A LAYERED MODEL FOR INTERNET POLICY

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ABSTRACT

Today, communications regulators mechanically apply outmoded categories to novel converged services, creating irresolvable contradictions and forcing hair-splitting distinctions that seldom hold up under the strain of judicial review or market forces. Policy-makers should reformulate communications policy around the technical architecture of the Internet itself, which is based on end-to-end design and a layered protocol stack. Horizontal service and geographic classifications should be reconceived in terms of four layers: content, applications or services, logic and physical infrastructure. Different policy approaches should be used for each layer, and regulators should turn their attention from pricing to the openness of interfaces between layers and competing services. The layered model would make many of the conflicts that bedevil regulators more tractable. It would bring important issues to the surface, and would put communications policy on a sound footing for the future.

INTRODUCTION

It has been clear for some time that the Internet would challenge the regulatory and business models governing communications in the U.S.[1] When Internet usage was miniscule compared to traditional telecommunications services such as circuit-

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1. *See, e.g.*, KEVIN WERBACH, DIGITAL TORNADO: THE INTERNET AND TELECOMMUNICATIONS POLICY (FCC, OPP Working Paper Series 29, Mar. 1997), *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp29pdf.html; David Isenberg, *The Rise of the Stupid Network*, *at* http://www.rageboy.com/stupidnet.html (last visited Feb. 24, 2000). This article focuses on the particulars of communications policy in the U.S. However, the Internet is a global phenomenon. Specific rules differ from country to country, but the basic framework described herein is equally relevant elsewhere.

access can thus be understood as a debate over whether cable operators can use their control of the physical layer (cable distribution plant) to restrict choice and competition at the three higher levels. Another example of this is telephone number portability, mandated under the 1996 Act as a way to ensure that ILECs don't leverage control over logical infrastructure (phone numbers) to prevent competition at the application layer.[106]

In the horizontal model, service categories are distinct from one another, and therefore the issue of interfaces does not arise. But in a communications world that will only become more converged and more interconnected, open interfaces are increasingly critical to an innovative, competitive market.

Restrictions on ILEC information services derive from the same separation of service categories. Consequently, their true value is misunderstood. When an ILEC offers an application-level service such as Internet access or voice mail, the competitive issue does not arise from the nature of those services. SBC's Internet access services do not differ in any fundamental technical way from EarthLink's.[107] What is different is that SBC controls lower-level infrastructure which it could use to disadvantage ISP competitors. The ILECs have frequently made the argument that they should be freed from regulation on their data services because these markets are competitive.[108] But this analysis misses the importance of interfaces between layers.

Under the layered model, ILEC data services should be deregulated if and when the FCC can assure itself that ILECs will not be able to leverage lower-level control into these layers. This could happen in one of two ways. If the physical and logical infrastructure layers in the relevant markets were sufficiently competitive, ILECs would not be able to gain unfair advantage over competitors at the application and content layers. Despite many changes in technology and market dynamics since the passage of the 1996 Act, this level of competition does not yet exist in the local exchange market. The second possibility is that the FCC or Congress could adopt rules preventing ILECs from clos-

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106. *See* 47 U.S.C. § 251(b)(2) (Supp. V 1999).

107. There may still be operational differences between services that are technically similar and identically priced. EarthLink, for example, may offer better customer service or more tolerant policies regarding home servers. This represents a policy argument in favor of open access. *See* Werbach, *supra* note 68.

108. *See, e.g.*, Thomas Tauke, VERIZON COMMUNICATIONS, *Testimony Before the House Energy and Commerce Committee* (Apr. 25, 2001), *available at* http://newscenter.verizon.com/policy/broadband; Thomas Tauke, Verizon Communications, *Speech to the Progress and Freedom Foundation Conference* (Aug. 21, 2001), *available at* http://broadbandforus.com/news/final_speech082101.html.

modem services, which currently are not, turns out to be a figment of the horizontal model. Both cases involve the possibility that service providers with control over the physical and logical layers of networks will extend that control into applications and content. Looking at the issues through the lens of the layered model does not compel any particular outcome. It may be that the FCC concludes open access is the right policy result, but that in the cable situation market forces will be sufficient to arrive at that result. The important shift is that the focus is now on the key policy issue at stake, rather than the almost accidental context that defines the issue today.

The layered model does not necessarily require wholesale changes in existing rules. In fact, one may view the FCC's basic/enhanced distinction as a partial implementation of a vertically-layered approach. The FCC in effect concluded that, to the extent that the communications and computer-processing layers can be separated, services that reside higher up are less regulated, while those lower down are subject to Title II obligations.[104] The binary distinction embodied in the *Computer II* and *Computer III* decisions and the 1996 Act is not sufficiently fine-grained to address the issues in today's data-centric networks, but it has proved quite resilient given the technological and competitive changes since it was first developed.

A. Open Interfaces

The layered model does more than reframe existing debates. It brings to the surface important issues that tend to become lost under the existing regulatory model. Perhaps the most significant of these is the question of interfaces between layers. A key element of the Internet model is that these interfaces are open.[105] This allows competitors to circumvent a bottleneck at one layer by deploying services over another layer, and prevents companies that have control of lower-level services from prejudicing or precluding certain services at higher layers. Cable open

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104. This viewpoint has sometimes been expressed in the notion that information services "ride on the rail" of telecommunications service. *See, e.g.*, Susan Ness, Making Sense, Remarks Before the Policy Summit of The Information Technology Association of America (Mar. 30, 1998), *available at* http://www.fcc.gov/Speeches/Ness/spsn807.html (last visited July 20, 2002).

105. This point is not limited to communications. Openness of interfaces, and the "middleware" between them, is also a central issue in the proposed settlement of the U.S. government's antitrust litigation against Microsoft. *See* United States v. Microsoft Corp., Civil Action No. 98-1232 (CKK), Proposed Final Judgment, §§ (III)(A)(1), (III)(C), *available at* http://www.usdoj.gov/atr/cases/f9400/9462.htm?chkpt=zdnnp1tp02 (Nov. 2, 2001).

to ensure a diversity of voices in media, though in practice it seeks to achieve that goal through limits on ownership of multiple media outlets rather than directly.[100] In addition, the FCC has various rules relating to political advertising, and also considers factors such as educational programming in connection with its broadcast license renewals.[101] Under "must-carry" rules, cable operators are required to carry over-the-air broadcast channels, but government is not involved in selecting the programming on those channels.[102]

Content-related issues are likely to become more significant in the future due to the Internet's blurring of category boundaries. Under the horizontal categorization model, telecommunications services generally fall within a "common carrier" framework, meaning that service providers—and government—may not dictate the content users can create. Broadcast and cable services, in contrast, inherently involve content discrimination, because the broadcaster must decide what content to deliver over scarce spectrum. In other words, traditionally we think of telecommunications as two-way and open, while broadcast is one-way and controlled. Internet-based services, however, can exhibit elements of both paradigms. When a user sends an instant message to a friend commenting on a streaming video clip delivered over an Internet-based broadband platform to a digital television set-top box, which paradigm should apply? What happens if the broadband provider, or the government, wants to constrain the content of that instant message? Such questions only make sense if viewed in terms of content rather than categorization.[103]

IV. Applying the Layered Model

The layered model makes many of the conflicts that today bedevil regulators more tractable. For example, the inconsistency between the treatment of DSL, which is subject to federal open interconnection requirements (under Title II), and cable

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100. *See, e.g.*, 47 U.S.C. § 533(c) (Supp. V 1999) (FCC's authority to prescribe cable cross-ownership rules); 47 C.F.R. § 73.3555 (2001) (broadcast ownership limits).

