ground that it was a breach of an implied term in the contract, and also that it was a breach of confidence… Justice North interjected in the argument of the plaintiff's counsel the inquiry: "Do you dispute that if the negative likeness were taken on the sly, the person who took it might exhibit copies?" and counsel for the plaintiff answered: "In that case there would be no trust or consideration to support a contract." Later, the defendant's counsel argued that "a person has no property in his own features; short of doing what is libelous or otherwise illegal, there is no restriction on the photographer's using his negative." But the court, while expressly finding a breach of contract and of trust sufficient to justify its interposition, still seems to have felt the necessity of resting the decision also upon a right of property, in order to bring it within the line of those cases which were relied upon as precedents.*"

Brandeis concludes with the following:

"First. The right to privacy does not prohibit any publication of matter which is of public or general interest….

Second. The right to privacy does not prohibit the communication of any matter, though in its nature private, when the publication is made under circumstances which would render it a privileged communication according to the law of slander and libel….

Third. The law would probably not grant any redress for the invasion of privacy by oral publication in the absence of special damage….

Fourth. The right to privacy ceases upon the publication of the facts by the individual, or with his consent.

Fifth. The truth of the matter published does not afford a defense….

Sixth. The absence of "malice" in the publisher does not afford a defense….

The remedies for an invasion of the right of privacy are also suggested by those administered in the law of defamation, and in the law of literary and artistic property, namely:

An action of tort for damages in all cases. Even in the absence of special damages, substantial compensation could be allowed for injury to feelings as in the action of slander and libel.

An injunction, in perhaps a very limited class of cases."

Brandeis thus initially established the tort type protection that has been discussed herein. Specifically, the discussion by Prosser and the Restatement of Torts discussed by Prosser may be for shadowed by the recommendation by Brandeis.

However, Brandeis deflects inwardly, on the individual and a right to be let alone. It is the reclusive version of privacy. He most likely would never have imagined the role of the Etzioni school of thought, wherein the proposal is to embed micro chips to monitor each human!

10.3.2 Posner

Richard Posner, a prolific Federal Court Judge and faculty member at the University of Chicago, approaches privacy in a purely economic fashion. As he states:

"… the interest I am calling "the face we present to the world". Economics, with a bit of simple game theory… and some help from philosophy, can help us thread this maze, uncover the laws unity, think concretely, about problems often obscured by the "sonorous" talk of "privacy", and incidentally provide a bridge…"[356]

Posner is clearly a jurist who views almost all legal issues in an economic context. All interactions or actions are transactions, the decision to make and compete an action based on some economic measure or value. For example, I decide to rob a bank because in my mind I make money from doing so and the weighted probability of getting caught and the cost to me of doing so is significantly less than what I will get robbing the bank. It is not clear that all thieves think in terms of von Neuman game theorists, in fact I can think of very few people who can or even less who do.

[356] Posner, Overcoming Law, p. 531.

To Posner, there is first and almost only and economic rule a play, a rule in many ways dependent on privacy as a property and with an economic or transactional value applied.

To better understand property and privacy one must consider why Richard Pipes, of Harvard, in his treatise on Property, makes the following statement regarding privacy:

> *"The whole concept of privacy derives from the knowledge that we can withdraw, partly or wholly, into our own space; the ability to isolate oneself is an important aspect of property rights. Where property does not exist, privacy is not respected…which helps explain why the Russian language-the language of a people who through most of their history have no private property in the means of production-has no word for privacy…"*

Pipes is a Soviet and Russian scholar, a Pole, who had escaped the Soviet domination of Poland and Central Europe. He clearly understands the issues of privacy as derivative from but as superior to property. Pipes is one who has seen the flow of German Nazi troops and the counter flow of Russian Soviet forces back and forth across Poland. He understands the essential belief in the sanctity of the individual and in his work clearly and unambiguously states this.

Posner considers privacy as an element of an economic exchange. Part of that assumption is that privacy has value comparable to property. Pipes takes that even further and states a duality between property and privacy, in fact Pipes can be said to state that privacy is the natural extension to property.

Posner starts his discussion on Privacy in his book, *The Economics of Justice* ("EOJ"), as follows;

> *"Provisionally, privacy means the withholding or concealment of information, particularly personal information…"*

Posner then states:

> *"It is no answer that people have the "right to be let alone" for few people want to be let alone"*

Clearly that statement is at best self serving, since aloneness is not necessarily the same in all cases. I may want as a social animal to interact with people but at the same time I may want to retain the privacy or secrecy of my hobbies or collections.

Posner states regarding privacy as concealment. He argues that people frequently go around selling themselves but conceal items that may not allow them to be presented in the best light. Posner then goes on to say that in buying things, we should have the right to know anything material to the sale about the person selling the product. Thus for example, one may assume Posner demands that the seller of a Pizza if he has AIDS

should reveal that to all buyers, or at least the buyer should have the right to ask and the seller the duty to respond truthfully. This is generally not the case.

He talks generally about the concepts of privacy as; (i) secrecy, (ii) seclusion, and (iii) autonomy. Specifically these are defined as:

Secrecy: Secrecy is a form of concealment. Posner states that he feels that what people do today is seek to keep personal information secret for personal gain.[357] In a sense the desire for secrecy is to control others perceptions of one's self.[358] This means to create an alternative persona. This concept of privacy in the Posnerian world is one we shall see again in the Internet world. The ability to create a persona, to mold by withholding and to mold by mis-stating, a new and unique personality. The Internet personas are based on controlling information, but positively and negatively.

Seclusion: In a sense this is a withdrawal from the cares of public life. Posner refers to gregarious seclusion, specifically when someone wants to be let alone to do something of more import, not a desire to separate themselves from society.[359]

Autonomy: Posner defines this as the "being allowed to do what one wants without interference". He further states that it is inappropriate to define privacy as the same thing.

The three types or characterizations of privacy from Posner seem very compelling. As he states in EOJ, the interpretation of Brandeis and the subsequent attempts by the Supreme Court to establish a right of privacy where none exists is to limit privacy to secrecy and seclusion and it should be expanded to be free from governmental interference.[360] This expansive interpretation would seem to be within the Brandeis format but Brandeis in writing his section was responding to an invasive attack by the press, not government. Would Brandeis have responded in a similar fashion in today's world. Thus, in a Posnerian world, the autonomy construct is the broadest and most far reaching.

10.3.3 Etzioni

Etzioni is a communitarian. He states that:

"Communitarianism holds hat a good society seeks a carefully crafted balance between individual rights and social responsibilities, between liberty and the common good…"[361]

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[357] Posner, EOJ, p. 271.

[358] Posner, EOJ, p. 233.

[359] See Posner, EOJ, p 269. He has extensive discussion on these concepts.

[360] Posner, EOJ, p. 315.

[361] Etzioni, p. 5.

He further notes in the introduction of his book:

> *"my first call is to demonstrate that immoderate champions of privacy have not merely engaged in rhetorical excesses but that these excesses had significant and detrimental effects."*

Etzioni further goes on to state:

> *"while we use voluntarily more …ID cards…they are inadequate…all people be required to identify themselves when asked to do so by public authority.."*

He totally rejects the Fourth Amendment, he takes a neo-Nazi neo-Stalinist view that some benign public authority has the right to demand from the public, for no good reason, that they totally abandon all their constitutional rights.

Etzioni goes on to "re-examine" the privacy arguments. He criticized Warren and Brandeis, then criticized Griswold on the basis that although contraception may be good the right recognized under Griswold may lead to " the unbounded nature of the position embraced.."[362]

Etzioni goes on to suggest eliminating privacy as we now know it for such areas as national ID cards, implanting biometric identifiers in humans, expanding the Megan's law disclosures, increasing government control over encryption, disclosing who has AIDs, and other such areas. Etzioni would see the release of all medical records record if he sees them for the public good.

In many ways Etzioni is not an aberration but a clear example of what certain major and influential groups want, namely government access and control over not only information but the individual. The ID cards are a single first step, but the biometric plants are horrifying.

10.3.4 DeCew

DeCew has developed a concept of narrow and broad views of privacy. These views, based upon her work and others, is an ideal stepping off point for the development of privacy issues. She begins by establishing two elements of her reasoning: (i) the developments eschew privacy as a right, the discussions use rights terminology, but the establishment of privacy as a right is not a basis of her discussions, (ii) she makes no endorsements of the cases or decisions discussed. The reasons for these disclaimers at the outset are better understood as she develops the privacy concepts as regards to the feminist movement.

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[362] Etzioni, p. 193.

DeCew established privacy in two domains; Narrow View and the Broad Concept. We develop each as follows:

Narrow View: DeCew uses reference to two writers to map out some landscape for this narrow view. The first is Parent and his view that privacy is the protection of private knowledge.[363] This is the school of "secrecy" or "concealment" where an individual has the alleged right to keep from others what they desire. However, this view of privacy as secrecy is very narrow, it puts the burden on a narrow set of things which can be kept secret and puts the burden on the individual to keep them as secret. The second school is that of Henkin and the concept of privacy as autonomy.[364] Frankly Henkin perceives autonomy as separate from privacy. For Henkin autonomy is freedom from governmental regulation. Henkin believes that autonomy, not privacy, is the basis for the cases like Griswold. Privacy for Henkin is more narrow encompassing the tort based claims which are invasion from other persons. Thus, according to DeCew, the narrow view of privacy is concealment or secrecy and possibly the protection of invasion from others.

Broad Concept: The Broad Concept is more far reaching. DeCew defines three aspects and each, she states, has an affiliated set of claims.[365] These three aspects are:

1. *Informational Privacy:* This is the expectation that information about oneself is to be kept from public view. This is a right of secrecy.

2. *Accessibility Privacy:* This type of privacy allows one to keep from interfering with ones private actions. In effect it is a right of seclusion.

3. *Expressive Privacy:* This is the right to express ones self. In effect this is a form of self-expression.

DeCew's three elements, secrecy, seclusion, and self expression, are a broad view of the concept of privacy. However, the issue of anonymity is not within this domain. In fact it is an extension of the three elements as espoused by DeCew.

Expanding on DeCew, Mell states a theory of privacy via these definitions:

"Several privacy definitions recognize the individual's right to control personal information. In this article, privacy is the legally recognized power of an individual (group, association or class) to both 1) regulate the extent to which another individual (group, class, association or government) may access, obtain, make use of or disclose a persona concerning him, or concerning those for whom he is personally responsible; and 2) monitor and correct the accuracy of the persona compiled concerning him or those for whom he is personally responsible. This definition incorporates the five rights and

[363] DeCew p. 28.

