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Net Neutrality: A Market Structure Perspective

What we now think of as the Internet began life in the late 1960s as a US Government research program (then known as ARPANET) aimed at facilitating communication among government and private research institutions and universities. The commercial Internet as we now know it has actually been around for less than two decades. Its mass market adoption became possible with the creation of the World Wide Web in 1991 and by the introduction of web browsers offering a graphical user interface (GUI). It was around that same time that preexisting online services like Prodigy, CompuServe and America Online began migrating their subscribers off of proprietary (non-Internet) GUI browsers and over to the Internet.

The early commercial Internet was wildly competitive and facilitated competition in virtually every economic sector, by providing consumers with nationwide – even worldwide – access to suppliers of almost any imaginable product or service. User access to the Internet was achieved using conventional voice telephone lines provided by the local telephone company to place dial-up calls to so-called Internet Service Providers (ISPs). The ISP would in turn route its customers' e-mail, web address requests, searches, and various other Internet communications to “peering points” where Internet traffic could be exchanged with other networks for routing to and from its origin and destination. And, while the local telephone company generally enjoyed near-monopoly control of this “last mile” telecom segment, customers could use their phone lines to access any ISP of their choice.

At the outset, most local telcos were not even in the ISP business, and when some finally began offering ISP services beginning in the late 1990s, they were compelled by long-standing FCC rules to afford their own affiliate no preference or advantage relative to other non-affiliated ISPs. By the end of the 1990s, numerous local and national ISPs had entered what had become an extremely competitive and unconcentrated market. When demand for dial-up Internet access had reached its peak, around the beginning of 2002, even the largest ISP at that time – America Online – served only about one in five Internet-connected households. And while the larger telcos – Verizon, SBC, BellSouth and Qwest – had each begun to offer dial-up ISP services of their own, their market presence was quite limited.

Broadband access and vertical integration

By 2000, roughly one in five US households had installed a second residential dial tone access line primarily to be used for dial-up Internet access. Since most of the plant required to provide second

lines was already in place, this turned out to be a highly profitable market for telcos – generating as much as \$9-billion in annual revenue at its peak. Then came broadband. Starting in the late 1990s, some cable TV operators began offering “always on” high-speed (when compared with dial-up) Internet access over their recently upgraded digital hybrid fiber/coax cable systems. The telco response was to bring to market what was by then a nearly decade-old technology known as “Digital Subscriber Line” (DSL) service, which could be provided over the same copper twisted pair wire that was already being used for voice. Why did the telcos withhold DSL from the market for so long? The telcos assumed (correctly) that widespread consumer adoption of DSL would cannibalize their lucrative second line market. Indeed, even after introducing DSL to retail customers, the telco roll-out of retail DSL was extremely slow. But once “cable modem” services became available in a given local market, cannibalization became subordinate to a much larger concern – that of ceding the high-speed Internet market to cable altogether.

During the period when the telcos were dragging their feet on making DSL available to their own retail subscribers, competitive data local exchange carriers – sometimes referred to as “DLECs” – were proceeding with business models that involved leasing the DSL “channel” from the local telco as an “unbundled network element” (“UNE”) and offering it on a retail basis along with Internet access. Once the telcos entered this market, however, they became possessive, and ultimately proprietary, about their broadband access capabilities. Soon thereafter in 2003, the FCC, responding to a DC Circuit Court order, eliminated the requirement that incumbent telcos provide the DSL channel as a UNE. This action had the effect of shutting down retail DSL competition just as it was taking hold.

Unlike incumbent wireline local telcos that were subject to the unbundling and nondiscrimination requirements of the 1996 Telecom Act, cable operators had not been considered to be providers of telecommunications services. In 2002, the FCC ruled that there was no separate telecommunications service to be unbundled from the cablecos' Internet access services – an action that was ultimately upheld by the US Supreme Court. Soon, the FCC, seeking to create “parity” between competing telco and cableco broadband Internet access services, extended unregulated treatment to DSL and other telco consumer broadband offerings and dropped the requirement that telcos sell the underlying transmission on a common carrier basis. So, whereas with dial-up Internet the last-mile (dial-up) telecom link could be used to access *any* ISP of the customer's choice, with broadband Internet access the last-mile telecom link (whether provided by the telco or the cableco) and the

ISP service are inextricably linked and cannot be purchased separately. If customers use a telco broadband connection (e.g., DSL, Verizon's FiOS or AT&T's U-verse), they must also purchase and use the telco's ISP service as their gateway to the Internet. Similarly, if the customer takes cable modem (last-mile) service from the cableco, the customer is forced to accept and pay for the cableco's ISP service. And, it is precisely because the last-mile broadband connection and access to and from the Internet are linked together in this manner that the last-mile broadband service provider is placed in the role of *gatekeeper* with respect to access to its end user subscribers.

