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**FROM CLONES TO PACKETS:
THE DEVELOPMENT OF COMPETITION
IN LOCAL RESIDENTIAL TELECOMMUNICATIONS**

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INTRODUCTION

This paper explores the development of local telecommunications competition and the role of regulation in North America, from the original expectation that new entrants would look like the incumbent local exchange carriers (ILEC clones) to the current, and more promising, entry by companies using the Internet's packet technology to provide telephone service (Voice over Internet Protocol or VoIP). Policies were put in place by federal and state regulators that were sometimes consistent, and sometimes inconsistent, with permitting facilities-based entry by ILEC clones, and these policies are now being reconsidered in light of the experience with this type of entry. New policies are now required to permit entry by VoIP service providers, and these policies must be reconciled with the previous local telecommunications competition policies that were put in place. Comparing and contrasting U. S. and Canadian regulatory policy can often provide some useful insights into the development of local exchange competition. The paper offers a framework for analyzing VoIP service that illuminates the regulatory and policy issues that must be addressed.

THE RISE AND FALL OF ILEC CLONES

Almost 10 years ago in the United States, with the Telecommunications Act of 1996 and its implementation by the Federal Communications Commission (FCC), and about a year later in Canada, with Decision 97-8, Local Competition, by the Canadian Radio-television and Telecommunications Commission (CRTC), policies were put in place to permit ILEC clones to enter local telecommunications markets.¹ In the U. S., state regulators implemented policies to enable the local competition sections of the Telecommunications Act of 1996 and the FCC's subsequent decisions and orders.

In order to permit competition for local telephone service, any essential facilities must be made available to competitors at regulated prices so that they can provide local telephone service. Such essential facilities are those that are required to provide

¹ It is interesting that the CRTC's Local Competition Decision was released on May 1, 1997 but that there is not one mention of the Internet in the decision. Yet the decision was released over the Internet. Clearly, the implications of the Internet, and especially its implications for voice communications, were not at all understood just a few years ago.

telephone service, are provided on a monopoly basis, and cannot be economically and technically duplicated by an entrant.² While any such essential facilities must be made available to entrants, there are certain pitfalls in implementing this policy.

At the time of the Telecommunications Act of 1996 and the Local Competition Decision in Canada, it was generally considered by observers both within and outside the industry that, if competition emerged for local telephone service, it would be from entrants who looked like the ILECs, *i.e.*, ILEC clones. The expectation was for facilities-based entrants so that there would be competition for the provision of the telecommunications infrastructure as well as the services that relied on this infrastructure. In both the U. S. and Canada, some policies were consistent with facilities-based competition by ILEC clones and others were not, favoring companies that resold ILEC facilities in whole or in part.

It is not apparent, however, that there are many, if any at all, essential facilities. Beyond getting access to telephone numbers and social welfare services such as 911 service, there may not be other components of the provision of local telephone service that satisfy the definition of an essential facility. Local loops, for example, can generally be provisioned by a competitor at a cost that is often less than the cost incurred by the ILEC, due to improved technology and network design. While unbundling in Canada was generally limited to local loops, the mandatory provision of unbundled network elements (UNEs) went much further in the U. S., with the FCC ordering much of the local network to be made available as UNEs and even recombined by the ILECs for the CLECs (competitive local exchange carriers) into a UNE platform (UNE-P). Furthermore, the FCC and state regulators generally required that the ILECs make their local service available for resale at a wholesale rate. While resale is permitted in Canada, there is no mandated discount for wholesale purchases of an ILEC's service by a competitor.

The availability of non-essential facilities to entrants, as well as the possibility of simply reselling the entire ILEC service, aside from the question as to whether such partial facilities-based competition is worth the cost of implementing it, makes it more difficult for full facilities-based competitors to enter the market. The availability of part or all of the ILECs' networks undermines the willingness of investors to take the risk of building infrastructure to compete with the ILECs. This negative incentive for infrastructure investment was aggravated in both the U. S. and Canada by mandated pricing for UNEs that is lower, often significantly lower, than the cost to the ILECs of providing the UNEs.