[364] DeCew p. 35

[365] DeCew, p.75.

demonstrates the situations in which the individual might want to control disclosure of personal information."

Mell further continues along the lines of property rights:

"The recognition of a property right in the individual about whom the persona is collected does not detract from the interest any collector or compiler of databases may have in the same persona. It does mean, however, that any information-collector's interest would be "subject" to that of the individual in some important respects. A basic premise of the law creating this property right should be that the identity of the holder or the information (government or private) industry would not determine the nature and extent of protection provided the individual. This is consistent with the current balancing of interests required both constitutionally and by existing regulatory statutes.

The property analogy is not without its difficulties for the electronic persona. Historically, the protection of any property was based on the presumption that the object to be protected had a consistent configuration regardless of the holder's identity. In contrast, the electronic persona is characterized by its mutability. Created and continually manipulated by parties other than the individual, the electronic persona may be the compilation of any variety of pieces of personal information. The key to recognizing a property interest in the electronic persona must be based in the identifiably of the persona to a specific individual. Once that link has been established, the persona "belongs" to the individual about whom it "speaks" without regard to the source or content of the specific pieces of information constituting it. Thus the electronic persona could be defined as a collection of at least three pieces of personal information concerning the individual (or those for whom he is responsible) that identifies the individual(s): for example, name, social security number, selective service number, finger print, etc.

The common-law view was that an owner could never be deprived of his ownership rights without either consent or compensation. This theory is the basis of the current protection of identity as persona under the intellectual property doctrines of the right to publicity, misappropriation and copyright. Each of these doctrines is premised on the protection of various indicia of a specific person's identity from its commercial exploitation or use by a third party."

10.3.5 Tribe

Tribe is a professor at Harvard Law and is a noted liberal constitutional scholar. Tribe, in his book on constitutional law, details privacy into several areas where government allegedly interferes. The approach is to categorize dimensions of privacy in several areas and then to summarize the nature of the Courts rulings in each. As with most of the Court rulings, the challenge would be to establish a logical framework of what would be expected in variants from the special cases generally placed before the Court.

Tribe's areas are as follows[366]:

Mandatory Incantation and Liberty of Conscience: The classic case is Wooley v Maynard where a Jehovah's Witness objected to the New Hampshire motto of "Live Free or Die".[367] The issue is can the Government take a position to infringe on the privacy of the individual by making the individual cooperate with the Government in a way in which the individual and their "space" are interfered with.

Compulsory Education and Freedom of Inquiry: The classic cases are *Meyer v Nebraska* and *Pierce v Society of Sisters*. They reaffirm the parent's rights to raise their children, limited rights of teachers, and provide certain rights to local school boards. More recently in *Board of Education v Pico,* the Court allowed the keeping of certain books in libraries for the education of students.

Screening the Sources of Consciousness: In *Stanly v Georgia,* during a legal search, the authorities discovered pornographic files. The individual was convicted of possession of pornography, albeit in their him. The Court reversed stating that mere possession was not a crime even if the selling, transport or exporting was. This is the establishment of the fact that inner most thoughts are protected, even if the actions taken by these latter may not.

Coercive Conditioning: In one case, for example, *Kaimowitz v Department of Mental Health,* the Court reaffirmed the fact that a patient cannot be involuntarily made to participate in psychological experiments.

Prevention of Bodily Intrusion: Such items as compelled vaccinations, blood tests, bodily cavity exams, have limitations. In *Rochin v California* the Court held that forcible pumping of the stomach is a flagrant violation of fourteenth amendment due process.

Decisions about Birth: This is the *Griswold v Connecticut* and *Roe v Wade* decisions. The most intimate and personal control of birth control and birth are personal decisions that the government is prohibited from intervening.

Decisions about Death and Dying: This relates to death with dignity and the right to die. Such cases as *Brophy v New England Sinai Hospital* permit the removal of feeding tubes.

Choice of Life Plan and Risk Taking: The ability of a person to take personal risks, such a riding without a seat belt or without a helmet on a motorcycle, have certain standing. However in *People v Kohrig* there were limitations placed which allowed the state to

366 See Tribe, Chapter 15.

367 The New Hampshire case is of interest due to several factors. The motto was actually created in the French Revolution and then used almost simultaneously in New Hampshire. New Hampshire also had a Governor, Meldrin Thompson, who asked to Federal government to have the State National Guard equipped with Nuclear weapons to protect the US frontier from attacks from the Soviets from the north. New Hampshire has a unique reputation in that regard.

control this to some degree. Again, New Hampshire has no seat belt law and no helmet law for motor cycles and the Federal government must let that stand.

Vocation:In *Schware v Board of Bar Examiners of New Mexico*, the Court held that the state could not deprive the plaintiff of being admitted top the Bar without due process on a record which the Bar could not rationally find as unfit.

Travel;In *Shapiro v Thompson* the Court stated that the right to travel was "not a mere conditional liberty…subject to regulation…but an unconditional personal right".

Appearance ;In *Kelley v Johnson* the Court upheld the right of the state to set standards for appearance of police officers. In *Katz v U.S.* the Court stated that the fourth amendment *protects people not places*.

Reputation and Records: In *U.S. v Miller* the Court stated that an individual has no protection of privacy when it relates to his checks.

In the Tribe areas of privacy, they relate to how we deal and are dealt with regarding personal choices, decisions, and actions. The relate to how we deal with and of ourselves and what protections we have under the Constitution to retain the penumbra of privacy. The question then becomes, how does one take the Tribian elements, and apply then to the Internet and Data world.

Another question regarding the Tribian elements, is can one construct a syntax from which this extension to other domains is possible. Are there elements that we can use a mathematical schema and understand the logical framework, establish a grammar and syntax which allows one to ascertain consistency and extensibility.

Clearly, under the law and the use of both the Constitution and the Court's precedents, we seek to establish a consistent architectural framework to establish the extensibility, to propose privacy analogs that have a clear and well defined nexus to the world as we find ourselves in.

10.4 Internet and Electronic Privacy

As we have developed, privacy can be viewed in various contexts. Posner reflects on privacy as being in three different modes; secrecy, seclusion, and autonomy[368]. As secrecy it is a concealment of certain personal facts, as seclusion it is hiding, and as autonomy it is to be able to do our own thing, whatever that means, assuming it is legal.

As Brandeis stated in Warren and Brandeis:

[368] Posner is of the economic school of law. He views almost all legal issues in the context of some financial or economic transaction. Cantor divides the legal theorists into seven schools, leaving Posner in what he calls the Law and Economics school. The other schools are: Justice and Liberty wherein he uses Maitland as the primary speaker, Marxist wherein he places Horwitz of Harvard, Feminist wherein he places Foucault, Psychoanalytic where is placed Lacan, Structuralism and Levi-Strauss, and Deconstructionist with Derrida.

"Recent inventions and business methods call attention to the next step which must be taken for the protection of the person, and for securing to the individual what Judge Cooley calls the right ***"to be let alone."*** *Instantaneous photographs and newspaper enterprise have invaded the sacred precincts of private and domestic life; and numerous mechanical devices threaten to make good the prediction that "what is whispered in the closet shall be proclaimed from the house-tops." For years there has been a feeling that the law must afford some remedy for the unauthorized circulation of portraits of private persons; and the evil of the invasion of privacy by the newspapers, long keenly felt, has been but recently discussed by an able writer. The alleged facts of a somewhat notorious case brought before an inferior tribunal in New York a few months ago, directly involved the consideration of the right of circulating portraits; and the question whether our law will recognize and protect the right to privacy in this and in other respects must soon come before our courts for consideration."*

The above statement commences with the statement concerning recent inventions. In the Internet world, the recent inventions are overwhelming. For example, one may think if IP appliances, refrigerators with IP addresses which monitor their performance as well as those possibly of the owner. Is it possible to track what goes in and out of a refrigerator, even to the level of calories. The next step is implanting IC chips in humans, the extension of the smart card to the individual and track their for consumption, sex lives, and stress levels. So the statement by Brandeis that "*Recent inventions and business methods call attention to the next step which must be taken for the protection of the person, and for securing to the individual…"* go to the heart of the Internet world and the issues of privacy.

The secrecy issue is keeping ones thoughts, ideas, concepts, and actions secret. This is the secrecy or privacy of the person. However, Posner then goes onto the issue of secrecy in communication. Namely the secrecy between people. Here facts are disclosed by the keeper to an recipient. However, if the two parties enter into an agreement to not share the information, item, fact, whatever, then the extension of privacy as secrecy may be extended beyond just one person. Clearly there is a great deal of justification of privacy as secrecy. To the extreme, the Fifth Amendment prevents self incrimination. The state has no right to force an individual to disclose anything that may be self incriminatory. In fact, the definition may be in the mind of the beholder. However, the government does have the right to have one disclose information that may be necessary to the prosecution of a case as is done in the case of a material witness to a crime. In fact, one may be incarcerated as a material witness, in apparent defiance of habeas corpus by a judge if one does not comply. Journalists are frequently jailed for refusing to provided sources. In that case however they have revealed the fact that they have information. For a non journalists material witness incarceration may be effected without any stated probable cause and without due process, despite the Constitution.

Privacy as seclusion if the ultimate of being let alone. It is a concept that Posner has developed at length.[369] Secrecy is that I do not want to tell you anything seclusion is that

[369] Posner, EoJ, p. 269.

I do not want to be bothered by anyone. Seclusion is a desire not to be bothered by others, secrecy is a desire to conceal from others. Seclusion is a passive concept whereas secrecy is an active concept.

Autonomy, according to Posner, as a privacy concept is the freedom to do what one wants without interference.

The next question is can we extend this concept of privacy to more than one person, namely to a group. In addition in *NAACP v Alabama* the Court stated:

> *"It is hardly a novel perception that compelled disclosure of affiliation with groups engaged in advocacy may constitute as effective a restraint on freedom of association as the forms of governmental action in the cases above were thought likely to produce upon the particular constitutional rights there involved. This Court has recognized the vital relationship between freedom to associate and privacy in one's associations. When referring to the varied forms of governmental action which might interfere with freedom of assembly, it said in American Communications Assn. v. Douds, supra, at 402: "A requirement that adherents of particular religious faiths or political parties wear identifying arm-bands, for example, is obviously of this nature." Compelled disclosure of membership in an organization engaged in advocacy of particular beliefs is of the same order. Inviolability of privacy in group association may in many circumstances be indispensable to preservation of freedom of association, particularly where a group espouses dissident beliefs."*

This ruling allows for freedom of association in a form of privacy as a group. Thus if a group, why not a married couple. The US Supreme Court in *Griswold* stated as follows:

"In NAACP v. Alabama, 357 U.S. 449, 462 , we protected the "freedom to associate and privacy in one's associations," noting that freedom of association was a peripheral First Amendment right. Disclosure of membership lists of a constitutionally valid association, we held, was invalid "as entailing the likelihood of a substantial restraint upon the exercise by petitioner's members of their right to freedom of association." .... In other words, the First Amendment has a penumbra where privacy is protected from governmental intrusion. ....."