101. *See* 47 C.F.R. § 73.1942 (2001) (political advertising rules); Policies and Rules Concerning Children's Television Programming Revision of Programming Policies For Television Broad. Stations, *Report and Order*, 11 F.C.C.R. 10660 (1996) (adopting new educational programming requirements for broadcast license renewals).

102. *See* 47 U.S.C. § 534 (Supp. V 1999).

103. Of course, policy-makers and regulators will also consider other factors such as the maturity of the relevant service and the competitive landscape.

the cases described above, but should those conditions not hold, the FCC will need a way to ensure that logical infrastructure does not become a competitive bottleneck.[96] Thinking about the problem on its own terms is the best way to start.

3. Applications

The *application* (or service) layer is where most of the functions familiar to end-users appear. Basic voice telephony is an application, as is Internet access, IP telephony, video programming, remote access to corporate local area networks, alarm monitoring and so forth. Much of the existing body of communications regulation appears to concern itself with applications, but in actuality relates more to physical infrastructure.

By and large, applications need not be regulated to ensure competition, so long as the physical and logical infrastructure underneath is open. With open platforms, anyone can build new applications to compete with incumbent providers. Regulatory issues related to applications generally spring from other policy goals. For example, under section 255 of the 1996 Act, providers of telecommunications services must "ensure that the service is accessible to and usable by individuals with disabilities, if readily achievable."[97] The FCC also has initiatives to ensure that certain services, including basic telephony and "advanced communications services,"[98] are available to all Americans. How such rules should be implemented may vary from application to application, but divorcing application-level policies from all-encompassing categories and unrelated infrastructure issues makes it easier to focus on such issues directly.

4. Content

Content, the final layer in the stack, involves the information delivered to and from users as part of the applications running over communications networks. In the U.S., government directly regulates content only in very limited circumstances. For example, the FCC has rules governing indecency on broadcast networks (but not for telecommunications services).[99] It also seeks

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96. The open access debate, at least in part, involves such a question. Cable Internet access services use networks of local caches to enhance performance of their networks, but those caches also give the cable operator the ability to degrade or exclude content from competitors. *See* Werbach, *supra* note 68.

97. 47 U.S.C. § 255(c) (Supp. V 1999).

98. 47 U.S.C. § 157 (Supp. V 1999).

99. *See* 18 U.S.C. § 1464 (2000) (prohibiting obscene material on broadcast television, and prohibiting indecent material between 6am and 10pm); 47 C.F.R. § 73.3999 (2001) (FCC rules enforcing the statutory provision).

has become involved is the management of the domain name system (DNS), the closest thing today's Internet has to telephone numbering. For most of the history of the Internet, a set of informal arrangements loosely governed by contracts among various arms of the U.S. government, private companies including Network Solutions Inc. and an informal technical organization that came to be known as the Internet Assigned Numbers Authority provided oversight of DNS. In 1998, the newly-formed Internet Corporation for Assigned Names and Numbers (ICANN) took on the mantle of DNS coordination and policy development.[94] The Department of Commerce is the lead federal agency overseeing the relationship with ICANN, though FCC staff have been involved in policy discussions through inter-agency working groups. The DNS issues are extremely complex and easily beyond the scope of this article, but they give a flavor of the kinds of logical infrastructure issues that are emerging and the difficulty of finding appropriate institutional structures to deal with them.

Another element of logical infrastructure involves the distributed virtual networks that are poised to become the critical management and distribution points for Internet content, applications and transactions.[95] The first application of this architecture, promoted by companies such as Akamai and Digital Island, is speeding up delivery of Web pages. By using thousands of edge servers to serve content from the edge of the network close to the end-user, these "meta service networks" avoid bottlenecks in delivering information across the Internet. As they are extended to handle other functions, meta service networks may have a significant impact on issues as diverse as privacy, intellectual property, and antitrust, but they tend to be overlooked because they do not fit into traditional categories such as carriers or end-user service providers.

Today, with the exception of established historical functions such as telephone number assignment, the FCC has no foundation for understanding the policy implications of logical infrastructure. Competition and private self-regulatory bodies may obviate the need for government involvement in many or all of

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operate on the principles of "rough consensus and running code". *See* Brian Carpenter, *Architectural Principles of the Internet*, Network Working Group Request for Comments 1958 (1996), *at* http://www.ietf.org/rfc/rfc1958.txt (last visited Feb. 24, 2002).

94. Esther Dyson, the Chairman of EDventure Holdings, served as the founding chairman of ICANN. The views expressed in this article are solely those of the author and should not be construed as those of Esther Dyson.

95. *See* Kevin Werbach, *Meta Service Providers: The Internet's SS7 Network*, RELEASE 1.0 (Dec. 1999).

2. Logical

Logical infrastructure includes the management and routing functions that keep information flowing smoothly within and across networks. The classic example is the telephone addressing system, which the FCC oversees in conjunction with the North American Numbering Council. In the telephone world, logical infrastructure was tightly coupled to physical infrastructure because of the lack of competition and the focus on the single application family of voice.[91] There is a precedent, however—the FCC's open network architecture (ONA) rules under Computer III, which govern competitive access to advanced intelligent network features in the telephone network.[92] Though the ONA implementation process bogged down, the basic notion was the foundation for the unbundled network elements provisions of the 1996 Act. As networks become more dynamic, their logical infrastructures will become increasingly important relative to the physical infrastructure, making a coherent policy approach to such facilities essential.

In the Internet world, logical infrastructure issues have generally not reached government regulatory forums, because the industry has done a sufficiently good job of preserving open standards and competition.[93] One issue where a policy-making body

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91. Physical and logical infrastructure are tightly coupled as business elements in the PSTN, but they are separated as engineering concepts. The PSTN, in its current digital incarnation, uses a "control plane" physically separate from the "data plane" over which traffic flows. The control plane is known as the signaling system 7 (SS7) network, a private packet network built in parallel to the voice network. On the Internet, there is only one network for both signaling and content. Control functions are embedded within packets sent over the common infrastructure, and separated out by the switches and other devices at the endpoints. To support voice-based services over IP, equipment and software vendors are adopting mechanisms to interconnect with or replace the SS7 network.