² The concept of an essential facility and its application to the telecommunications industry and to unbundling is explained in greater detail in Willie Grieve and Stanford L. Levin, "Telecom Competition in Canada and in the U. S.: The Tortoise and the Hare," in Jeffrey K. MacKie-Mason and David Waterman, editors, *Telephony, the Media, and the Internet: Selected Papers from the 25th Annual Telecommunications Policy Research Conference*, Lawrence Erlbaum Associates, 1998.

This policy has generally failed, insofar as there has not been the widespread entry of successful ILEC clones. New Paradigm Resources reports that in the U. S. the number of Bell competitors declined from a peak of 203 in 2000 to 63 in 2004, with more expected to fail.³ In Canada, the CRTC's expectation that ILEC clones would use the ILEC loops only temporarily while reaching sufficient scale to build their own access networks has proven incorrect, and the pace of local competition has been slower than anticipated.

There are two general causes of this failure for full facilities-based local competition to develop as anticipated, in addition to regulatory incentives that mitigated against it. First, there are technical problems in providing competitive service when part of the infrastructure is provided by another company. Even when both parties attempt to make this work, the ILEC clone's service will probably always be technically inferior, and the ILEC clone's customer service will probably always be inferior to that of the ILEC. Second, there does not appear to be a viable business plan for an ILEC clone. The cost of providing service when part of the network must be purchased on an unbundled basis from another service provider does not appear to be competitive with the cost of a company that provides all of its own infrastructure. Repeated attempts by Canadian and U. S. regulators to find ways to reduce the regulated price of UNEs has still not been able to overcome the cost of the technical problems and the shortcomings of a business plan based on full or partial resale of the ILECs' service. Reductions in the wholesale price of local service to be resold have also not been sufficient to make resale, which provides little competition in any case, a successful strategy for competitors.

Regulators, at least in the U. S., are beginning to recognize that this ILEC clone entry policy, based on full or partial resale of the ILECs' service, is one that is failing, and they are reversing some of the steps they have taken to make this policy work, particularly when these steps have had negative consequences of their own. In its Triennial Review Remand Order (TRRO), for example, the FCC has eliminated mass market circuit switching and UNE-Ps as UNEs that the ILECs must provide at regulated rates. The TRRO, through a revision of the impairment standard for competitors, also reduced the extent to which ILECs must make transport facilities available to competitors.⁴

The FCC has also ruled that the ILECs do not need to unbundle their fiber-to-the-curb (FTTC) networks in order to provide loops to competitors. The ILECs were also granted relief from certain unbundling requirements when they use time-division-multiplex technology on packet networks.⁵ The FCC appeared to be concerned about the

³ Anne Marie Squeo, "Bell Rivals Struggle to Connect," *The Wall Street Journal Online*, November 20, 2004.

⁴ "TRO Remand Order Puts Ball Back in Court; Impairment Threshold Higher than Expected," *Telecommunications Reports*, Aspen Publishers, Vol. 71, No. 1, January 1, 2005, pp. 1+.

⁵ "FCC Grants Telcos FTTC Unbundling Relief; BellSouth, SBC Promise Accelerated Fiber Rollout," *Telecommunications Reports*, Aspen Publishers, Vol. 70, No. 21, p. 13., and "FCC Order Clarifies Unbundling Relief," *TR Daily*, Aspen Publishers, October 19, 2004.

negative consequences such unbundling might have on the ILECs' incentives to invest in new broadband infrastructure. Most recently, in the context of a Bell South petition, the FCC ruled that ILECs do not need to provide DSL service to customers who obtain their local service over ILEC loops leased to CLECs. The FCC found that this would effectively require the ILECs to unbundle the low-frequency portion of their loops, something that the FCC has explicitly declined to unbundle.⁶

At the same time, many states have reversed a trend of ever-lower UNE prices, which were put in place at least in part to improve prospects for ILEC clones relying on all or part of the ILECs' networks. Recently, some states have begun to increase UNE prices to make them more in line with actual ILEC costs.⁷ States have abandoned ever-lower UNE prices as an attempt to make the ILEC clones profitable.