It is hardly surprising that the introduction of broadband, coupled with the evisceration of any remnant of nondiscriminatory last-mile access, locked the dial-up ISPs – AOL, and Earthlink, among others – out of the broadband Internet service market altogether, to the point where these companies have either gone out of business or have become minor players in the ISP world.

Vertical integration, net neutrality, and competitive foreclosure

Which brings us to the subject of Net Neutrality. There are a myriad of facets to this issue, and we do not attempt to address them all here. The FCC's *Net Neutrality NPRM*, issued earlier this year, proposes the formal adoption of previously stated net neutrality policy principles and proposes specific, new regulations in two key areas:

- No discrimination against competing content, applications, or service providers.
- Transparency (customer disclosures) regarding network management practices

In certain key respects, the FCC's earlier rescission of – or (in the case of cable) its failure to apply – unbundling and nondiscrimination rules to telco and cableco high-speed Internet access has had exactly the adverse impact upon competition in the adjacent ISP market against which the Commission now seeks to protect Internet content and applications. But these are hardly independent, unrelated policies. When the FCC permitted the providers of last-mile broadband to bundle the access link with Internet transport, routing, and connectivity, and concurrently eliminated any requirement that the last mile broadband link be offered to competitors on an unbundled basis, the effect was to foreclose entry by anyone not in possession of last-mile access facilities. Opponents of net neutrality regulation – not surprisingly these very same telco and cableco last-mile facilities providers – argue that absolute control of the use of their local facilities in connection with Internet access is required for them to “optimize” their broadband businesses. They downplay the fact that it would leave them free to discriminate vis-à-vis Internet applications and content, to afford preferential treatment to some while degrading service to others, or to charge and/or to grant exclusivity to certain application and content providers so as to control those providers' ability to communicate with their last-mile customers. Were the FCC to accede to the ILEC and cable company demands, the adverse impact upon competition in the adjacent application and content markets would be similar to what happened to competition in the adjacent ISP market when last-mile providers were allowed to give preferential treatment to their own ISP affiliate and refuse last-mile broadband connectivity to rival ISPs. The open Internet would rapidly devolve into a small number of proprietary networks, each built around its owner's last-mile end user subscribers.

Those who ignore history are doomed to repeat it

The concern here is certainly neither theoretical nor far-fetched. Prior to the consent decree with the US Department of Justice that broke up the former Bell System in 1984, local Bell telcos afforded highly preferential treatment to their own and their affiliate's long distance service. Customers of competing long distance carriers were forced to dial as many as 35 digits rather than 11 to place a long distance call. Physical interconnection arrangements available to competing carriers were distinctly inferior, and no access at all was provided to important signaling protocols. The denial of access to one of these, answer supervision, undermined rival carriers' ability to accurately time and bill calls to their customers. Meaningful long distance competition did not become a reality until the structural separation of the local and long distance businesses made local telcos *indifferent* as to their customers' choice of long distance carrier, thereby eliminating any business purpose in the local telcos' maintaining these and other discriminatory practices. When the 1996 federal Telecom Act allowed the divested Bell companies to reenter long distance (upon satisfying certain requirements intended to facilitate competition at the *local* service level), and the FCC went on to permit them to bundle their local and long distance services into a single flat-rate package, stand-alone long distance competition all but disappeared.

Which brings us back to net neutrality. Net neutrality is about a great many things, but fundamentally it is about preserving and protecting competition in all non-last-mile adjacent network, application and content markets. When a “last mile” broadband provider is able to act as a gatekeeper for access to consumer “eyeballs,” it has the ability to restrict or deny access to downstream application and content providers, impose fees for such access, and/or force downstream application and content providers to direct their traffic to the “last mile” provider's own backbone network. Notably, such a requirement could put backbone network providers that do not also have end user customers out of business altogether. Similarly, application and content providers unwilling or unable to pay “tribute” may be cut off from the last-mile provider's end users or otherwise offered only a degraded connection. The potential for vertical market foreclosure and the parallels with pre-Bell System break-up long distance competition are strikingly similar. That experience must not be ignored or lightly dismissed.

Legitimate network management is not inconsistent with net neutrality

Much of the current impetus for net neutrality regulation was catalyzed by certain actions taken by Comcast in 2008 regarding its customers' use of “peer-to-peer file sharing” (P2P). P2P is a distributed networking technology in which network members download large files (e.g., music, movies) broken up into many small fragments sent from each of many other P2P network members (“peers”). These file fragments are managed and reassembled into a complete file by the P2P software. P2P allows the network member to download large files far more quickly in multiple small fragments from many “peers” rather than as one very large file from one source. It also enables the source distributor to reduce its own bandwidth requirements by shifting the fragment-level downloads to P2P members. Although P2P file sharing is also widely used to facilitate illegal downloads of copyrighted material,

the need to control or prevent such unlawful activity was not the specific goal of Comcast's initiative or of the FCC's response.