Justice Douglas introduced the concept of the penumbra or shadow of protection of a privacy right. Admittedly this right was applied to the use of birth control but it was stated clearly. This then states that we have certain privacy rights as two people, at least two people having sex. This has yet to be extended to two people doing anything else.

As we have previously discussed, another view of privacy is in the context of property of the persona and the torts associated with the misappropriation of that property. Prosser, as discussed, has characterized four categories of tort relief under the heading of privacy:

1. appropriation of name or likeness;

2. intrusion upon an individual's seclusion, solitude or private affairs;

3. public disclosure of private or embarrassing facts; and,

4. publicity that places a person in a false light in the public eye.

These are common law "rights" that have been recognized in various forms of case law. We must ask however how and where they can be applied in an electronic world.

Consider a set of simple examples.

Case 1: I am walking down the street in New York. It is 8 PM and I am alone, dressed in a conventional manner, I an clean cut, and am conducting myself in a civil fashion. Does the police have a right to ask me for identity or if asked do I have a right to deny them such proof of identity. In New York, if questioned, and if there is no probable cause, namely there is no identified felon or potential felon for whom the police officer has been informed is a person to be "on the look out for" then the request has no merit and I have the right to deny the request, namely I have a right to be left alone and keep my anonymity. In California that is not the case. The California statue requires presenting identification. This is a result of the World War II problems with the risk of Japanese spies. It was a result of a clear and present danger. The question can then be posed, why not in New York fearing German spies, or is California wrong in having such a law. Do I have a right to be left alone in this context.

Case 2: A husband is at home with their spouse and engage in sexual activity. The activity involves the use of birth control methods. The state has declared the usage of these devices illegal. What right if any does this couple have?

Case 3: I am at home and I decide to use my telephone. I place a call to a friend and discuss how I really hat a certain situation and the persons involved. I make no defamatory statements. I have no predisposition to cause any harm, I have no criminal record, and neither does my friend. Does the government have a right to tap my phone lines under any law. If so, can they do it without getting a search warrant?

Case 4: I want to buy a new car. The car costs $25,000 and I want to pay for it in cash. I have the money in my bank account. I go to the bank, get the money in $100 bills and go to the car dealer. I pay for the car. Both the bank and the car dealer then file reports with the Federal government. Have they violated my right of privacy?

Case 5: I am a moderate Republican but I work in a city job in a very liberal Democratic city government. I decide that I want to send a contribution in for the new Republican candidate for President. I send in a check for $1,000. My wife and I make the contribution and we both send two checks, each for $500. A month goes by and my boss,

a Democratic Party appointee calls me in and shows me the Republican donor sheets he has received for the state. My name is there. He states that he does not like having Republicans in a sensitive political job. Has he violated my privacy rights.

Case 6: A patient has terminal cancer and is a user of morphine a controlled Class 1 narcotic. The patient purchases the drug from the local druggist with a prescription from their physician. The state orders all pharmacists to provide the names of all users of Class 1 controlled substances. What rights does the patient have regarding their medical records at the pharmacist?

Case 7: I am at home and use my computer to store all my business records. I was on the Board of a company which has gone bankrupt and the government is now investigating the company for criminal charges. I left the Board well before any of the claimed actions. A compute repair person comes into my house to fix my computer to work with a DSL modem. They also are the child of a shareholders who lost all their money. In the process they take all my records off of my computer. They then turn them over to the FBI. What rights, if any, to I have to protect those records?

These all relate to "privacy" in a broad context. At one extreme is personal sexual behavior, use of birth control or the desire to have an abortion, and at the other extreme the search and seizure of items from my person, such as information, data, records, identity, and such. They involve physical contact, telecommunications contact, and data contact. They do not all fit under the same set of laws in the context of U.S. legal systems however. In fact "privacy" under U.S. Supreme Court judgments relates almost exclusively to sexual maters, abortion and birth control, and say little if anything about the person qua individual.

10.4.1 Persona in the Internet and the Electronic World

The term persona is to be used to describe the individual as regards to the Internet and their life thereon as well as a persona of the individual in the electronic hyperspace facilitated by the Internet. We bifurcate the medium upon which this persona is created into two parts; (i) the public Internet as best exemplified by the proliferation of web sites, search engines, and email, and, (ii) the less than public electronic world of databases and information storage media owned generally more privately, and upon which are imprinted our day to day actions and reactions. We divide this world into these two elements and call them appropriately "Petri dishes".

The Internet Petri Dish: This environment for creation is the Internet as we know it, a world of web sites and email, a world in which the individual or a third party may create a persona.

The Electronic Data Petri Dish: This world is the world of third party databases, government or private databases, which contain our lives, and in turn reflect our persona. For example, it may be our health care provider, combined with EZ Pass (a highway electronic toll system), combined with Visa credit card, combined with the telephone

company, combined with INS passport control, all creating a view of who we are. The persona we grow on this Petri dish is to some degree under our control but to a great degree at the control of others. We can be identified as someone who is ill each February, who calls their mother every day, spends a lot for restaurants in central Manhattan, goes away to war locations, and travels frequently to Washington, DC. What does that profile or persona mean and to whom does it have meaning. In many ways this is a much more powerful persona, it may say things about us that we may never really know, and do not want known. No single fact may be telling, but the correlation of these facts is overpowering. The simple example is what credit card companies do to protect their cards, relative to spending patterns, could one expand this to the total person, effectively electronically psychoanalyzing the person or more importantly the persona.

There has been the view that this persona is what the person creates but I will argue herein that there are many ways that this persona may develop. A digital persona is a mapping of the individual which may not be one to one with their actual identity. The Internet may allow the individual to create personas, many of them in fact, and to live in the electronic cyber world as may personas, as many cyber-persons. I may create a persona, some other person may create a persona, or the Internet as an "organic" entity may create the persona.

Let us consider these three persona creation mechanisms:

Self Created Persona: This persona is what we create for and of ourselves on the Internet. We may create multiple such personas. It is our web page, it is what we say in chat rooms, it is how we choose to interact with others and how we want to identify ourselves. It is in many ways the extension in a much more complex domain what was done in CB radio. We can say whatever we want, we can create images, withhold information, or whatever we choose. We can, as stated, create multiple persona.

Other Created Persona: Others can create a persona of us. They can steal our identity, they can become us in ways in which we may never know. This may be identity theft.

Organic Created Persona: This is the creation of a persona independent of us or a third party, it is the creation of a persona by the accumulation of the interactions we have on the Internet, very much like to creations we have in the Electronic Data Petri dish world discussed above.

The broadening of persona in both Petri dishes is that of a Digital Persona. Mell describes the persona as follows[370]:

> *"The term "persona," derived from the Greek term for the mask worn by theatrical performers, is generally used to describe the various ways by which a person can be identified by personal information about him. The term is also used with reference to the right of publicity to describe the*

[370] See Mell

bundle of commercial values embodied in the identity of a person. The right of publicity comprises a person's right to own, protect and commercially exploit his own name, likeness and persona."

Mell goes on to state:

"The electronic persona is then autonomous, commoditized into the physical world, directing from the electronic wilderness the actions and transactions in which we are involved. It can survive our deaths, exist totally without our awareness and be unresponsive to sudden changes in our society and lifestyles. To the user of this information, who will seldom meet the individual face-to-face, the electronic persona becomes the "real person." The outsider will see and use the persona to make decisions about the individual's life. In effect, the individual becomes secondary to the accuracy of the persona. No one or two pieces of information can tell the entire story of the individual's life. Nor do the separate pieces of information necessarily identify the individual directly. At some point, however, the combinations of personal information can form seemingly complete "images" of the individual. At that critical moment, an electronic persona is born and its reality overtakes our own."

10.4.2 Creating the Digital Persona

Life on the Internet requires that individuals be able to identify themselves while still retaining privacy and confidentiality. All the components are in place for the marketplace to evolve a uniquely elegant and powerful solution to these identity and privacy needs on the Internet.

An individual will not have a single identity on the Internet. Instead, he or she will have multiple identities for use in different situations, a concept we call the "Digital Persona." The Digital Persona emerges from and combines other personal identifiers. At birth, humans are named. Soon afterwards, they are assigned social security numbers. Later, people acquire drivers' licenses, passports, credit cards and other identifying records. They have school and job affiliations, home addresses, telephone numbers and email addresses. The Digital Persona is a collection of such digital identities, stored on a network directory and made selectively available by the user, much as a person now physically takes out various cards from his or her wallet in different situations.

Mell makes the following statement regarding this persona:

"The electronic persona is stored and manipulated in the database environment. It cannot be categorized as stock or material suitable for either traditional copyright or patent protection. The several layers of interests competing for its use make the electronic persona sui generis as property. Collected and stored in both government and private databases, the electronic persona is a valuable resource or property. Each database represents a bundle of competing rights in its use. The interests of the

government, the public and commercial entities continually conflict with one another as they flow through commerce. The government needs to access personal information to determine eligibility for benefits or violations of lawful regulation. The public has a right to access this information to assist it in understanding the nature and scope of governmental activity. Commercial interests include the economic interest of a data collector, compiler or user in personal information about an individual. These three interests must achieve a balance, but none should be presumed superior to the others. Ultimately, the private nature of the information should allow the subject to control disclosure of the information to third parties."

Mell is using the persona created externally in databases as an example. She develops this construct and the exogenous persona which we frequently have no control over and frequently have no knowledge of. The Internet persona has characteristic which are similar. It is a person we may crate or also a person created without our participation.