While regulators in the U. S. appear to be recognizing that a local competition policy based on the resale of the ILECs' non-essential facilities both provides limited competition and does not work in practice, while providing disincentives for full facilities-based competitors, it is interesting to note that European regulators are pushing ahead with their similar policy of local loop unbundling (LLU). The effects of this policy imposed by the European Commission are evident in the U. K., where competitors initially provided full facilities-based competition. OFCOM, the U. K. telecommunications regulator, has embarked on a process to mandate access to British Telecom's local loops.⁸ This process is likely to be endless, and whatever LLU regime that is eventually implemented, the U. S. experience suggests that the controversy will not end and that LLU will not be successful in generating full facilities-based competition for local exchange service. In stark contrast to the FCC, OFCOM has also initiated a process to consider competitor access to British Telecom's next-generation network.⁹

THE RISE OF VOIP

In the end, it is not surprising that competition, given its nature, did not develop as foreseen by most industry observers. At the same time that competition from ILEC clones is failing, and that regulators have begun to understand that such a policy does not result in full facilities-based competition in any case, there has been increasing competition for local exchange telephone service from wireless service providers. This has been more

⁶ "FCC Grants BellSouth Preemption Plea, but Hits Incumbents on LNP Delays," *TR Daily*, Aspen Publishers, March 25, 2005.

⁷ For example, "Ohio PUC Adopts Increase in SBC's Unbundled Loop Rates," *Telecommunications Reports*, Aspen Publishers, December 1, 2004, Vol. 70, No. 23, p. 10.

⁸ "BT's rivals call for 'big stick' not more talk," *TeleGeography's CommsUpdate*, Primetrica, March 2, 2005.

⁹ "U. K.'s Ofcom Seeks Input on Access, Interconnection to New BT Network," *TR Daily*, Aspen Publishers, November 29, 2004.

pronounced in the U. S., where flat-rate pricing plans with no long-distance charges and free off-peak calling have made wireless service a good substitute for the ILECs' wireline service for a growing number of people. In much of the rest of the world, where per-minute local service calling charges are common, wireless has also been able to establish itself as a competitor to wireline service, although this is limited by the high charges that callers must pay to call a wireless phone. The real competitive breakthrough, however, is the provision of VoIP service both by stand-alone companies such as Vonage and, more importantly, by cable companies.

ILECs provide access to their network and telephone service itself with an aggregated rate covering both services. VoIP service providers can enter in two different ways, and it is important to understand this as there are implications for competition and for regulation of VoIP service. When cable companies offer telephone service using packet networks, they tend to do so over a proprietary network, offering an aggregated rate covering access and the service, similar to the ILECs.¹⁰ This is an access-dependent VoIP service, as the access and the service are offered as one package. From the customer's point of view, such a service is generally indistinguishable from the circuit-switched service offered by the ILECs. By way of contrast, companies such as Vonage enter with an access-independent service. With this type of service, customers make two separate purchase decisions, one for high-speed Internet access and one for voice telecommunications service. The provision of this service is, in effect, not geographically tied; there need not be any connection between the customer's location and the telephone number he/she uses, and the service can be used through any high-speed Internet access. The rates for the access and the service are not aggregated, and, most importantly, the voice service is provided over the public Internet.¹¹

When cable companies provide voice service using an access-dependent VoIP, the competitive landscape changes immediately and dramatically. Cable companies have upgraded their infrastructure to provide high-speed Internet access and digital cable services. As they choose to add voice telecommunications services to their group of services, the service becomes available throughout a service territory served by one or more head-ends. This is quite different from the experience of ILEC clones, which much extend service through their own or unbundled loops and other UNEs one customer at a time. Indeed, with access-dependent VoIP service, the cable companies can serve every customer that they pass, regardless of whether or not the customer is a cable or high speed Internet access customer. This results in local telephone competition on a scale that has not been provided by ILEC clones. Furthermore, the cost of the additional

¹⁰ Some cable companies initially entered the voice telephone market using circuit-switched service similar to that offered by the ILECs, and many had substantial success. The refinement of IP technology, however, and the ability to offer voice, video, and data services on an integrated network have made VoIP service the technology of choice as cable companies provide voice service.