92. *See* Filing and Review of Open Network Architecture Plans, *Memorandum Opinion and Order*, 4 F.C.C.R. 1 (1988) (BOC ONA Order), *pet. for review denied*, California v. FCC, 4 F.3d 1505 (9th Cir. 1993); Filing and Review of Open Network Architecture Plans, *Memorandum Opinion and Order on Reconsideration*, 5 F.C.C.R. 3084 (1990) (BOC ONA Reconsideration Order), *pet. for review denied*, California v. FCC, 4 F.3d 1505 (9th Cir. 1993); Filing and Review of Open Network Architecture Plans, *Memorandum Opinion and Order*, 5 F.C.C.R. 3103 (1990) (BOC ONA Amendment Order), *pet. for review denied*, California v. FCC, 4 F.3d 1505 (9th Cir. 1993); Filing and Review of Open Network Architecture Plans, *Memorandum Opinion and Order on Reconsideration*, 8 F.C.C.R. 97 (1993) (BOC ONA Amendment Reconsideration Order); Filing and Review of Open Network Architecture Plans, *Memorandum Opinion and Order*, 6 F.C.C.R. 7646 (1991) (BOC ONA Further Amendment Order); Filing and Review of Open Network Architecture Plans, *Memorandum Opinion and Order*, 8 F.C.C.R. 2606 (1993) (BOC ONA Second Further Amendment Order).

93. Internet technical standards have traditionally been developed by loose organizations of engineers such as the Internet Engineering Task Force (IETF), which

lower layers, because openness at one layer often allows for innovation at higher layers.[90] What each layer includes, and the implications of this approach, are described below.

1. Physical

Physical infrastructure is the underlying networks: wireline (copper), cable, fiber, terrestrial wireless and satellite. This includes switching as well as transport, from the local loop to the long-haul backbone networks. It is at this level that most communications regulation is concentrated. Even when competition is not an issue, there may be other causes for regulation, such as the disruption involved in tearing up streets to lay cable, the scarcity of space on telephone poles, the need to avoid spectral interference and the need to assign satellite orbital slots. Because infrastructure deployment involves heavy fixed costs, it has historically been viewed as a natural monopoly. In recent decades communications policy has moved away from regulated monopolies toward pro-competitive approaches that rely on market forces to stimulate innovation and keep prices under control. As the 1996 Act demonstrated, however, such "deregulation" generally involves substantial regulatory involvement to ensure that incumbents do not simply shift from regulated to unregulated monopolies. A vertically-layered communications policy would focus on these issues as they apply to all physical infrastructures, starting with the concept that where a physical network owner has market power, regulation may be the only way to ensure an open platform that fosters the beneficial dynamics of competitive markets.

20, 2002). More recently, Yochai Benkler used layers as a framework for examining the relationship of information producers and consumers on the Internet and elsewhere. *See* Benkler, *supra* note 37. Lawrence Lessig adopts and elaborates on Benkler's model in his analysis of how the Internet's original architecture promoted innovation. *See* LESSIG, *supra* note 85. Benkler and Lessig use a three-layer model: physical, code/logical, and content. The primary difference from the model proposed here is that Benkler places all software applications in one layer. As discussed below, it is useful in the context of communications regulation to separate software that routes traffic around the network (what I call the logical layer), from software exposed to end-users (the application layer). *See infra* text accompanying notes 91-98. This is a minor point. Benkler's and Lessig's thoughtful works demonstrate the power of layering as an organizing principle for studying the social and legal dynamics of digital networks.

90. *Cf.* LESSIG, *supra* note 85, at 44-46 (explaining how, thanks to government regulation, the openness of telephone networks allowed the Internet to come into being). In practice, the level and form of appropriate regulatory action hinges on market and technology dynamics. Under some circumstances, more extensive regulation may be justified at a higher layer, or competition may be sufficient to ensure openness without the need for regulatory intervention.

rence Lessig have adopted it as a tool for legal and policy analysis.[85] The Internet's layered protocol stack differentiates higher-level functions, such as content presentation, separately from lower-level ones such as congestion buffering and traffic routing.[86] The Web, Napster and email are all applications that run on top of other Internet protocols. A consequence of layering in an end-to-end environment is that Internet services can be moved up or down the stack as necessary. IP telephony, for example, takes a service – voice – previously delivered at one level and recreates it at a higher level on top of an Internet data stream. Engineers generally describe the Internet's layered structure using what is known as the OSI model, developed in the 1980s by the International Standards Organization.[87] The OSI model identifies seven layers from physical to application,[88] but several of these are only relevant from an engineering perspective. For regulatory purposes, it makes sense to think of the Internet as comprised of four layers:

- content
- applications or services
- logical
- physical

Communications policy should be developed around these four vertical layers, rather than the horizontal categories employed today.[89] In general terms, regulation is more justified at

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85. *See* Benkler, *supra* note 37; LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD 23-25 (2001); *see also* Timothy Wu, *Application-Centered Internet Analysis*, 85 Va. L. Rev. 1163 (1999) (arguing that cyberlaw should examine the Internet at the application layer). The Internet is layered in the general sense of modular levels of functionality and specifically in its use of a protocol stack. Higher-level protocols for representing data, such as the hypertext markup language used to build Web pages, are encapsulated into lower-level protocols such as IP.

86. *See, e.g.*, Anthony Rutkowski, *The Internet: An Abstraction in Chaos*, The Internet as Paradigm (Institute for Information Studies 1997) (explaining the importance of layering); TIM BERNERS-LEE, WEAVING THE WEB: THE ORIGINAL DESIGN AND ULTIMATE DESTINY OF THE WORLD WIDE WEB BY ITS INVENTOR 129-30 (1999).

87. The OSI protocol stack is widely used as a conceptual model. However, it is not OSI but the Internet's TCP/IP stack that became the dominant set of protocols for global data networks.

88. The seven layers, in descending order, are: application, presentation, session, transport, network, data link, and physical.

89. Others have made similar connections. In an insightful presentation delivered at the FCC in 1996, economist Jeff Mackie-Mason made a similar (though more general) proposal to view communications developments through the lens of vertical layering as developed in the software and networking industries. *See* Jeff Mackie-Mason, *Leveraging and Layering: Making Sense of Telecom, Computing and Data Market Structure*, unpublished presentation to the FCC (July 23, 1996), *at* http://www-personal.umich.edu/~jmm/presentations/fcc96-layering.pdf (last visited July

First, it assumes distinctions between services are clear, but in a converged Internet-centric world any network can carry virtually any type of traffic. Second, it applies most rules in an all-or-nothing fashion. To avoid imposing certain provisions, the FCC finds itself compelled to class services in the unregulated "information services" bucket.[81] The FCC and industry participants are also forced to contend with the possibility that if services (such as cable Internet services) bear indicia of more than one regulatory category, they will be subject to *both* sets of rules. Third, the horizontal model looks at each service category in isolation, when increasingly all networks are interconnected and the critical policy issues concern the terms of such interconnection. Fourth, it concentrates on the services ultimately provided to end-users, when competitive dynamics are increasingly driven by behind-the-scenes network architectures.

Rather than seeking to defend ephemeral service boundaries in a digital world, regulation should track the architectural model of the Internet itself. The Internet's astonishingly rapid growth derives in large part from its technical architecture.[82] That architecture is based on two characteristics: end-to-end design and a layered protocol stack.[83] The Internet's end-to-end structure means that intelligence resides at the edges.[84] A new service can be deployed simply by connecting two client devices capable of talking to one another, without requiring any approval or technical configuration inside the network. By contrast, traditional communications networks involve centralized control mechanisms such as switches that must be upgraded when new features are added.