One can view self generated persona on the Internet in at least four distinct levels:

1. "Lurker" – a listen-only identity that can exist undetected in some communities;

2. "Present" – an anonymous identity that can listen and send but whose identity is unknown;

3. "Self-Identified" – an identity which is entirely defined by the user;

4. "Certified Identity" – an identity some of whose aspects are not user-controlled, but are certified by another entity (such as a government agency, a company or a bank)

Mechanisms to build these identities are partially available today on the Internet. Chat rooms have the ability to have "viewers" who watch but do not participate (Lurkers). Anonymous re-mailers enable people to participate while hiding their identities ("Present"). Chat rooms and online communities often have identities that are limited to specific uses and completely defined by the user (with properties like age and sex left up to the user.) When companies give employees email they in effect certify that the person is affiliated with that company. Cookies in browsers often contain a mixture of self-reported information and information certified by a provider. Certification Authorities exist to authenticate characteristics of identity, such as age, location or ability to pay, that are necessary to engage in certain activities or complete certain transactions.

These collections of identities will be stored in well known places accessible to users on the Internet. Users will be able to manage all components of their Digital Persona except for those that require certification, which will be controlled by the certifying entities.

The Digital Persona can become a central focus for privacy protection on the Internet as well as private data systems. Through it, the individual keeps control over his or her identities and can choose to disclose information to other parties on an as-needed basis.

The user can choose to send only a reference to the needed information and can use encryption or other authentication tools to make sure that the other party is who or what it represents it is. The user can give general instructions to his or her Digital Persona about what information to release for which activities under what safeguards, or he or she can individually approve each use of data or each transaction.

Organizations doing business on the Internet should clearly state their privacy policies on their Websites and have a legal obligation to follow them. With such information about Website privacy policies, users can instruct their Digital Persona to "negotiate" with Websites about release of personal data. The P3P technology under development by the World Wide Web Consortium (see details in 2.8.2) appears one such promising approach to facilitating the flow of necessary identifying information while still protecting individual privacy as defined by the user.

More generally, software technology is becoming available to manage the tradeoffs between anonymity, privacy and accountability at each level of identity within the Digital Persona; that is, software that can:

1. Enable users to control and manage their Digital Persona;

2. Support negotiations between consenting parties regarding the exchange of information;

3. Document exchanges of information or transactions; and, if needed,

4. Collect evidence to show violations of privacy agreements.

The necessary tradeoffs are best resolved directly between affected parties, and within the context of particular situations. Firms and other organizations that have published their privacy policies will have commercial as well as legal incentives to comply with them. Bad reputation travels fast. We believe that technical tools and non-governmental arrangements will provide essential privacy protection in most cases.

Government presence is needed, however, to assure an appropriate legal framework for private transactions on the Internet, and to take action if voluntary efforts to protect privacy fail. Much of the framework for privacy protection on the Internet carries over from traditional commerce and is well articulated in the "Electronic Bill of Rights" presented in the *First Annual Report of the U. S. Government Working Group on Electronic Commerce*:

1. The right to choose whether one's personal information is disclosed

2. The right to know how, when and how much of that information is being used

3. The right to see that information themselves

4. The right to know if information is accurate and correct it if it is not.

E-commerce requires a level of trust between buyers and sellers, including a secure payment mechanism that is appropriate for a particular transaction. Different kinds of transactions will use different forms of payment and levels of authentication:

1. Secure credit card payments for many consumer transactions;

2. Third party escrows for certain transactions between individuals (e.g., auctions);

3. Certification Authorities for high-value or other important transactions.

Technology is commercially available to support each level, and each has a different cost structure. Each level also requires processes for buyer protection, transaction enforceability and dispute resolution, which rely primarily on existing legal frameworks. International coordination is needed, but additional government intervention to support e-commerce security and payment mechanisms doesn't seem necessary at this time.

From the seller's viewpoint, e-commerce security should be thought of in terms of risk management. Issues such as fraud, buyer authentication, and recourse for non-payment arise in e-commerce just as in other commercial transactions. Ways to manage e-commerce risk appear to be evolving satisfactorily within the private sector, although many issues remain (such as the lack of an adequate experience base on which to determine appropriate premiums for purchased or self-insurance). In particular, the technology generally appears adequate and available to support risk management for e-commerce.

Markets rely on information about buyers, sellers, and products, and participants in market transactions have for much of this century relied on both direct assertions (e.g., advertising) and third-party references (e.g., credit bureaus, D&B, Consumer Reports). However, these brokers of reference data are being joined by private, direct sources of claims that circulate without the safeguards of traditional systems. The ability to efficiently and reliably establish or withdraw trust for commercial transactions may be disrupted.

New claims may take a variety of forms. For example, firms may circulate "private blacklists" based on unspecified or otherwise unverified claims about creditors. While the law grants firms and individuals certain rights in their dealings with credit bureaus and other traditional providers of such data, the private blacklist may have no specified recourse for review, challenge, or correction. Similarly, individuals can circulate economically damaging claims about institutions that a corporation may find difficult to fight (e.g., McDonalds). Spoofing can also pollute the commercial environment by undermining trust, which, in the absence of reference schemes, can then be generalized to other legitimate actors in the market space (cf. the "Dysson" scam).

Recourse may be slow or unavailable. Without guaranteed protections through commercial law, recourse may be sought through claims of defamation, libel, etc. This avenue is slow, expensive, and of limited value in international commerce. Since it is also by definition ex post facto, it may rightly be claimed to be inadequate to the problem, since the new information generated never expunges the previous information. The circulation of conflicting claims and even persistently discredited information (e.g., urban legends) can result in marketplace relations characterized by tentativeness, protracted and/or multiple negotiation, and inefficient, costly diligence efforts.

There may be alternative methods of addressing the problem. One issue is the establishment of trusted third party arbitrators of commercial information. This may be the traditional firms or new mediators. Acceptance of third party arbitrators should be subject to private sector agreement.

A second matter is the migration from traditional information asymmetries that characterize especially business-consumer relationships (the data companies can get about consumers is much more systematically collected and reported over longer periods than that available to consumers about businesses) to an environment in which more symmetrical information relationships can be established. Efforts to extend and expand the types of consumer information associated with Zagat© type guides are much easier and dynamic on the net, and the openness of such systems (the desirability of a large 'N') can act as a safeguard against individual vigilante actions.

There may also be mechanisms and markets for generalizing and publishing the trust-related data created by individual consumer decisions. For example, Amazon.com now includes a feature that allows consumers interested in a book to see what others interested in that work also bought. By moving away from self-reporting to reports based on behavior and then aggregating the data, this feature allows individuals to distribute decision-making about the extension of preferences.

Such features could be raised one level so that similar distributed decision-making could be a guide to initiating relationships with firms instead of products. An individual that had negotiated a commercial relationship with a firm to his/her individual satisfaction could learn what other people who had made similar trust decisions with that firm to see what other firms they had extended relationships to. If it were sufficiently dynamic, such a mechanism could allow people to make threshold decisions about new commercial relationships based on growing or falling numbers of analogous relationships.

10.5 Definition of Electronic Privacy

10.5.1 Definitions

Definitions of "private" and of "privacy" are often sought. Many of those who have studied privacy know what it is when they see it but have difficulty defining it. The difficulty is based upon the fact that when defined it delimits. The Fourth Amendment process is a clear example. It defines a set of rights, but on a case by case basis, the

meaning of those rights are clarified. For example, let us assume we accept the following definition as a starting point:

"when information is given by A about A to B, B may use it for no other purpose without A's consent. If B wants to use it in another way, B must give A the option of not being included - whether by specific opt-in or opt-out strategies or by general policy."

Many privacy approaches assume that control of privacy and information disclosure can be accomplished simply by supplying users with information about the privacy policies of a site being accessed. These mechanisms may not be workable in practice. In particular, the notion that users will be able to explicitly choose to exchange privacy for access to goods, information, or other benefits may not work well when a broad range of alternatives does not exist. Just as, if there are few suppliers of a physical good, users often have little choice of price or quality, there may often be no practical way to both obtain goods or information and preserve privacy.

One particular type of information disclosure involves identification of the identity of the originator of a message. Notions of privacy imply that there should be a right of anonymity, and anonymity may be particularly important for some types of political speech. But any such right must be balanced with the right to not interact with anonymous parties. Example: if spammers were uniquely identifiable as such, TCP transactions downloading SPAM could abort early, definitively ending SPAM as an issue.

Many recent trends also seem to mitigate against intelligent user choices about privacy and information disclosure. For example, recent versions of popular browsers make it harder to make informed choices about acceptance of information-disclosing "cookies" than some of their predecessors and some rule-based cookie-control programs have disappeared from the marketplace.

There are also privacy concerns about infrastructure-related databases. For example, records of domain name registrations and address allocations have traditionally been public in order to permit users of other domains or spaces to track down problems and get assistance with resolving them. But, in recent years, those databases have been captured and utilized for targeted marketing purposes and that practice has led to strong suggestions that the data not be public.

On the surface the privacy issue seems to be a relatively straightforward clear-cut issue. Individuals and organizations have the right to privacy, where: *Privacy implies the ability for an individual or organization to have control over their personal information. This includes access to and control over what information is disclosed, when, to whom, and how it is used.*

But upon closer investigation, this issue is far more complex. Privacy is a two-edged sword in that loss of privacy offers the potential for good and bad. Customers are concerned with their loss of privacy. They are concerned that when their personal

information is collected, it can fall into the wrong hands or just be misused, resulting in one or more of the following undesired situations, in increasing order of concern.

1. Annoying and unwanted sales pitches and cross sells

2. Personal embarrassment, damage of one's reputation, and in the case of corporations, the loss of trade secrets.

3. The denial of some desired end result; e.g. eligibility for health coverage, request for loan, application for employment.

4. Perpetrating some criminal activity, such as child porn, theft, fraud, account or identity take-over.

5. On the other hand, customers are motivated to provide their personal information for a number of reasons, including:

6. To obtain better more customized/personalized products and services

7. To obtain both specific information of value (e.g. personalized news); or in anticipation of gaining some unspecified benefit (e.g. unanticipated bargains, offers, analyses)

8. To obtain a desired product/service or end-result (e.g. commitment of a loan, acceptance of health claim, etc.)

9. In return for incentives such as money, loyalty points, frequent flyer miles

In some cases, the customer will initiate a request for a specific personalized service. For example, a customer might ask the service to alert him whenever it receives news articles on particular specified subject(s) of interest, and will fill out a personal information and preference form provided by the service provider for the requested service. The customer provides requested personal information with the understanding that the information will only be used in support of the requested service.