As a condition for participation in a P2P network, members must make their own PCs available for P2P downloads initiated by other network members. And therein lies the problem that Comcast had been attempting to address. When file fragments are *downloaded* by an individual Comcast customer, the download is initiated by that customer for his own benefit, and the aggregate bandwidth capacity demand is roughly the same as it would be if the download had been in the form of a single large file from a single host source. However, when file fragments associated with downloads initiated by other P2P members are being *uploaded* from the Comcast customer's PC, the customer's role is entirely passive, the transmission has been requested by and for the benefit of someone else (who is not necessarily a Comcast customer) and the traffic is flowing over Comcast's Internet access facilities even when the Comcast customer is not herself actively using the service.

With cable-based Internet access, many customers share the bandwidth capacity that is available on the coaxial cable that serves their apartment building, street or neighborhood. When a portion of that capacity is being utilized by members of a P2P network, it is not available to other Comcast customers, who may experience service degradation as a result of the increased traffic load. Residential Internet access is typically offered on a flat-rate or "unlimited use" basis. The flat monthly price is most likely set in contemplation of a normal range of utilization by customers, and therefore never intended to accommodate 24/7 maximum use, such as often occurs with P2P transmissions.

The term "all you can eat" is often applied to such flat-rate pricing arrangements and, indeed, the term provides a good analogy to "all you can eat" restaurant pricing. The operative word here is "you" i.e., all *you* can eat. By paying the (flat rate) price of an "all you can eat" meal, the patron does not acquire the right to shovel quantities of food into bags or other containers to be removed from the restaurant for consumption by others. Yet that is precisely what members of a P2P network are doing when they make their service available to other P2P members. In the FCC decision recently overturned by the DC Circuit, what the Commission found improper was not Comcast's attempt to *manage* the use of its network, but rather the *means* Comcast employed to control its customers' use of P2P (Comcast used "deep packet inspection," by which it examined the *content* of individual packets and, when a pattern common to P2P was detected, initiated a "disconnect" signal that caused the P2P transmission to terminate). By analogy, the "all you can eat" restaurant can rightfully prohibit its customers from removing food for consumption by others; what is less clear is whether the restaurant has the right to enforce that prohibition by inspecting handbags and other packages as the patron leaves the establishment.

There is clearly a tension between continued use of flat-rate ("all you can eat") pricing of consumer Internet access and some consumers' misunderstanding of what "all you can eat" means in this context. It is extremely unlikely that many customers would willingly participate in a P2P network if their monthly charges were based strictly upon the volume of bits transmitted. On the other hand, there is utility and value in giving consumers the choice to purchase plans that provide them with unlimited (personal) usage, as these plans have given rise to some of the most popular and innovative Internet applications. AT&T's announcement earlier this month that it would

discontinue all unlimited wireless data rate plans has raised concerns among mobile "app" developers that customers might be reluctant to download and use the more bandwidth-intensive apps.

Internet access providers have an entirely legitimate right to manage their networks and their customers' use of their services, and the FCC's net neutrality rules need to recognize this. At the same time, network management must not become a catch-all for any infringement on net neutrality – such as limiting customer access to certain applications and content. Careful navigation between these seemingly conflicting concerns will be challenging, but it is precisely in this area where detailed policy analysis and careful rulemaking on the part of the FCC will surely be most important.

If you would like more information on this subject, please contact Dr. Lee L. Selwyn at lselwyn@econtech.com.

Technology and Taxation: Keeping up with the tax implications of the fast-paced changes in telecommunications and the Internet

For many years, federal, state and local governments have obtained significant revenues from taxes imposed on telecommunications services and telecommunications providers. Many telecom-related taxes are linked to specific technologies or regulatory definitions; sometimes they depend on the type of provider and/or pricing structure, rather than on the underlying functionalities that the services provide. As a result, small changes in any of these conditions can result in profound and often unanticipated tax and revenue increases or decreases. Because of the many subtle distinctions involved, attempts to adjust or reinterpret telecommunications taxes to mesh with current technologies and services can result in unintended consequences.

A case in point is the federal telecommunications excise tax imposed on local service and toll telephone service (i.e., long distance). In order to distinguish taxable "toll calls" from non-taxable services (such as private lines), the federal tax code defined "toll calls" as those whose prices were based upon call duration and distance. But as very high capacity fiber optics and digital switches replaced legacy transmission and switching technology, distance all but dropped out as a cost driver and, by the end of the 1990s, most long distance calls were priced solely on the basis of call duration. Several taxpayers challenged the applicability of the excise tax to toll calls once the "distance" element dropped out and, following several years of litigation, the IRS ultimately conceded.