Layering is a well-established concept among technologists, and several other scholars including Yochai Benkler and Law-

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81. The 1996 Act does give the FCC the authority to forbear from imposition of virtually any provision of the Act or the FCC's rules. *See* 47 U.S.C. § 160 (Supp. V 1999). This power, however, has been more theoretical than real, and has been barely invoked in more than four years since the Act's passage. On its face, the forbearance provisions are a sort of "get out of jail free" card that would allow the FCC to rewrite the Act based on its analysis of real-world conditions. However, political realities, and the possibility of judicial reversal, have kept the FCC from doing so up to this point.

82. *See* Werbach, *supra* note 68; Lemley & Lessig, *supra* note 68. Lawrence Lessig has examined the policy implications of the Internet's architecture or "code" in great detail. *See* LAWRENCE LESSIG, CODE AND OTHER LAWS OF CYBERSPACE (1999).

83. *See* Clark & Blumenthal, *supra* note 38. A full technical description of Internet architecture is beyond the scope of this article.

84. *See* J.H. Saltzer et al., *End to End Arguments in System Design*, *available at* http://web.mit.edu/Saltzer/www/publications/endtoend/endtoend.pdf (Apr. 8, 1981), *reprinted in* INNOVATION IN NETWORKING 195-206 (Craig Partridge ed., 1988); Isenberg, *supra* note 1.

The exceedingly cautious tone of this sentence suggests how hesitant the FCC was to reach this conclusion.[78] By concentrating on the small number of commercial phone-to-phone IP telephony providers that provide the most extreme case of an Internet-based telecommunications service, the FCC remained true to its statutory mandate while avoiding the minefield of the ESP exemption.[79] Remarkably, this tentative and vague conclusion remains the FCC's most direct statement on the regulatory status of IP telephony four years later. Though US West and BellSouth made noises about the Stevens Report, seeking to impose access and universal service charges on IP telephony providers, the FCC has taken no action and the situation remains largely where it was before the Stevens Report.[80] The Report took the pressure off the FCC, allowing the Internet industry to develop without the threat of imminent regulatory intervention.

Similar tactical maneuvering to avoid regulation will remain important throughout the transition from service-specific networks to next-generation data networks. But there is a danger in carrying this approach too far. Fudging avoids bad or premature decisions, but it does not move the regulatory structure any closer to where it needs to be. Additionally, it can allow pressure to build up to the point where a minor decision becomes a full-throttle battle involving billions of dollars. The FCC will need to think carefully in each case about when to shift from avoiding harmful or disruptive outcomes to a more pro-active strategy.

B. The Layered Model

As they muddle through the transition period to quell inevitable conflicts, policy-makers can turn to the most important change: the replacement of horizontal categories with vertical layers as the basis of communications regulation.

As discussed above, the regulatory ambiguity of Internet-related services derives from the dominant horizontal categorization model of communications policy, under which a string of rules apply based on the substantive or geographic status of an offering. There are four primary problems with this approach.

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78. The following two paragraphs of the report further reiterate that this decision is not binding and that a more thorough record would be required for any firm conclusion to be made. *See id.* at 44-45, ¶¶ 90-91.

79. The FCC walked a similarly fine line in its treatment of Internet backbone services in the *Stevens Report*. *See id.* at 32-36, ¶¶ 66-72.

80. *See* BellSouth, Policy on IP Telephony, Sept. 1, 1998 (on file with author); US WEST, Letter Regarding Access Charges for IP Telephony, Sept. 11, 1998 (on file with author).

tion of the FCC's budget appropriation.[74] Senator Stevens made it quite clear that he believed the FCC was misguided in its treatment of Internet services, especially IP telephony, which he felt should be subject to universal service obligations.[75] The Committee asked pointed questions, leaving little doubt as to what answers it expected:

> The report . . . shall provide a detailed description of the extent to which the Commission interpretations . . . are consistent with the plain language of the Communications Act . . . and shall include a review of . . . who is required to contribute to universal service . . . and of any exemption of providers or exclusion of any service *that includes telecommunications* from such requirement or support mechanisms . . . . (emphasis added)[76]

The FCC had previously reaffirmed that ISPs should not be subject to access charges, and had avoided imposing any Title II obligations on IP telephony. It could not simply repeat these positions in the Stevens Report, because the appropriations language and Committee pressure obligated it to explain specifically how services such as IP telephony could be classed as "information services" and not "telecommunications services."

The FCC avoided the desired conclusion that IP telephony was telecommunications by dividing IP telephony into three categories: phone-to-phone, PC-to-phone and PC-to-PC. It acknowledged that phone-to-phone IP telephony, tentatively defined under a four-part test, was probably telecommunications: "Thus, the record currently before us suggests that this type of IP telephony lacks the characteristics that would render them "information services" within the meaning of the statute, and instead bear the characteristics of "telecommunications services."[77]

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74. The link to the agency's annual funding was important because it made it impossible for the FCC to ignore the Congressional request, as it had done with previous requests to address IP telephony such as the ACTA petition. *See ACTA Petition, supra* note 22.

75. *See, e.g.*, Statement of Senator Stevens, Universal Service Hearing, June 3, 1997 (prepared text of Senator Stevens' remarks on file with author) ("I am concerned that the continued exemption of information service providers from access charges, with their inherent contribution to universal service, amounts to a continued subsidy by other telecommunications users.").

76. *See* Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Act, 1998, Pub. L. No. 105-119, 111 Stat. 2440, 2521-2522, § 623.

77. *Stevens Report*, *supra* note 16, at 44, ¶ 89.

money depend on the regulatory and pricing arrangements now in place. Second, even if it were clear where communications regulation should go, getting there involves at the least FCC rulemaking proceedings, and most likely also Congressional action, both of which involve significant time lags, comment periods, negotiation processes and so forth.

Communications policy is like sausage—even if you like the results, you may not want to know how it *really* gets made. Under the formal tenets of administrative law, Congress delegated authority to the FCC to implement statutory mandates, with the courts serving as a check against "arbitrary and capricious" agency actions.[70] This only tells part of the story. In theory Congress makes the hard decisions and delegates only the details to the expert agency, but in reality Congress often sets general policy frameworks and leaves it to the FCC to hammer out many of the hard issues.[71] On the most important issues, Congressional dictates are seldom unambiguous. The cycle of contested FCC proceedings, often featuring formal or informal interjections by individual Members of Congress, followed by litigation and possible reversal of the FCC, shows just how much reasonable minds can differ on these questions.

Though the FCC has never stated it in this manner, the FCC's Internet-related efforts to date have often been animated by a desire to avoid bad results.[72] In many cases, the results the FCC sees as potentially harmful appear to be dictated by the very statutes it is required to implement. Consequently, the FCC has often had to bide its time, and decide not to decide.

A good example of this is the FCC's April 1998 Report to Congress on Universal Service, known as the "Stevens Report."[73] The Senate Appropriations Committee, chaired by Senator Stevens of Alaska, directed the FCC to issue the report as a condi-

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70. *See* Administrative Procedure Act, 5 U.S.C. § 706 (2000).

71. *See* Chevron U.S.A., Inc. v. Natural Res. Def. Council, Inc., 467 U.S. 837, 844 (1984). Under *Chevron*, administrative agencies are entitled to deference in their interpretations of Congressional mandates. When reviewing recent FCC decisions, however, the courts have shown little hesitation in finding the FCC's actions arbitrary and capricious. Reciprocal compensation is a good example. *See* Bell Atl. Tel. Cos. v. FCC, 206 F.3d 1 (D.C. Cir. 2000).