In other cases, the customer may be willing to provide information, where the service provider is given more latitude in the use made of this information in anticipation of unspecified benefits and/or in return for incentives. For example, based upon an analysis of customer-supplied information about their current mortgage and financial health, a mortgage company offers the customer attractive refinance options for her consideration. Prior to the offer the customer had not requested nor anticipated the need or desire to refinance. In another example, a bookstore knows that its customer enjoys Danielle Steele novels, so sends him a book review of a new author whose novel has gotten rave reviews and is likened to a Danielle Steele novel. Again the customer never requested this information but is glad to receive it. In both these examples, by using personal information the company offers the customer services and products that the customer

perceives as value. The downside of giving a service provider this sort of latitude is that the service provider's use of the information might lead to offers and services that the customer finds at best a waste of time and not particularly useful. Worse, the use of the information might result in a serious invasion of the customer's privacy.

Over time the customer will learn whether it can trust a company to use personal information wisely and to provide value, rather than a nuisance or worse to the customer. This sort of trust is engendered and cultivated through:

1. The service provider's brand and reputation

2. The customer's experience and relationship with the service provider

3. Referrals and testimony by third parties

4. Guarantees and means of recourse

5. Existing laws, contracts and regulations

6. Self auditing

In any event we see that in the customer's eyes all service providers are not equal with respect to their trustworthiness in protecting customer information. The importance of and need for additional law and regulation is unclear and varies with the service provider. The need for additional regulation is likely to be influenced by whether or not there is a ready availability of service providers and third parties with proven reputations and track records who are willing to offer services with adequate privacy protections.

The regulatory environment is currently quite mixed and uncertain. There currently are advocates and arguments both favoring and arguing against special privacy legislation for on-line commerce. The European Union passed a privacy directive that went into effect this year. It requires that consumers "get disclosure statements" on how personal information will be used and the option of preventing companies from sharing information about them. Further, any company doing business in the European Union is prohibited from sending information to countries that do not meet a threshold of protection. The U.S. is one of the nations that do not meet the European standard.

The new European directive requires that companies tell people when they collect information about them and disclose how it will be used. In addition, customers must provide informed consent before any company can legally use that data. This would be an "opt-in." policy, rather than an "opt-out" policy where the customer is informed of the intent to collect data and the purpose to which the data is used, but the data is collected unless the customer objects and expressly instructs the company not to. The U.S. is so far favoring a voluntary industry self-audit and policing approach, and is more disposed to an opt-out policy.

The European directive law also requires companies to give people access to information about themselves. This is not always practical. For example, a company purchases or collects data for a specific purpose (e.g. a direct mail solicitation) and does not retain the data. Because of this American officials say they disagree with giving people unconditional access to information about themselves, saying access should be allowed only if it is reasonable or practical to do so.

Under European law, each member nation is required to implement the directive by enacting its own law. Six nations have drafted or passed such laws so far. It is not clear that all European nations will actually pass regulation and/or institute such a policy. In the short term government and industry officials predict that nothing much will happen. Most countries have yet to implement their own laws to carry out the directive. And several countries, including Germany, have had tough laws in place for years, and companies have found ways to deal with the requirement. For example, in 1995 Citibank was challenged in Germany, but successfully demonstrated to the German government officials there how its system protected data in the United States, and it has since operated without conflicts.

Given that sufficient services are available with adequate privacy assurances, and no really grievous well-publicized privacy violations occur, the need for and nature of additional privacy regulation for Internet, over and above the already existing laws and regulations in the consumer protection area, are likely to remain cloudy and uncertain.

10.5.2 Privacy in a Electronic Transaction Environment

The previous discussion generally argues that the customer is already in control over what information should be provided to what company and for what purposes. There are already various consumer protection laws on the books, such as the Fair Credit Reporting Act, which forces banks to let consumers know they may "opt out" of information sharing, which includes both the internal use of the data for cross-marketing and selling the data to third parties. Additionally, the customer can be educated to be cautious in giving out private information to any but well-known and trusted service providers who voluntarily provide ample warning to the customer, what they intend to collect and for what purpose. But there are some special issues and concerns in the on-line world.

Some information can be collected without the customer's direct knowledge. In some cases, data can be collected without the customer's knowledge. Information can be captured without requiring the user to explicitly provide it. For example, a user's navigation clicks can be stored by the client as "cookies" or as hidden fields in URLs and forms, accessible by the service provider. Information collected from the user as part of the service session can be collected and stored by the server, or it can be stored as part of a secure socket layer (SSL) session index (if the HTTP session is cryptographically protected). For example, a web server can measure, records and stores a customer's actions while visiting their web site and from transactions they process. Information concerning the customer can also be captured from properties contained in customer

email addresses and Internet service descriptions. This is a concern because it is being obtained without informed customer consent (either implied, opt-out, or specific, opt-in).

A related privacy concern deals with infrastructure-related databases. For example, records of domain name registrations and address allocations have traditionally been public in order to permit users of other domains or spaces to track down problems and get assistance with resolving them. But, in recent years, those databases have been captured and utilized for targeted marketing purposes and that practice has led to strong suggestions that the data not be public.

The ability of a service provider to collect this type of information should be common knowledge but customers are often unaware of this capability. The consciousness and concern of the public regarding these indirect means of information capture is increasing. Responsible on-line service providers are beginning to alert their customers when this data is being collected, and how the collected information will be used. Technology solutions are being developed that would give the customer greater control, including blocking, over the collection of this sort of information. In fact technology plays an important role in privacy protection over the Internet.

The acceptance and practical implementation of most privacy approaches is still unknown. Most of the privacy approaches rely on technology solutions. For example, encryption is required to prevent unauthorized third parties from eavesdropping and intercepting the exchanged private information. Authentication technologies are needed to make sure that the transacting parties are who they claim to be and that the information provided is authentic and has not been tampered with by eavesdropping third parties. Implementing encryption and authentication over the Internet has its own set of issues ranging from issues of interoperability, cost, performance, scalability and legal and regulatory restrictions that are discussed elsewhere in this document.

Additional technology solutions have also been proposed to assist in the implementation of privacy protections. One of the most well known is the Platform for Privacy Preferences (P3P), proposed by W3C. P3P is a technology that makes possible a kind of automated assistance in the screening of information requests and control over the delivery of requested information, including a negotiation of privacy terms between the individual and the service provider the information. It operates sort of like a digital analogue to caller id and blocking of caller id, where the requesting party wishes to know who is phoning, but this information can only be provided if the calling party does not block the request.

P3P increases the explicitness with which privacy policies are expressed, allowing the user and the service provider to specify and match for each data item, the terms of usage (e.g. how the information will be used, for what purpose and who the information will be shared with). This includes information not explicitly supplied by the user, but collected indirectly, as just discussed in the previous paragraph.

In principle this technology sounds quite promising. It protects the user while minimizing manual intervention. These mechanisms may however not be workable in practice. For example, the user may find the technology too complex and/or not acceptable. Specifying ones privacy preferences down to each data element may prove too daunting to the user. It could require the user to either set as many as 80 or more parameters, or rely on a program that can map/infer these parameters from a smaller set of simpler higher level privacy preferences, or through learning customer preferences by observing customer behavior. Alternately, the system can simply work with default settings that can be over-ridden by the user. Further complicating this technology is that the user preferences may involve too many variations. In fact, the user may change his/her mind and preferences frequently. And of course for P3P to work, it needs to be implemented on top of good privacy and authentication infrastructure which have implementation issues of their own that are discussed in subsequent sections.

Customer provided information is unreliable and varied. Further adding to the confusion surrounding customer supplied information is the underlying complexity surrounding any individual identity. We all are in actuality many different individuals with different roles and attributes. For example, a person can simultaneously be a father/mother, husband/wife, corporate officer, consumer, advisor, patient, and member of a number of different lifestyle organizations (e.g. Gay and Lesbian, Black American, College alumni). We tend to often keep these different identities separate and in very different compartments of our lives. These various identities and roles can lead to very different information being provided and inferred by a service provider depending upon the context in which the data is collected. The customer may wish to supply different information, for different persona, service providers, and circumstances.

The customer may even choose to provide the service provider with inaccurate or incomplete information. This may be deliberate; e.g. as a means of ensuring privacy is not violated, to ensure eligibility for some service, or for sheer delight in making mischief. It also might be inadvertent; e.g. in error. So it is likely that the disclosure of information involves more than deciding which information items to release under what conditions of privacy. It also concerns which version of the information items is provided, the context under which the information is provided, and the need of the service provider to check the accuracy and authenticity of the information provided.

The customer can’t always appreciate all the different ways bits of information can be combined and used? The user, or their surrogate program, may not truly appreciate the actual information value contained in a piece of information when combined with other data items and make poor privacy preference selections that they will be unhappy with. For example, although an individual data item by itself might not appear to pose a privacy concern, when combined/associated with other similarly seeming harmless bits of information, often collected at another time and circumstance, may provide insights whose disclosure in the wrong hands would be of great concern. For example, a customer might be concerned if the money and purchases made on two different credit cards from two different companies were combined. It might reveal a shaker financial history than either set of data taken alone would show.

The issue of the use of agents, proxies and brokers on behalf of the consumer adds complexity to the privacy issue, especially when they are software robots. P3P, which was just discussed above, allows both user privacy preferences and service provider privacy principles to be placed in a form that is suitable for unambiguous interpretation by software agent programs. Software agents are likely to be used by many other applications in addition to P3P. These se agents raise a whole set of additional issues. For example, can a software agent be trusted? Authenticated? How does one bestow and verify that the agent has clearly recognizable authorizations? Who is liable if the agent makes a mistake or violates the user's privacy.

There are some instances where customer permission might/should not be required. Collecting information about one's customers might be needed by the service provider in order for them to manage fraud and resolve disputes. In this case the collected personal information allows the service provider to detect unusual practices and anomalies that can help to spot attempted fraud, and to challenge and authenticate transacting parties to verify that a transaction is legitimate and has the consent of all involved parties. It can also be used to identify, catch, and prosecute criminals. Other examples might be government reporting requirements for criminal prosecution, for collection of taxes, census and statistics-taking and other purposes. But the customer can be made aware of the collection of this information and the use of this information can be restricted to just the stated purposes.

There are cases where the customer but can be pressured into providing information. A firm accepting some risk or liability on behalf of its customer has the right to request information needed to help it manage and price its risk. For example, a financial firm that grants a customer a loan, providing money on credit, is assuming a risk that the customer might default. The financial firm has the right to request information that would give it some confidence that the customer has the capacity and will to repay the loan. That seems a fair exchange – sensitive personal information for a needed product – e.g. a loan. But what if the firm also plans to sell the information to other third parties for a profit? The customer may not want their data used for any purpose other than that required for processing the loan, credit or other related service, but needs the offered service (e.g. loan) so badly that it is forced to accept the firms terms and to allow them to resell the data. Should a consumer be protected against this pressure? The notion that users will be able to explicitly choose to exchange privacy for access to goods, information, or other benefits may not work well when a broad range of alternatives does not exist. Just as, if there are few suppliers of a physical good, users often have little choice of price or quality, there may often be no practical way to both obtain goods or information and preserve privacy.