However, by this time, many telcos were offering "all distance bundles" of local and long distance services for a single monthly charge. In a ruling effective August 1, 2006 (and retroactive, upon request, to March 1, 2003), the IRS determined that the excise tax should not be collected either on long distance service priced solely on a time-sensitive basis or on bundled service provided under a plan that does not separately state the charge for local service. However, the tax remains applicable to stand-alone local telephone service charges. This, of course, creates a distortion favoring bundled services and the providers capable of offering them.

Another example: Many states have historically applied franchise-type taxes to telephone companies based upon the book value of their plant-in-service (“rate base”). Prior to the break-up of the Bell System in 1984, that “rate base” included customer premises equipment. But when CPE was spun off and eventually sold off to customers, taxable plant values declined, and state and local tax revenues took a sudden – and unanticipated – hit.

More recently, with the substitution of DSL or other broadband Internet service for second residential phone lines that had previously been used for dial-up Internet access, the elimination of secondary (and some primary) residential lines in favor of wireless “family plan” packages, and the increasing use of Internet-based services (phone, e-mail, texting), there has been a significant decrease in the total number of residential wireline access lines in service. These demand shifts can have major tax consequences for state and local *ad valorem* property tax revenues. For example, many of these taxes are based upon the value of physical wireline infrastructure, but have not been applied to electromagnetic spectrum – a direct substitute for physical copper, coaxial cable, or fiber infrastructure. Hence, as wireless technology supplants traditional physical distribution and interoffice plant, the property tax base is diminished and the associated tax revenues fall.

Over time, advances in technology, changes in competitive conditions, and blurred lines between what is “telecom” and what is not have created increasing complexity for both those doing the taxing and those being taxed. “Telecommunications” is no longer a neatly or easily defined term, and what the FCC may define as “telecommunications” may or may not correspond to the manner in which taxing authorities view such services. A blurred understanding as to whether or not a service is “telecommunications” can lead taxing authorities to miss out on revenues or taxpayers to overpay.

Within the next several years, anticipated regulatory and market changes may result in opportunities or exposures in the taxation of telecom and related services. In particular, revenue shortfalls in state and local governments may engender reevaluations of tax policies that have, up until now, shielded Internet services and many Internet-based transactions from taxes that apply to other economic sectors. Among the issues that may arise are the following:

- Definitions contained in state laws and regulations may not mesh with the way that telecom services are provisioned or billed.
- Changes in industry structure may result in the shifting of revenues from one industry segment to another.
- Jurisdictional “sourcing” of calls, which has been an issue in the mobile telecommunications area, is also likely to be exacerbated with the expansion of Internet-based telecom.
- Traditional “utility” status of wireline telecommunications companies has conferred on them certain unique (and often advantageous) tax treatment. Will the bundling of traditional voice service with Internet and video services result in the reevaluation of such tax laws?
- There is ongoing uncertainty as to how far the *Internet Tax Freedom Act* extends into telecom and how federal policies will affect states’ ability to tax Internet-related activities.
- If the FCC reclassifies Internet access services as telecommunications (rather than “information services”), will there be a corresponding change in the tax treatment of these services?

- How long and on what basis will the moratorium on the application of sales tax to Internet purchases continue?

Legislatures and taxing authorities can make these transitions easier or harder, depending on how well they understand the underlying technical and market complexities and can capture them accurately in laws and regulations. Imprecise language in tax laws or regulations makes them more difficult to enforce and invites protracted and unnecessary litigation. It is also important that tax treatments not result in unintended distortions of economic decisions by favoring one particular technology or business model over others. Stakeholders (i.e., taxpayers and potential taxpayers) with a sound understanding of industry technologies and market conditions can help by identifying potential unintended consequences of proposed legislation or regulations before they are enacted.

Still, even when the language of tax laws and regulations is clear at the outset, enforcement and compliance may be complicated by new technologies or industry relationships not originally contemplated. Taxpayers that understand the interplay between existing tax laws and regulations and evolving technologies and market conditions are in a better position to avoid paying excess taxes on telecommunications and telecommunications-related activities.

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The Transition to IP Telecom: Evolution, not Revolution—June 2010

Live video of Dr. Lee L. Selwyn’s June 16, 2010 presentation at the California PUC, Q&A, and copies of the accompanying slides

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Why Broadband Internet Access Should be Reclassified as a Title II Telecom Service

Market Structure Regulation Will Lead to Increased Competition and Stimulate Increased Investment and Jobs

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