72. *See* OXMAN, *supra* note 4. There are certainly exceptions, including the schools and libraries or "E-Rate" program that has dramatically improved the rate of Internet connectivity at such institutions. *See* GREAT EXPECTATIONS: LEVERAGING AMERICA'S INVESTMENT IN EDUCATIONAL TECHNOLOGY (Norris Dickard ed., Benton Foundation 2002); Reed Hundt, Speech to the National School Boards Association, *Giving Schools and Libraries the Keys to the Future* (Jan. 27, 1997), *available at* http://www.fcc.gov/Speeches/Hundt/spreh704.html.

73. *See Stevens Report*, *supra* note 16.

C. Coming Soon: More Problems

Reciprocal compensation and open access are hardly the last cases where the FCC will face a classification dilemma. As broadband connections multiply, a whole new set of Internet services will become commercially viable. IP telephony, which has so far been limited primarily to free PC-to-phone services and international calling, will become a much more direct competitor through next-generation voice-over-DSL hardware, IP-based softswitches and other equipment. It will become possible to distribute television-quality video programming over the Internet, competing directly with existing broadcast and cable offerings. Though most Internet usage falls outside the statutory definition of broadcasting, which specifies use of the radio spectrum,[69] the Internet will eventually pose at least as great a competitive threat to existing video distribution mechanisms as early cable services did to over-the-air broadcasters. As they did in the cable situation, broadcasters will likely appeal to the FCC to impose a "level playing field," and the FCC will be hard-pressed to respond using the horizontal model.

III. A Better Way

There is a better way. Rebuilding communications regulation for the Internet era will not be easy, but it is possible. At the tactical level, the FCC should expressly acknowledge that the current period is one of transition, and that in such an era the tools of the past may not be the most appropriate guide. Then, going forward, the FCC should get out in front of the technological developments now underway and develop a new policy framework. This framework should replace horizontal categories with vertical layers, definitional challenges with policy goals and price regulation with a focus on open networks.

A. Muddling Through

The layered model is the primary focus of this article. However, the intermediate steps are also important. Though putting a comprehensive structure into place is important, policy-makers should be sensitive to the transitional nature of the current environment. There won't be a flash cut to something better. First, such a change would be highly disruptive, as large sums of

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rence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. Rev. 4 (2001).

69. *See* 47 U.S.C. § 153(6) (Supp. V 1999) ("The term 'broadcasting' means the dissemination of radio communications intended to be received by the public . . . .").

In February 1999, the FCC refused to address open access in a formal proceeding, arguing that the broadband market was too nascent for any regulatory intervention.[64] Precisely because the FCC did not open a proceeding, it did not rule on the jurisdictional classification of broadband Internet services or prohibit other regulatory authorities from adopting open access rules. When cities such as Portland, Oregon stepped into the breach through the required franchise transfers in the AT&T acquisition of TCI (a major Excite@Home participant) and required open access to cable facilities, the jurisdictional question become critical. AT&T sued Portland, arguing that it did not have the authority to impose open access requirements. On appeal, the Ninth Circuit threw the parties (and the FCC) a curve. It concluded that the Excite@Home service was telecommunications, therefore outside the scope of the cable franchising authority.[65] This disposed of the case at hand, but opened up a can of worms at the federal level. If cable Internet services are telecommunications, does that make them subject to Title II requirements? And what about Internet access services over telephone networks, both dial-up and DSL?

The FCC announced that, in light of the Ninth Circuit decision in the Portland case, it would begin a proceeding on open access issues.[66] Finally, in March 2002, it issued a declaratory ruling labeling cable Internet offerings as "information services."[67] This decision codified the FCC's refusal to mandate open access. It did not, however, fully answer the question of how broadband Internet services over cable or other media should be treated. The declaratory ruling put cable Internet services in a nether region, subject to FCC jurisdiction under Title I of the Communications Act but not subject to its existing rules under either Title II or Title VI. Whatever happens in the subsequent regulatory proceedings and court battles to fill in the blanks, the FCC is in a difficult spot because of the limitations of its existing rules.[68]

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64. *See* Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorizations from Tele-Communications, Inc., Transferor to AT&T Corp., Transferee, *Memorandum Opinion and Order*, 14 F.C.C.R. 3160 (1999).

65. *See* AT&T Corp. v. City of Portland, 216 F.3d 871 (9th Cir. 2000).

66. *See FCC Chairman to Launch Proceeding on "Cable Access,"* FCC NEWS RELEASE (June 30, 2000), *at* http://www.fcc.gov/Bureaus/Cable/News_Releases/2000/nrcb0017.html; *Open Access NOI*, *supra* note 25.

67. *See Cable Declaratory Ruling*, *supra* note 25.

68. Open access is a particularly important issue because of what it suggests about the technical architecture of the emerging broadband Internet. *See* Kevin Werbach, *The Architecture of Internet 2.0*, RELEASE 1.0, February 1999, at 1, *available at* http://www.edventure.com/release1/cable.html; *see also* Mark Lemley & Law-

the required phone call for each connection. Requesting and viewing Web pages and engaging in other Internet functions over a cable Internet connection also seems to be "subscriber interaction . . . required for the . . . use of . . . other programming service;"[61] which is part of the definition of cable service. This viewpoint is strengthened by the legislative history surrounding the addition of "or use" to this provision in the 1996 Act.[62] And finally, cable Internet service can be classed as telecommunications, in that the cable operator gives the subscriber a raw connection to an Internet backbone.

The disparities created by the traditional classifications are highlighted in the "open access" debate. While the rules require digital subscriber line (DSL) operators to carry any ISP, the leading cable operators signed exclusive contracts with two broadband ISPs: Excite@Home and Roadrunner.[63] Other ISPs that wish to serve those customers cannot do so over the cable plant. Moreover, the cable ISPs are able to impose content restrictions such as limitations on the length of video streams that subscribers can access. Such restrictions are unremarkable in the Title VI world of cable, but prohibited in the Title II world of common carriers. ISPs, consumer groups, and content providers urged the FCC to mandate that the cable ISPs provide open access to their platforms, similar to what ILECs must do for their broadband DSL services.

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61. *Id.* § 522(6)(B).

62. The 1996 Act's only change in § 522(6) was the addition of the two words "or use," which to a casual reader may seem to have no substantive import. The relevant hearings and Congressional floor debates, as well as contemporaneous accounts from cable industry lobbyists, make clear that the change was made specifically with interactive and Internet services in mind. "Selection" of video programming means changing channels, but "use" of video programming encompasses broadband Internet services that incorporate streaming video. At the time, the cable industry was concerned that Internet services delivered over cable would be treated as Title II telecommunications services. The addition of "or use" enhanced the industry's legal argument for keeping these services in the familiar realm of Title VI. *See* BARBARA ESBIN, INTERNET OVER CABLE: DEFINING THE FUTURE IN TERMS OF THE PAST (FCC, OPP Working Paper No. 30, August 1998), *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp30.pdf.