Privacy concerns varies greatly by the nature of the transaction/interchange. Concerns over privacy and the need for authentication of the information provided vary greatly by the nature of the transaction. Examples include:

1. A friend to share information with – social/personal

2. A merchant to purchase something from – commercial, difference between high value and low value transactions

3. Chat room conversation – informal, social/personal

4. Entering into a business relationship – commercial

5. Applying for a loan – commercial

6. Communicating with your doctor – commercial

Of course the unreliability of the user information supplied can serve to protect personal privacy, particularly in social situations where the information provided cannot be as easily cross-checked and validated by any but an authorized commercial service provider.

This diversity of information-exchange needs and multiple roles played by any one individual suggests that a universal national identification is probably not a good idea. It will not satisfy all the various needs information exchange and for identification, and could destroy a means for an individual to ensure their privacy through selective dissemination of unreliable and varied information.

10.5.3 Anonymity versus privacy

One particular type of information disclosure involves the identity of the originator of a message. Notions of privacy suggest to some that there should be a right of anonymity, and anonymity may be particularly important for some types of political speech. But any such right must be balanced with the right to not interact with anonymous parties. For example: if spammers were uniquely identifiable as such, TCP transactions downloading SPAM could abort early, definitively ending SPAM as an issue. Additionally implementing reliable business transactions with the ability to resolve disputes and meet government regulations (such as taxation and money laundering reporting) often conflict with the desire for anonymity.

Historically, in the English and American Common Law principles, there is an inherent right to Anonymity, namely, one may take a fungible currency, such as gold, or even "dollars" and enter into a transaction with another party without either party needing to know the identity of the other party. There is recourse if the party sells defective goods, if there is a fraud perpetrated, or if some other crime or *Tort* results. However, neither party is generally required to reveal to the other their identity at any time prior to, during, or even after the transaction. If we accept the over one thousand years of precedent regarding anonymity, then we may ask how does it apply to the Internet. Specifically we may ask:

1. Can we create an environment wherein the "identity" we create can be kept private and secure and that we may enter into any form of communications and transaction on an anonymous basis?

2. Can we create a secure form of "money" which allows us to purchase and get involved in value based transactions without the need for identifying ourselves and again retaining our anonymity?

3. Can we apply all laws that ensure protection, as we have done for the course of the Common Law, and do so in an electronic anonymous environment?

It should be remembered that the United States was generally one of the few countries where identity papers were never carried during the twentieth century, with the exception of California, an artifact of fear of the Japanese during World War II. However, again as the world is opening up, other countries no longer require the possession of the infamous identity "papers", whereas the United States is now the only country that demands "papers", namely passports or the like, for inter-state transport by air. Identity and the governments "right" to access it and its concomitant other elements, has evolved in a rapid fashion in the US without and delimitation under the law. The issue is will the lack of anonymity in the Internet facilitate and accelerate this process of a lost right?

Fromkin has stated four types of computer or Internet anonymity"

"Before discussing remailers in any detail, it is useful to distinguish between four types of communication in which the sender's physical (or "real") identity is at least partly hidden: (1) traceable anonymity, (2) untraceable anonymity, (3) untraceable pseudonymity, and (4) traceable pseudonymity. The objective of these categories is to disentangle concepts that are otherwise conflated: whether and how an author identifies herself as opposed to whether and how the real identity of the author can be determined by others."

Fromkin further states:

"Anonymity has often had a good press in the United States. Perhaps the most famous political tract in this country's history, the Federalist Papers, were written pseudonymously. In 1958, The Supreme Court upheld the right of members of the NAACP to refuse to disclose their membership lists to a racist and surely vengeful state government,[371] a decision that I imagine almost every lawyer in the US would endorse today. Simultaneously, however, the United States has nurtured a deep-seated fear of conspirators and conspiracy,[372] with the McCarthyite witch-hunts of the 1950's being only one of the more lurid examples. Anonymous communication is of course a superb tool for the conspirator.

[371] NAACP v. Alabama ex rel. Patterson, 357 U.S. 449 (1958).

[372] I discuss the US hypersensitivity to conspiracy in A. Michael Froomkin, *The Metaphor Is the Key: Cryptography, the Clipper Chip, and the Constitution*, 143 U. PENN. L. REV. 709, 850-62 (1995).

The US Constitution does not guarantee a right to be anonymous in so many words. The First Amendment's guarantees of free speech and freedom of assembly have, however, been understood for many years to provide protections for at least some, and possibly a great deal, anonymous speech and secret association."

Anonymity is in extremis the "right to be let alone". Generally we agree to that right if one is in their home. Generally we agree to that right if one is in ones auto or out by them selves. Generally we agree to that right between husband and wife or between people engaged in a sex act, unless otherwise banned by the state such as Bowers. How then do we extend that to transactions. That is the first step in the anonymity debate, can I use cash to buy something that I want no to know that I am buying.

Let us assume I want to buy a pornographic file. Let us assume it is legal to do so. Let us assume I do so with cash at a local store. Then do I have a right, say under the tort of "Public Disclosure of Private Facts" to prevent someone from telling third parties of this. Does the Government or a neighbor have the right to obtain the information and disseminate it in a public manner?

10.6 Rights, Liberties, and Freedoms

The legal structure that we operate in the United States is a complex amalgam of laws, culture, and people. Notwithstanding the laws, and especially the Constitution, we see that the Supreme Court has the ultimate authority to "invent" expansions and "invent" contractions on our freedoms. Privacy is one of those areas. The classic example is Roe v. Wade, wherein the Court allowed abortion under the rubric of a right of privacy. At the other extreme, the Court has been closing down the rights of privacy that we would normally seek under the guise of delimiting the search and seizure limitations.

The issue hereunder is the following:

What do we mean by privacy? This is a definitional problem and in the case of the law it may be addressed in one of two ways. First we can create a law to protect privacy, in which case we can define it and thus delimit it. Second, we can address a case process wherein we seek a court to rule on some case.

The issues of rights, liberties and freedoms is a set of discussions in the theory of laws. Cantor has presented an interesting structural description of the types of schools of legal studies and we find this useful to review so as best understand where the issue of privacy may find a home and where it may be attacked. The Cantor categories are as follows:

1. ***Justice and Liberty:*** Cantor states that this school is founded on the approach of Maitland. It states that there is an interaction between legal ideas and societal contexts. It is a school that attempts to integrate many features of a culture into the law, and that views the law a vehicle for social and societal change.

2. ***Marxist:*** This is the classic Marxist approach which states that the law and the legal system is just a tool of industrialists to maximize their profits.

3. ***Feminist (Foucault):*** The law is a tool for oppression, it serves holders of power, and it has been a general tenet of the feminist school which views laws as oppressive tools of the male dominant society to keep women in their place. DeCew discusses this school of privacy especially Katherine McKinnon's approach to legal studies. The a priori view creates a ad hoc propiter hoc form of argument, which makes it very difficult to understand and develop the issue of privacy.

4. ***Psychoanalytic (Lacanian):*** Law is considered a psychosexual control and dominance mechanism.

5. ***Structuralist (Levi-Strauss) :*** Mind and society combine to elicit the law. This is reminiscent of the Society of the Mind, by Marvin Minsky, one of the fathers of Artificial Intelligence at MIT. The theory is that the mind and society interact, that society can be better served by the understanding of the almost algorithmic interactions and that the optimization of these interactions is an improved embodiment of the law.

6. ***Deconstructionist :*** This is classic Derrida. The Derrida school of deconstructionist though must place you in the mind of both the authored and the reader, each having differing planes of reference. The "original intent" doctrinal approach to the Constitution is somewhat a Derrida approach, what did the founding fathers mean. Unfortunately, even there, the simple battle between Federalists and Anti-Federalists is best reflected in the conversation tempus proximis, not necessarily in the "self serving" writing of those attending.

7. ***Economics :*** This is the Chicago Schools as described best by Posner. The discussion on Posnerian theory is that every interaction is at heart an economic transaction. The state should understand that and the state is or is not a party to that transaction. The law is a reflection of what the state has as an interest in the transaction, and it reflects through a quasi economic metric how it values that transaction.

These seven "schools" as described by Cantor are a useful construct to develop an better understanding on how best to reflect upon privacy. W\Canto does not include the Etzioni type Communitarianism, but one may place that in the Justice and Liberty school of modernism, wherein what is good for all applies. I would argue that Rawls belongs in that school as well.

10.6.1 Definitions

DeCew states the following:[373]

"Two points should be kept in mind. First, … I shall not place special interest on privacy as a right, as opposed to a claim or interest. A "claim" is often described as an argument that someone deserves something. A "right" is then a justified claim; justified by laws or judicial decisions if it is a legal right, by moral principles if it is a moral right."

Judge Thomas C. Cooley in 1880 in his treatise on *Tort*s stated that privacy is the "right to be left alone".[374] Warren and Brandeis in 1890 further expanded upon this and explained privacy in a far reaching manner.

DeCew further paraphrases Catharine MacKinnon in characterizing two general types of privacy:[375]

> *"…privacy has developed to protect both (i) an individual interest in avoiding disclosure of personal matters, as well as limiting government intrusion on a regulation of these matters, and (ii) an interest in independence in making certain kinds of important decisions regarding body, home, and lifestyle."*

This simply stated means the we have a set of two privacy rights; the right to conceal and the right to act. The right to conceal we shall call the right of anonymity and the right to act we shall call the right to choose.

10.6.2 Rights

Rights are those elements provided by or under the law, whatever law may be controlling, by which we as individuals, or collectively as a people may act without fear of the government or any other controlling force seeking to intervene on our actions in any way. Thus, we have, under the U.S. Constitution, some defined rights of free speech. It is not as free as we may think it to be, but it is free to a great extent.

In Blackstone's Commentaries on the law, he establishes the fundamental rights of Englishmen[376]:

1. Personal security:

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[373] DeCew, p. 27.

Keeton & Prosser, p. 851.

[374] Keeton & Prosser, p. 849.

[375] DeCew, p. 82.

[376] See Posner, EoJ, p. 15.