¹¹ Some of the ideas in this section and in the subsequent one, particularly the terminology of access-independent and access-dependent, were developed by the authors in conjunction with the TELUS regulatory staff for inclusion in "Comments of TELUS Communications, Inc.," PN 2004-2, Regulatory Framework for Voice Communications Services Using Internet Protocol, before the Canadian Radio-television and Telecommunications Commission, June 18, 2004.

network upgrades required by cable companies already providing high-speed Internet access and digital cable in order to provide voice telephone service appear to be sufficiently attractive to permit the cable companies to overcome the disincentives to facilities-based competition imposed by regulators attempting to make the ILEC clones financially viable. While additional competition is also provided by access-independent VoIP service providers, and while these services are available to anyone with a high-speed Internet connection, the different characteristics of this access-independent service, compared to the ILECs' access-dependent circuit switched service and the cable companies' access-dependent VoIP service, may make this access-independent service less of a close substitute for traditional telephone service in the eyes of some consumers. For others, however, it may be a more attractive substitute.

REGULATING VOIP

The distinction between access-independent and access-dependent VoIP service is crucial in determining how, if at all, VoIP service should be regulated. In both the U. S. and Canada, an entrant's service is typically regulated little if at all. An entrant providing either access-independent or access-dependent VoIP service should not attract regulation any different from that used for other entrants such as ILEC clones.

The more difficult regulatory issues concern the ILECs who may be providing different types of VoIP service. If an ILEC provides either access-independent or access-dependent VoIP outside of its traditional service territory, then it should clearly be regulated in the same way as any other competitor. It is with the in-territory provision of VoIP service that the regulatory issues become more complex. Typically, the ILEC's non-VoIP service is regulated because of the ILEC's perceived dominance, its requirement to be the carrier of last resort, its obligation to serve, or some other regulatory justification. This regulation generally applies to an aggregated rate for access and service, and this combination of access and service has historically been provided using circuit-switched technology. An ILEC may change the internal network technology used to provide this aggregated service from circuit-switched to VoIP technology, but this does not change the underlying circumstances that justified the ILEC's in-territory regulation. Therefore, the continued provision of this aggregated access and service, but now using VoIP, does not, in and of itself, provide the justification for a change in how this aggregated service is regulated.

This is different, however, from the situation in which an ILEC offers an in-territory access-independent VoIP service. This access-independent VoIP service is, in effect, just another Internet application. It is a voice application carried on the public Internet. In the U. S. and Canada, and in Europe, Internet applications are generally not regulated. That this forbearance from regulation for ILEC in-territory access-independent VoIP service is warranted is clear from a closer examination of the nature of the service.

A customer wishing to use an access-independent VoIP service must first arrange for high-speed Internet access. Depending on the country and jurisdiction, this may be provided competitively or it may be regulated. Then the customer can purchase access-independent VoIP service from any one of a number of service providers that might, incidentally, be anywhere in the world. This service is generally provided in a competitive environment, and certainly it is easy for additional service providers to enter the market. As long as the access-independent VoIP service is not tied to the ILEC's traditional aggregated and regulated local exchange service, it will not be possible for the ILEC to use any market power it might have for the aggregated service to the advantage of its access-independent VoIP service. If the ILEC's high-speed Internet access is regulated, and there are any pricing or bundling rules that apply to a regulated service, then those rules would apply if the high-speed Internet access were combined with the access-independent VoIP service. Of course, if the high-speed Internet access service is forborne from regulation because the service is provided competitively, then no special restrictions are required. This approach will be sufficient to protect both other providers of local service, whether VoIP or not and whether access-dependent or access-independent VoIP service. Of course, all VoIP service providers should be treated symmetrically regarding any regulation for social issues such as 911, message relay services for the hearing impaired, directories, number portability, etc.