63. Excite@Home (then called @Home) was established by venture capital fund Kleiner, Perkins, Caufield and Byers, in conjunction with several cable operators. It merged in 1999 with Web portal Excite. AT&T assumed voting control over Excite@Home following its acquisition of TCI. Roadrunner is a joint venture of Time Warner Cable (now part of AOL Time Warner) and MediaOne (now part of AT&T Broadband). (Due to financial difficulties, Excite@Home planned to liquidate on February 28, 2002.) *See Excite@Home Announces AT&T Termination of Pending Asset Purchase Agreement and Transition Agreements with Several Cable Companies*, Excite@Home Press Release (December 4, 2001), *at* http://www.home.net/news/dec4-01.html (last visited Feb. 24, 2002). Its subscribers were to be migrated to networks operated by the individual cable partners.

sense under the notion that telephone networks are wired networks that carry two-way voice communications, while cable networks are wired networks that carry one-way video programming. In fact, that's exactly how Title VI defines cable:

> [T]he term 'cable service' means – (A) the one-way transmission to subscribers of (i) video programming, or (ii) other programming service, and (B) subscriber interaction, if any, which is required for the selection or use of such video programming or other programming service;[56]

The definition of a "cable system" is "a facility. . .that is designed to provide cable service."[57] Under these categories, the networks are subject to different requirements. Among other things, Title II networks are subject to common-carrier interconnection and non-discrimination requirements, along with the competitive and pricing rules the 1996 Act imposed on incumbents.[58] Cable networks have special requirements governing their use of video programming (for example, they must offer channel capacity on a "leased access" basis).[59] But they have no requirement to interconnect with other cable providers or to treat content in a non-discriminatory way. Cable operators must choose some programming over others to fill their limited set of channels, so a common-carrier obligation would not make any sense.

These tidy divisions fall apart when cable networks and telephone networks carry the same services. The FCC first considered this issue when both types of operators attempted to offer the traditional service of the other. For telephone companies offering video programming, the FCC developed the video dialtone rules, superceded under the 1996 Act by the open video system rules.[60] Cable operators interested in offering telephony were subject to the same rules and requirements as any other new entrant in the local exchange market, described in sections 251 and 252 of the 1996 Act.

Although the horizontal model accommodated initial forays across its boundaries, the existing rules are not adequate to deal with broadband Internet access. Such services include elements of information, cable, and telecommunications services. The end-user service resembles dial-up Internet access, which the FCC has classified as an information service, albeit faster and without

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56. 47 U.S.C. § 522(6) (1994 & Supp. V 1999).
57. *Id.* § 522(7).
58. *See id.* §§ 251-52.
59. *Id.* § 532.
60. *See id.* §§ 571–73.

ing traffic.[54] Along with the order, the FCC issued a new intercarrier compensation notice of proposed rulemaking.[55] Despite all this maneuvering, the issue is far from resolved.

The reciprocal compensation controversy shows the failings of the horizontal approach for Internet services. First, it is too rigid. A connection to a dial-up ISP has a definite origination point, but no destination in the same sense as a circuit-switched call. From the user's perspective, a Website or an email address may be a destination, but there does not seem to be a separate "call" to each of these locations, just a stream of packets back and forth. Even if there were, it is not so clear what location should be assigned to a Website which might reside on numerous mirrored servers and local caches around the world. Second, in the horizontal paradigm, relatively arbitrary classification decisions have excessively far-reaching consequences. If traffic is local, revenues flow in one direction, but if it is interstate they flow the opposite direction. The economics of the dial-up Internet business and the financial viability of many CLECs turn on an obscure provision in the 1996 Act in a situation Congress appears not to have contemplated at all.

2. Open Access

The debate over open access to broadband Internet access services is another example of the flaws in the horizontal regulatory model. The Communications Act treats voice telephone networks as common carriers under Title II, and cable television networks under a separate set of rules in Title VI. This makes

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54. *See supra* note 47.

55. *See* Developing a Unified Intercarrier Comp. Regime, *Notice of Proposed Rulemaking*, 16 F.C.C.R. 22781 (2001). The FCC acknowledged that there was a more fundamental flaw in its rules:

> We recognize that the existing intercarrier compensation mechanism . . . has created opportunities for regulatory arbitrage and distorted the economic incentives related to competitive entry into the local exchange and exchange access markets. As we discuss in the Unified Intercarrier Compensation NPRM, released in tandem with this Order, such market distortions relate not only to ISP-bound traffic, but may result from any intercarrier compensation regime that allows a service provider to recover some of its costs from other carriers rather than from its end-users.

Reciprocal Compensation Remand Order, *supra* note 46, ¶ 2. FCC staff published two working papers during 2001 exploring intercarrier compensation issues in more depth. *See* PATRICK DEGRABA, BILL AND KEEP AT THE CENTRAL OFFICE AS THE EFFICIENT INTERCONNECTION REGIME (FCC, OPP WORKING PAPER NO. 33, DEC. 2000), *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp33.pdf; JAY M. ATKINSON & CHRISTOPHER C. BARNEKOV, A COMPETITIVELY NEUTRAL APPROACH TO NETWORK INTERCONNECTION (FCC, OPP WORKING PAPER NO. 34, DEC. 2000), *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp34.pdf.

have amassed aggregate reciprocal compensation balances of several billion dollars.[46]

As reciprocal compensation balances ballooned, most ILECs refused to pay on the grounds that the traffic at issue was not local.[47] The Internet, they argued, is a global network, even if the call to an ISP is initially local. In a February 1999 declaratory ruling, the FCC attempted to split the difference.[48] First, it found that traffic to dial-up ISPs was not local. Second, however, the FCC left existing state-level interconnection agreements in place, and sought comment on what a federal inter-carrier compensation regime should look like. The U.S. Court of Appeals for the D.C. Circuit vacated the FCC's decision in March 2000, finding the FCC's jurisdictional analysis unpersuasive.[49] It remanded the issue to the FCC.

The FCC sought additional comment,[50] and in April 2001 issued its order on remand.[51] It once again concluded, based on different reasoning, that ISP traffic was predominantly interstate and thus not subject to reciprocal compensation.[52] Again, it softened the blow for CLECs, this time through an interim recovery mechanism.[53] The interim mechanism lowers CLEC payments immediately, caps the amount of ISP traffic for which compensation is owed, and initiates a 36-month transition toward "bill and keep," a compensation-free arrangement for carry-

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46. *See* Implementation of the Local Competition Provisions in the Telecomms. Act of 1996, Intercarrier Comp. for ISP-Bound Traffic, *Order on Remand and Report and Order*, 16 F.C.C.R. 9151, 9154-55 (2001) [hereinafter *Reciprocal Compensation Remand Order*] ("For example, comments in the record indicate that CLECs, on average, terminate eighteen times more traffic than they originate, resulting in annual CLEC reciprocal compensation billings of approximately two billion dollars, ninety percent of which is for ISP-bound traffic."). The ISP reciprocal compensation issue was identified shortly after the passage of the 1996 Act, but pressure to address it didn't develop until these large balances accrued. *See* WERBACH, *supra* note 1, at 35.

47. CLECs and their supporters pointed out in response that in state-level negotiations, the ILECs had opposed compensation-free "bill-and-keep" arrangements because they expected to be net recipients of traffic in most situations.