2. Personal liberty:

3. Private property:

Finnis develops in some detail the Hoheld ideas of rights.[377] They can be summarized as follows:

Definition: Let P_n and P_m be persons n and m respectively. A person may be either natural or legal.
Definition: Let $F_{n,m}$ be any act from P_n to P_m.
Definition: P_n has a *claim-right* than Pm should $F_{n,m}$, if and only is Pm has a *duty* to P_n to perform act $F_{m,n}$. $F_{n,m}$ and $F_{m,n}$ are *reciprocal* acts.

For the time being this definition of a claim-right assumes a definition of a duty and a definition of reciprocal. We shall defer the discussion on these until latter.

Definition: P_m has a *liberty* relative to P_n to perform an act $F_{m,n}$, if an only if P_n has *no-claim-right* that P_m must perform act $F_{n,m}$.
Definition: P_n has a *power* relative to P_m to perform act $F_{n,m}$, if an only if P_m has a *liability* to have his legal position changed by P_n executing $F_{n,m}$.

Definition: P_m has an *immunity* relative to P_n performing act $F_{n,m}$, if and only if P_n has no power, a *disability*, to change P_ms legal position by performing act $F_{n,m}$.

Thus claim-right, liberty, power, and immunity are defined in terms of duty, no-claim-right, liability, and disability. Albeit somewhat circular, these constructs can be used to establish a certain framework for the establishment of what rights does one expect for example for privacy.

10.6.3 Rights of Man

The Rights of Man, established at the beginning of the French Revolution, were an alternative to the Bill of Rights as established in the US Constitution. The key elements relating to privacy are as follows:

3. The aim of all political association is the preservation of the natural and imperceptible rights of man. These rights are liberty, property, security, and resistance to oppression.

4. Liberty consists in the freedom to do everything which injures no one else; hence the exercise of the natural rights of each man has no limits except those which assure to the other members of the society the enjoyment of the same rights. These limits can only be determined by law.

[377] Finnis, p. 199.

5. Law can only prohibit such actions as are hurtful to society. Nothing may be prevented which is not forbidden by law, and no one may be forced to do anything not provided for by law.

6. Law is the expression of the general will. Every citizen has a right to participate personally, or through his representative, in its foundation. It must be the same for all, whether it protects or punishes. All citizens, being equal in the eyes of the law, are equally eligible to all dignities and to all public positions and occupations, according to their abilities, and without distinction except that of their virtues and talents.

7. No person shall be accused, arrested, or imprisoned except in the cases and according to the forms prescribed by law. Any one soliciting, transmitting, executing, or causing to be executed, any arbitrary order, shall be punished. But any citizen summoned or arrested in virtue of the law shall submit without delay, as resistance constitutes an offense.

8. As all persons are held innocent until they shall have been declared guilty, if arrest shall be deemed indispensable, all harshness not essential to the securing of the prisoner's person shall be severely repressed by law.

9. No one shall be disquieted on account of his opinions, including his religious views, provided their manifestation does not disturb the public order established by law.

10. The free communication of ideas and opinions is one of the most precious of the rights of man. Every citizen may, accordingly, speak, write, and print with freedom, but shall be responsible for such abuses of this freedom as shall be defined by law.

16. Since property is an inviolable and sacred right, no one shall be deprived thereof except where public necessity, legally determined, shall clearly demand it, and then only on condition that the owner shall have been previously and equitably indemnified.

10.6.4 Bill of Rights

Consider the following elements of the Bill of Rights. Each may have some element of a privacy right established:

Article I. : Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.

Clearly this allows for the privacy of thought and religious expression. It also may be extended by the assembly clause to extend privacy from the individual person to the group. The expression

Article II. : A well regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed.

One view of this is the privacy right to possession and protection of the person. This has not been deemed an approach by the Court but in the sense of the right of "the people" both collectively and individually is the essence of the right of privacy as both individual and group.

Article III. : No Soldier shall, in time of peace be quartered in any house, without the consent of the Owner, nor in time of war, but in a manner to be prescribed by law.

Article IV. : The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

Article V. : No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentment or indictment of a Grand Jury, except in cases arising in the land or naval forces, or in the Militia, when in actual service in time of War or public danger; nor shall any person be subject for the same offence to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.

Article VI. : In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the Assistance of Counsel for his defense.

Article VII. : In Suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury, shall be otherwise re-examined in any Court of the United States, than according to the rules of the common law.

Article VIII. : Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

Article IX. :The enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people.

10.6.5 Natural Law

Natural law is an old concept that basically means that there exists a set of principles, methods to evaluate those principles, and the ability to generate laws from the principles and methods. Consider what Finnis presents as the basis for natural law.[378] Namely that:

(i) There exists a set of ***basic principles (BS)*** reflective of a basic and generally agreed set of human goods to be sought or realized,

(ii) There exists a set of ***methods and procedures (M&P)*** that allow for the distinguishing of "sound" from "unsound" and allow anyone to distinguish what is "reasonable" and what is "unreasonable",

(iii) That the combination of BS and the M&P allow for the establishment of general moral standards, GMS.

Latter Finnis states[379]:

> *"Natural law – the set of principles of practical reasonableness in ordering human life and human community – is only analogically law…"*

In contrast, Aquinas, in Question 94 derives natural law from Divine Law.[380] The issue in Aquinas is that there is a hierarchy of these laws, Divine, Natural, and Human. He takes a great deal of time developing the essential linkage of the natural law being what we a culture of humans use as the basis for Human law which is derivative from the ruler. The concept is that natural law precedes human law, human law exists only because divine law recognizes the king.

10.6.6 Common Law

As Eisenberg states, the common law has two major types of propositions; doctrinal and social.[381] Common law is that collection of legal rules which are the concatenation of what has gone before. In the areas of torts and contracts common law principles dominate. Specifically Eisenberg states[382]:

> *"What then does the common law consist of? It consists of the rules that would be generated at the present moment by application of the institutional principles of adjudication. I call this the generative conception of common law…"*

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[378] Finnis, p. 23.

[379] Finnis, p. 280.

[380] Aquinas, p. 54.

[381] See Eisenberg, p. 1.

[382] Eisenberg, p. 154.

10.7 Conclusions

Privacy is an evolving concept. It has been developed within the regimes of Constitutional law, Tort law, US Law, and the broad basis of natural and common law. It has been viewed as the right to be left alone, a property right, an economic right, and most recently as a right to control ones reproductive capabilities and actions. In the electronic world it has been viewed since September 11, 2001, as less of a right and more of a liability since most government agencies want unfettered access to individual's thoughts, ideas, proclivities, and intended actions. At what point does the governments powers end and the citizens rights begin. The issue here is "government powers" and "citizen rights". Not necessarily or even at all the rights of enemies or foreigners. Not the rights of the government since the government has powers given to it by the people as stated in the constitution. But the issue is what rights do American citizens, and by extension other respective citizens have.

The area of privacy protection over the Internet is complex involving many conflicting requirements, unresolved issues and unknowns. These issues include making the proper trade-off between the needs of society vs. the rights of the individual, and between the benefits of personalization vs. abuse of privacy. For example, there are conflicts between the need for information in support of criminal prosecution (e.g. money laundering, fraud control, tax evasion) versus concerns for individual privacy protection. There are many unknowns regarding the likely acceptance and effectiveness of associated privacy solutions.

Can they be practically implemented? Is the best approach self-policing or regulation, user opt-in or opt-out? Will they be acceptable from an economic and practical implementation? Are they acceptable from a cost, convenience, performance, and ease of use viewpoint? Will they truly prove effective in helping to enforce privacy policy and providing the desired privacy protections? Will they result in acceptable risk exposure? Can they accommodate international and cultural differences? In light of these unresolved issues and unanswered questions, a hands-off, wait-and-see policy is recommended for the time being with respect to any special legislation. We should let the multiple solutions and market forces work themselves out.

What might be helpful is a program directed at educating users with respect to privacy cautions and the tools they have available today to alleviate these concerns.

10.8 Appendix B: Key Supreme Court Rulings

Alabama 357 U.S. 449 1958		Rights	NAACP to disclose its members list as a part of registering in Alabama. The Court said: "*This Court has recognized the vital relationship between freedom to associate and privacy in one's associations. When referring to the varied forms of governmental action which might interfere with freedom of assembly, it said in American Communications Assn. v. Douds, supra, at 402: "A requirement that adherents of particular religious faiths or political parties wear identifying arm-bands, for example, is obviously of this nature." Compelled disclosure of membership in an organization engaged in advocacy of particular beliefs is of the same order.* ***Inviolability of privacy in group association may in many circumstances be indispensable to preservation of freedom of association, particularly where a group espouses dissident beliefs****."*	
Griswold v Connecticut 381 U.S. 479 1965	1965	Privacy	Griswold was the Executive Director of Planned Parenthood in CT. CT had a law against selling or prescribing contraceptive devices. PP sued CT to be able to provide birth control methods to the CT citizens, and in this case specifically a husband and wife. The Court first granted that the married couple, part of Griswold et al, had standing to assert a constitutional right and second that the CT law violated the right of marital privacy which was covered by the penumbra of the Bill of Rights. Justice Douglas delivered the opinion. The logic for Douglas for establishing standing was based upon CT having arrested and convicted the defendants, albeit for a $100 fine. Douglas states*: "In other words, the First Amendment has a penumbra where privacy is protected from governmental intrusion."* and also *"The Third Amendment in its prohibition against the quartering of soldiers "in any house" in time of peace without the consent of the owner is another facet of that privacy. The Fourth Amendment explicitly affirms the "right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures." The Fifth Amendment in its Self-Incrimination Clause enables the citizen to create a zone of privacy which government may not force him to surrender to his detriment. The Ninth Amendment provides: "The enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people."* Thus for the first time a "right to privacy".	