The FCC, in its first major order addressing VoIP,¹² pre-empted state regulation and asserted federal jurisdiction but failed to make the distinction between access-independent and access-dependent VoIP service. A major concern of the FCC in the order was to justify its pre-emption due to the tight integration of intrastate and interstate components and service, making it difficult if not impossible to separate out any intrastate components or services that the states might regulate.¹³ The FCC also stated that if another entity, such as a cable company, offers a service similar to Vonage's service, then that service would attract a regulatory treatment similar to Vonage's at the federal level.¹⁴

Because the FCC has only said that one of the characteristics of Vonage-type service is a high-speed Internet connection,¹⁵ they have not sufficiently clarified the issue

¹² "In the Matter of Vonage Holdings Corporation Petition for Declaratory Ruling Concerning an Order of the Minnesota Public Utilities Commission," Federal Communications Commission, WC Docket No. 03-211, Memorandum Opinion and Order, Adopted November 9, 2004, Released November 12, 2004.

¹³ The FCC is forced to concern itself with the distinction between intrastate and interstate service due to the split regulatory jurisdiction in the U. S. Similarly, because of federal law, the FCC must distinguish between basic telecommunications services and information services. These attempts are often futile, as the distinctions mean less and less and are less and less able to be made as new technologies become widespread. The result is that the FCC expends a great deal of effort making new technologies and services fit outdated regulatory processes, to the detriment of actually being able to address, in a useful way, important current and emerging regulatory issues.

¹⁴ "FCC Defines IP Services Eligible for State Preemption," *TR Daily*, Aspen Publishers, November 15, 2004.

¹⁵ *Ibid.*

and much litigation is to be expected as a result. By not specifying whether the public Internet is involved in providing the VoIP service, and by not specifying that Vonage's service is access-independent, the FCC missed key elements of the definition. Without further refining their definition, they will not necessarily be able to distinguish between Vonage's service and an access-dependent service offered by a cable company, nor may they be able to distinguish between an access-independent and an access-dependent service offered by an ILEC within its traditional operating territory. The uncertainty that will result, as the FCC attempts to refine its definition of VoIP service subject to federal pre-emption, will only serve to slow down the deployment of VoIP service by the ILECs and non-ILECs alike, thus preventing consumers from obtaining all of the benefits that might be available to them from new VoIP services.

The CRTC is currently considering how to regulate VoIP service but has not yet issued a decision in its proceeding.¹⁶ In its Public Notice, the CRTC has proposed regulating any VoIP service provided by an ILEC in-territory in the same fashion, and most likely at the same price, that the ILEC's traditional in-territory telephone service is regulated. In its public notice, the CRTC did not recognize the distinction between access-independent and access-dependent VoIP. While the CRTC's preliminary views would properly prevent an ILEC from escaping local service regulation simply by converting its local network to IP technology, it would also remove any possibility of the ILEC being able to offer a competitive in-territory access-independent VoIP service. Such a prohibition will reduce choice and limit VoIP competition for consumers, and it will also prevent the ILEC from having the opportunity to attempt to retain some of its customers as they move from the ILEC's traditional local exchange service to more attractive VoIP options.

European regulators have gone on record as favoring a "light touch" for regulation VoIP service and have extolled the potential benefits to consumers from the wide availability of VoIP service. They have, however, not even begun to address the issues related to its regulation, or forbearance from regulation, have not begun to implement their policy of light regulation for VoIP service, have not made the distinction between access-independent and access-dependent VoIP, and are still pursuing a failed policy of LLU.

Even with "light touch" regulation, or forbearance from regulation for certain VoIP services, regulators will still have certain issues that they must address to insure that competition can emerge and be sustainable. If access-independent VoIP service is to become a real alternative for customers, regulators will need to insure that no local exchange service provider, including ILECs, CLECs, and cable companies, can block ports, thereby preventing a VoIP service provider from offering service. In addition, high-speed Internet access providers should not be permitted to denigrate the quality of their high-speed Internet access service in such a way as to make the provision of access-independent VoIP service difficult or impossible, to the benefit of services that do not

¹⁶ Telecom Public Notice CRTC 2004-2, April 7, 2004.

rely on the public Internet or to the benefit of one VoIP service provider over another.¹⁷ If regulators choose to insure the possibility that many choices of access-independent VoIP services will be available to consumers, regulators will most likely always have a role in preventing such actions. This is analogous to the role that regulators will most likely always have in enforcing interconnection among carriers so that competition can flourish.