48. *See* Implementation of the Local Competition Provisions in the Telecomms. Act of 1996, Inter-Carrier Comp. for ISP-Bound Traffic, *Declaratory Ruling in CC Docket No. 96-98 and Notice of Proposed Rulemaking in CC Docket No. 99-68*, 14 F.C.C.R. 3689 (1999), *vacated by* Bell Atl. Tel. Cos. v. FCC, 206 F.3d 1 (D.C. Cir. 2000).

49. *See* Bell Atl. Tel. Cos. v. FCC, 206 F.3d 1 (D.C. Cir. 2000).

50. *See* Comment Sought on Remand of the Commission's Reciprocal Comp. Declaratory Ruling by the U.S. Court of Appeals for the D.C. Circuit, *Public Notice*, 15 F.C.C.R. 15054 (2000).

51. *See Reciprocal Comp. Remand Order*, *supra* note 46.

52. *See id.* ¶ 3.

53. *See id.* ¶¶ 77-79.

great deal in practice, not just because of the level of the charges, but because charges accrue in different directions depending on the classification of the call. Access charges are paid by the carrier in the middle of the call (the inter-exchange carrier (IXC)) to the local carriers at either end (the Local Exchange Carriers, or LECs). Thus, for originating traffic, the LEC gets paid for bringing traffic to the IXC. When reciprocal compensation applies, however, the *terminating* carrier always receives the payment, to recoup the costs of transporting the other carrier's traffic to its destination.[44]

The reciprocal compensation regime works fine if end-users make and receive about the same number of calls. A LEC would therefore pay about as much in reciprocal compensation as it received. If traffic is unbalanced, however, LECs can become either net payers or net recipients of reciprocal compensation. Asymmetric traffic exists in the world of traditional telecommunications—think telemarketers, almost exclusively calling out, or customer-support call centers, almost exclusively receiving calls. These customers generate a relatively small volume of traffic that nets out between carriers, because each carrier usually serves both inbound-heavy and outbound-heavy users.

Dial-up ISPs throw a monkey wrench in the situation. End-users of dial-up ISPs call to initiate an Internet connection; the Internet does not call them.[45] The ISPs, like call centers, are net recipients of calls, but they generate far more traffic than traditional asymmetric customers. Because the vast majority of end-users still receive their basic telephone service from incumbent LECs (ILECs), reciprocal compensation associated with dial-up ISPs flows almost exclusively from those ILECs to the carriers serving the ISPs, who are largely CLECs. By exploiting the structure of the reciprocal compensation rules, these CLECs

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44. The difference makes sense in the existing pricing regime, because it reflects the different billing arrangements for local and long-distance calls. For local calls, the customer pays his or her LEC, meaning that a terminating CLEC has no way to recoup its costs directly. For long-distance calls, the customer pays his or her IXC, which makes the originating LEC the one in need of compensation.

45. This scenario only applies for dial-up Internet access, since broadband connections are generally "always on." The question of broadband intercarrier compensation is beyond the scope of this article. Though broadband is growing, it represents only a small fraction of the Internet access customer base today. Broadband users represented 15 percent of total U.S. home Internet users at the end of 2001, according to research firm Jupiter Media Metrix. *See* David Lake, *The Need for Speed*, THE INDUSTRY STANDARD, May 7, 2001, at 73.

the deep structure of current policy.[37] The hermetically-sealed categories at the core of the horizontal approach are foreign to the Internet.

Unlike traditional communications networks, the Internet does not provide a particular kind of service.[38] Its designers set out not to deliver content, but to interconnect networks (hence the name Inter-net). Neither services offered nor physical infrastructure nor geographic location determine whether something is part of the Internet. Instead, the Internet tautologically includes all globally routable interconnected networks that can carry the Internet protocol (IP).[39] The developers of IP deliberately made it a lowest common denominator, so that a service such as the World Wide Web can run over everything from Sun workstations on corporate networks to smart mobile phone handsets to television sets using digital cable set-top boxes. This characteristic makes it impossible to classify the Internet into one type of service within the existing classes. In addition, IP is a packet-switching protocol, meaning that communications are not confined to easily-separated circuits with geographically-defined routes. This further complicates traditional service-oriented or geographic classification.[40]

Reciprocal compensation and broadband open access provide two examples of the tensions the Internet creates for communications policy, with more problems on the horizon.[41]

1. Reciprocal Compensation

The 1996 Act requires local exchange carriers (LECs) to pay each other for the transport and termination of local traffic, a concept known as reciprocal compensation.[42] Reciprocal compensation rates are set in state-level negotiation and arbitration proceedings under a cost-based pricing standard.[43] Reciprocal compensation only applies to *local* traffic; interstate traffic is covered by the FCC's access charge rules. This distinction matters a

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37. *Cf.* Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access*, 52 FED. COMM. L.J. 561, 562 (2000) (considering the failings of communications policy based on the concept of users as passive recipients of information).

38. *See* David Clark & Marjorie Blumenthal, *Rethinking the Design of the Internet: The End-to-End Argument vs. the Brave New World*, *at* http://www.tprc.org/abstracts00/rethinking.pdf (Aug. 10, 2000).

39. Private IP-based networks are known as intranets.

40. *See* WERBACH, *supra* note 1, at 17-18.

41. Nakahata offers other examples. *See* Nakahata, *supra* note 4.

42. *See* 47 U.S.C. § 251(b)(5) (Supp. V 1999).

43. *See id.* § 252(d)(2) ("a reasonable approximation of the additional costs of terminating such calls").

a data network sees voice as simply a form of data with certain encoding and quality-of-service characteristics.

Over the past several years, policy-makers have begun to acknowledge that the networks of the future will be data networks that carry voice, video and other services, rather than service-specific networks jury-rigged to pass data traffic.[33] Yet the necessary corollary is rarely articulated: communications policy will be a subset of Internet policy, rather than the reverse.[34] There is a historical parallel for such a shift. Twentieth-century U.S. communications law emerged from models developed for two specific industries: railroads and radio. Courts, regulators and legislators generalized these models over time into common carrier and broadcast regulation. Those two paradigms, enshrined in the Communications Act, have proven sturdy enough to address a fast-changing sector and new services such as television and mobile telephony that have emerged during the past seven decades. Now, however, telecommunications and broadcasting are becoming the specific cases of a larger phenomenon: the interconnected digital network of networks we call the Internet.

B. The Categories Break Down

Because of its unique characteristics, the Internet sows confusion when it comes into contact with the dominant horizontal categorization approach. The distinction between basic and enhanced services became more difficult to defend with the introduction of services such as IP telephony[35] and streaming video, which bear a close resemblance to traditional regulated offerings.[36] There is no simple fix, because the basic problem lies in

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33. *See, e.g.,* Reed Hundt, Speech to the Institute of Electrical and Electronics Engineers Hot Chips Symposium, *The Internet: From Here to Ubiquity* (Aug. 26, 1997), *available at* http://www.fcc.gov/Speeches/Hundt/spreh742.html ("We need a data network that can easily carry voice, instead of what we have today, a voice network struggling to carry data."); *Powell Broadband Speech*, *supra* note 21; Michael Powell, "Digital Broadband Migration" Part II (Oct. 23, 2001), *available at* http://www.fcc.gov/Speeches/Powell/2001/spmkp109.html.