410 U.S. 113 1973			a class action suit against the constitutionality of the Texas law which made abortions illegal. Justice Blackman rendered the opinion. Roe claimed that she had protection under the 1st, 4th, 5th, 9th, and 14th Amendments. The Court stated that the Texas act was unconstitutional The claimant used Griswold and the penumbra theory under the 14th Amendment. The Court went through the history of abortion laws demonstrating that they were of recent history. The classic statement is that the Hippocratic oath expressly prohibits abortion, and that almost all physicians in the US take that oat at their graduation from medical school, but the Court states "the Oath originated in a group representing only a small segment of Greek opinion.." The Opinion then states: "The Constitution does not explicitly mention any right of privacy. In a line of decisions…the Court has recognized that a right of personal privacy, or a guarantee of certain areas or zones of privacy, does exist under the Constitution." This then became the basis of the Opinion.	
Whalen v Roe 423 U.S. 1313 1975	1975	Privacy		
U.S. v Miller 425 U.S. 435 1976	1976	Privacy		
Bowers v Hardwick 478 U.S. 186 1986	1986	Privacy	Justice White delivered the decision. Charged with violating the Georgia law of sodomy with another adult male in the bedroom of his home, respondent Hardwick (respondent) brought suit in Federal District Court, challenging the constitutionality of the statute insofar as it criminalized consensual sodomy. The court granted the defendants' motion to dismiss for failure to state a claim. The Court of Appeals reversed and remanded, holding that the Georgia statute violated respondent's fundamental rights. The Supreme Court held*:* The Georgia statute is constitutional. (a) The Constitution does not confer a fundamental right upon homosexuals to engage in sodomy. (b) Against a background in which many States have criminalized sodomy and still do, to claim that a right to engage in such conduct is "deeply rooted in this Nation's history and tradition" or "implicit in the concept of ordered liberty" is, at best, facetious. (c) There should be great resistance to expand the reach of the Due Process Clauses to cover new fundamental rights.	

116 U.S. 616 1886			subsequent demand by the law authorities for certain documents that The district attorney in New York ordered the defendant to produce invoices showing certain plate glass was imported illegally, against the 1874 Customs Act. The defendants complained about the constitutionality of the law. Ruling summarizes prior cases and laws. States 1789 statute for custom duty collection as stating that searches for Customs violations are permitted. Court used this reference since it was same Congress which passed Bill of Rights (original intent). Court goes o to stress the Colonial opposition to English writs of assistance which empowered English to have warrantless searches. The Court details John Adams opposition to this and further strengthens the original intent of the framers as opposing warrantless searches and seizures. Court refers again to 1789 Custom Act and restates acts restriction "cases and circumstances where they might be compelled to produce…by the ordinary rules of proceeding.." Court further states that "any compulsory discovery…or compelling the production of …books and papers…is contrary to the principles of a free government. It is abhorrent.." Court overthrew the ruling and remanded case.	search and seizure without warrants. It clearly states the "intent" of the framers of the Constitution to make it unlawful and more importantly abhorrent to demand the delivery of "papers" to the government. It does not change the Customs right to search.
Carroll v U.S. 267 U.S. 132 1925	1925	Search	This case concerned the search of a vehicle without a warrant in an attempt by the police to discover liquor in violation of prohibition. The police suspected that the defendant was involved in some form of bootlegging, but the stop occurred some time after their initial suspicions, with no further evidence having been obtained in the interim. In the early days of the automobile the Court created an exception for searches of vehicles, holding in Carroll v. United States 55 that vehicles may be searched without warrants if the officer undertaking the search has probable cause to believe that the vehicle contains contraband. The Court explained that the mobility of vehicles would allow them to be quickly moved from the jurisdiction if time were taken to obtain a warrant. Thus the Court upheld the conviction and made a distinction based upon the auto as the element being searched.	This starts to begin the process of delimiting the areas of protection. The literal interpretation is that the auto is not secure and that it is akin to placing your property in plain view, even if it is not. This may mean that we could expect that Boyd could protect the computer in ones home but that a "packet" moving over a network may go un-protected via Carroll.
U.S. v Di Re 332 U.S. 581 1948	1948	Search	This case referred to a defendant possessing illegal gas rationing coupons. The police had prior knowledge that certain persons would be carrying and trafficking in illegal gas ration coupons. The defendant was stopped in a vehicle and one of the passengers held the coupons in plain view to the police officers. DiRe was taken out of the auto and frisked and the coupons were found on his person. The driver, Reed, was the suspect and the police had no knowledge of Di Re. The Court reviewed Carroll and stated that Carroll seemed to imply that warrantless searches were appropriate for an auto. The Court made a distinction here about Carroll allowing an auto search and the DiRe case of a search of the person. The Court states: We are not convinced that a person, by mere presence in a suspected car, looses immunities from search of his person to which he would otherwise be entitled." The conviction was overturned.	

392 U.S. 1 1968			Based upon that observation he then stops and frisks them. He finds a weapon, upon which discovery they are arrested. The men object on Fourth Amendment grounds of an unlawful search and seizure. The observation lacks probable cause but the "stop and frisk" is not a seizure and a search under the Fourth Amendment. The Court views "stop and frisk" as separate from "search and seizure". The stops based upon police officers experience and the frisk is for the safety of officer and public and limited to the "discovery" of weapons. The Court justifies "stop and frisk" as follows*: "This scheme is justified in part upon the notion that a "stop" and a "frisk" amount to a mere "minor inconvenience and petty indignity,"* The Court stated: "*In our view the sounder course is to recognize that the Fourth Amendment governs all intrusions by agents of the public upon personal security, and to make the scope of the particular intrusion, in light of all the exigencies of the case, a central element in the analysis of reasonableness*." The conviction stood.	
U.S. v Ross 456 U.S. 708 1982	1982	Search	Justice Stevens delivered the Opinion. In this case a police officer obtained a tip stating that a certain person was selling narcotics. In fact the information stated that the individual had just completed a sale. The informant detailed the perpetrator and his vehicle. The police did a check on possible perps and found the defendant. The fund the defendant and then the police took defendants keys and opened trunk. A bag was found in trunk and in the bag was cash and on the bag was narcotics. The Court of Appeals reversed the decision. The Appeals Court used Carroll to stated that the police could search trunk but not the bags. The Court restated the Opinion Carroll that a warrantless search of an automobile stopped by police officers who had probable cause was not unreasonable under the 4th Amendment. In fact the limitation is on "unreasonable" search and seizure. The Court also again reiterated the fact that the Founding Fathers themselves made a distinction of warrants for homes but warrantless for vessels, thus vehicles. The Court ruled that the police could do a warrantless search based upon the long standing fact that the Court had recognized the impracticality of securing a warrant in cases involving a vehicle. The Appeals Court decision was overturned and the search and its fruit permitted.	
Wyoming v. Houghton Wyo. 98-184 1999	1999	Search	This recent case involves a routine traffic stop. At the stop the police officer notices a hypodermic syringe in plain view in the driver's pocket. The driver admitted to taking drugs. The police officer then searched the glove compartment. There he found drugs. The Court upheld the conviction by establishing that	

of the State of New York 198 U.S. 45 1905		Due Process		
Muller v State of Oregon 208 U.S. 412 1908	1908	Substantive Due Process		
Olmstead v U.S. 277 U.S. 438 1928	1928	Wiretap	Justice Taft delivered the decision. Olmstead was a leading conspirator in a bootlegging ring. He moved liquor from Canada to the US. The police put taps on the telephone lines of all the conspirators. The taps were placed outside of the homes and were done without warrants. The information gathered from the taps were used to convict. The Court stated: "The court held the Act of 1874 repugnant to the Fourth and Fifth Amendments. As to the Fourth Amendment, Justice *Bradley said (page 621): [277 U.S. 459]* *"Concurring, Mr. Justice Miller and Chief Justice Waite said that they did not think the machinery used to get this* *evidence amounted to a search and seizure, but they agreed that the Fifth Amendment had been violated.* *But, in regard to the Fourth Amendment, it is contended that, whatever might have been alleged against the constitutionality of the acts of 1863 and 1867, that of 1874, under which the order in the present case was made, is free from constitutional objection because it does not authorize the search and seizure of books and papers, but only requires the defendant or claimant to produce them. That is so; but it declares that, if he does not produce them, the allegations which it is affirmed they will prove shall be taken as confessed. This is tantamount to compelling their production, for the prosecuting attorney will always be sure to state the evidence expected to be derived from them as strongly as the case will admit of. It is true that certain aggravating incidents of actual search and seizure, such as forcible entry into a man's house and searching amongst his papers, are wanting, and, to this extent, the proceeding under the Act of 1874 is a mitigation of that which was authorized by the former acts; but it accomplishes the substantial object of those acts in forcing from a party evidence against himself. It is our opinion, therefore, that a compulsory production of a man's private papers to establish a criminal charge against him, or to forfeit his property, is within the scope of the Fourth Amendment to the Constitution in all cases in which a search and seizure would be, because it is a material ingredient, and effects the sole object and purpose of search and seizure.""* Olmstead v. United States, 32 one of the two premises underlying the holding that wiretapping was not covered by the Amendment was that there had been no actual physical invasion of the defendant's premises; where there had been an invasion, a	

York 388 U.S. 41 1967			convicted in bribery of a government official. A bar owner had complained that officials from NY State Liquor Board had entered his bar and without cause seized his books. The bar owner said it was in reprisal for failing to pay bribe. On this basis an wire tap was authorized by NY court for 60 days on the office of official. Based on wiretap evidence the warrant was extended. Evidence was obtained on two other bars being shaken down. Defendant stated that this information was not legally obtained since the warrant was for evidence on the first case. Court ruled that this was un-constitutional. The warrant was too broad in scope.	
Katz v U.S. 389 U.S. 347 1967	1967	Wiretap	Justice Stewart delivered the Opinion. The defendant was convicted for a violation of the wagering acts. The FBI recorded his calls without a warrant by attaching a recording device on the outside of a telephone booth. The defendant tried to pose the following two questions: *"A. Whether a public telephone booth is a constitutionally protected area so that evidence obtained by attaching an* *electronic listening recording device to the top of such a booth is obtained in violation of the right to privacy of the user of the booth. [389 U.S. 350]* *B. Whether physical penetration of a constitutionally protected area is necessary before a search and seizure can be said to be violative of the Fourth Amendment to the United States Constitution."* The Court rejected this posing. The Court stated: *"The Government stresses the fact that the telephone booth from which the petitioner made his calls was constructed partly of glass, so that he was as visible after he entered it as he would have been if he had remained outside. But what he sought to exclude when he entered the booth was not the intruding eye -- it was the uninvited ear. He did not shed his right to do so simply because he made his calls from a place where he might be seen…. To read the Constitution more narrowly is to ignore the vital role that* the *public telephone has come to play in private communication."* Further; *"What a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection. But what he seeks to preserve as private, even in an area accessible to the public, may be constitutionally protected*." Finally the Court states: "*Wherever a man may be, he is entitled to know that he will remain free from unreasonable searches and seizures. The government agents here ignored "the procedure of antecedent justification . . . that is central to the Fourth Amendment,"{ 24} a procedure that we hold to be a constitutional precondition of the kind of electronic surveillance involved in this case*.." The Fourth Amendment protects people, not places.	

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