The availability of access-independent VoIP service makes the question of when to forbear from regulating local service more complex. Services from some providers, such as ILECs, CLECs, and some cable companies, will be provided at an aggregated rate for access and for the service, whether it is circuit-switched or VoIP. Alternatively, some service providers will provide high-speed Internet access and others will provide access-independent VoIP, these on a non-aggregated basis. Regulators will need to determine how to define the market, in order to assess market power, when some service providers offer an aggregated access and service (access-dependent) and others offer a service only (access-independent).

USING VOIP AND THE INTERNET IN THE FUTURE

It is important that regulators get their regulation of VoIP services right in order not to impede the flow of services that will be available to consumers in the future. VoIP, and its combination with other communications services, has the potential to deliver substantial advantages to customers.

Some customers will find certain characteristics of access-independent VoIP to be attractive. Numbers can be obtained from any part of the city, country, or world, if regulators permit, so that customers, for example, in the U. S. could have a local Toronto or London or Hong Kong number on their phones if they desired. Furthermore, an IP telephone could be connected to the Internet anywhere in the world where a high-speed connection is available and that telephone number would function. Service providers who begin with access-dependent VoIP service may, over time, if not hindered by regulation, also offer an access-independent service through the Internet in order to provide a service that better meets the needs of certain customers. These nomadic services, and the access-independent VoIP service itself, could be offered at attractive prices to customers either on a stand-alone basis or as part of integrated packages of video, Internet access service and different kinds of voice services.

Enabling IP services on a network, including VoIP, could lead to other services that customers would like. If networks are converted to IP technology, it will make it easier for telephone companies and cable companies to offer the triple play of voice,

¹⁷ High-speed Internet access providers should also not be permitted to reduce the speed and quality of their standard service, requiring customers to purchase a premium, more expensive service in order to use access-independent VoIP. This is unlikely to be the case, though, in practice, as high-speed Internet service keeps getting faster and faster with no increase in price.

video, and Internet service. The first step in this process is the expansion of on-demand video service by cable and telephone companies.¹⁸ This can radically alter the way people watch television, watching what they want when they want (and skipping over commercials), rather than watching according to a pre-determined schedule. With IP technology, video providers could also offer nomadic characteristics similar to those provided by access-independent VoIP. Subscribers to a particular television or cable service could access the Internet and view their video packages, including local television stations, anywhere in the world.¹⁹

CONCLUSIONS

The model of local competition that relies in whole or in part on the resale of the ILECs' networks has failed to deliver the extent of competition anticipated, except in select urban business and residential locations. This failure is a result of a combination of economic, technical, and regulatory impediments. While wireless service is providing an increasing level of competition for local wireline exchange service, it is VoIP service that promises to deliver widespread competitive alternatives, especially for residential customers. Cable companies, initially offering access-dependent VoIP service, and other providers of access-independent service, can provide immediate competitive alternatives to most, if not all, residential and business local exchange customers. It is an open question if, in this environment, there is a future for ILEC clones that rely on full or partial resale of ILEC service in the residential market, although there appear to be good opportunities in the business market for full facilities-based CLECs, especially in more densely populated areas.

It is up to regulators to insure that regulations do not inhibit the development of these new services. The key to insuring that regulation does not inhibit the development of new VoIP services is to begin by properly distinguishing access-independent VoIP services offered over the public Internet from access-dependent VoIP services offered on proprietary networks. There are also important social issues that must be addressed, such as the provision of 911 service and services for the hearing impaired, but solutions to these issues that do not hinder the offering of the service are emerging. Regulators are also concerned that VoIP service may threaten the subsidy flows that they have established to meet their social objectives. To the extent that regulators wish to maintain these subsidy flows, access-independent VoIP and the way access-dependent VoIP services are billed, may force them to find new methods of raising the required subsidies.²⁰

¹⁸ Peter Grant, "On-Demand TV Expands Via Underused Fiber Highways," *The Wall Street Journal Online*, December 17, 2004.

¹⁹ Of course, there are many intellectual property issues and, in some countries, cultural sovereignty issues that arise in considering television availability over the Internet.

²⁰ In Canada, the CRTC adopted a subsidy collection mechanism based on a percentage of telecommunications revenues and is considering whether VoIP service revenues should be included in the revenue calculations.