34. At an even more general level, communications regulation in the era of the Internet shares important elements with traditionally distinct areas of the law such as antitrust, intellectual property, and First Amendment jurisprudence. Thus, as Phil Weiser argues, these areas may productively be considered together under the rubric of information platforms. *See* Philip Weiser, *Law and Information Platforms*, 1 J. ON TELECOMM. & HIGH TECH. L. 1, 3-8 (2002).

35. The terms "IP telephony," "Voice over IP" and "Internet telephony" are frequently used interchangeably, though in some cases "Internet telephony" refers to consumer-oriented services only.

36. *See* WERBACH, *supra* note 1, at 26-47.

There are two ways to think about the application of communications regulation to the Internet.[29] The first is to parse existing laws and regulations, and then figure out how Internet-based services fit into those frameworks. Where tensions arise and the answer is not obvious, the FCC and Congress attempt to extend the existing rules to cover the new Internet services in a reasonable way. Policy is normally made in this manner. The second option is to start from the policy goals that undergird the legal structure, and from an understanding of the technological changes that the Internet heralds. This latter approach is the only way to achieve appropriate results when, as is the case with the Internet, the new services fundamentally undermine the assumptions of the current regulatory structure.

The Internet is going to swallow telecommunications. Data traffic is growing much faster than voice, and promises to dominate future capacity demands on all major networks.[30] The public-switched telephone network (PSTN) as we know it will not suddenly disappear. Circuit-switched traffic still accounts for the vast majority of telecommunications *revenues*, and will for some time.[31] But there is no doubt which way the wind is blowing.[32] All current and future communications switching and transport systems are digital, which means that at the basic technical level voice and data are interchangeable. A voice network cannot comprehend data, except as unintelligible noise, but

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29. These two approaches resemble the two phases of Constitutional law proposed by Bruce Ackerman. Ackerman distinguishes "normal politics" from extraordinary "constitutional moments" subject to different rules. *See generally* BRUCE ACKERMAN, WE THE PEOPLE (1991).

30. For surveys of available data about Internet traffic growth rates, see K.G. Coffman & A.M. Odlyzko, *Internet Growth: Is There a "Moore's Law" for Data Traffic?*, AT&T Labs—Research, *at* http://www.research.att.com/~amo/doc/internet.moore.pdf (June 4, 2001) (concluding that at the end of 2000, U.S. voice traffic totaled 53,000 Terabits per month, while Internet traffic represented 20,000-35,000 Terabits per month, growing significantly faster). *But see* A. Michael Noll, *Voice vs. Data: Estimates of Media Usage and Network Traffic*, *at* http://www.arxiv.org/abs/cs.CY/0109007 (last modified Sept. 5, 2001) (finding that in a survey of small groups of students, voice traffic significantly exceeded data traffic).

31. Circuit-switched networks hold open a dedicated channel for the duration of a communications session. In contrast, packet-switched networks divide transmissions into chunks that are routed independently of one another and reassembled on the terminating end. *See* WERBACH, *supra* note 1, at 17-18.

32. All major carriers are deploying Internet protocol (IP)-based equipment into their core networks. *See, e.g.*, *Sprint to Become First Incumbent Local Phone Company to Convert its Network Infrastructure to Next-Generation Packet Network*, Sprint Press Release, *at* http://www3.sprint.com/PR/CDA/PR_CDA_Press_Releases_Detail/1,1579,4081,00.html (Nov. 5, 2001) ("Sprint (NYSE: FON, PCS) Local Telecommunications Division (LTD) today announced plans to convert its existing digital circuit switched network to a packet switched network beginning in January 2003.").

tion of rulemaking proceedings, recognizing the dangers of regulatory intervention in competitive, fast-moving markets.[26]

Some questions are best left unasked, at least for a period of time. At some point, though, the costs in regulatory uncertainty and market distortions of not asking—and answering—those questions will exceed the benefits of a "hands-off" policy.[27] The FCC's "unregulation" concept suggests that the agency recognizes the Internet cannot be integrated into the established framework. The FCC is following the dictates of the Hippocratic Oath for doctors: "First, do no harm." There is more to medicine, however, than this laudable idea. If the patient is seriously ill, doing nothing will eventually result in significant ill effects. The following sections diagnose the problems with the current communications policy framework, and propose a course of treatment.

II. Square Pegs in Round Holes

A. Communications Policy as a Subset of Internet Policy

The first question to consider is whether the Internet justifies a radical rethinking of policy principles. New technologies arise all the time. There was no such thing as satellite television or voice mail when the current U.S. framework for communications policy took hold early in the last century. Policy-makers addressed these and other advances with minor tweaks and additions to existing law. Such quick fixes will not be sufficient to deal with the Internet.[28]

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26. The FCC's approach is consistent with the overall framework the Clinton Administration promulgated for U.S. government policy toward the Internet. *See* The White House, A Framework for Global Electronic Commerce 4 (July 1, 1997), *available at* http://www.ecommerce.gov/framewrk.htm ("Governments should avoid undue restrictions on electronic commerce."). The Bush Administration has given no indication that it intends to stray from this formula.

27. For example, if the unregulation of the Internet means that the regulatory treatment and pricing of functionally identical services depends solely on the protocols that carriers employ, those carriers will have incentives to build services around the regulatory categories rather than basing such decisions on normal business considerations. This does not mean that the FCC should always seek to ensure a "level playing field," because sometimes the status of the company providing the service justifies differential treatment. *See infra* text accompanying note 105. Given the choice, regulators should err on the side of deregulation, but they should regularly reassess the balance.

28. This question about the need for fundamental legal change mirrors the broader debate about whether we need a separate category of cyberlaw. *Compare* Lawrence Lessig, *The Law of the Horse: What Cyberlaw Might Teach*, 113 Harv. L. Rev. 501 (1999), *with* Frank Easterbrook, *Cyberspace and the Law of the Horse*, 1996 U. Chi. Legal F. 207 (1996).

them as ESPs. Therefore, ISPs are not subject to regulated pricing or other obligations.[20]

Eventually, the FCC labeled its approach toward the Internet "unregulation."[21] This approach fostered the growth of pro-competitive and innovative new services by leaving many essential questions unanswered.[22] For example, the FCC has never ruled on whether phone-to-phone IP telephony providers must contribute to universal service funding,[23] or whether Internet backbone providers are bound by common-carrier non-discrimination obligations.[24] It held off deciding how to classify broadband Internet services over cable infrastructure until March 2002, and even then it created as many new questions as it answered.[25] The FCC wisely chose to avoid premature initia-

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20. *See supra* text accompanying note 15.

21. *See* OXMAN, *supra* note 4 (justifying the unregulation approach). Chairman Powell has reiterated and even strengthened the FCC's commitment to an unregulated Internet. *See, e.g.*, Michael Powell, Remarks Before the Progress & Freedom Foundation, *The Great Digital Broadband Migration* (Dec. 8, 2000), *available at* http://www.fcc.gov/Speeches/Powell/2000/spmkp003.html (last visited July 16, 2002) [hereinafter *Powell Broadband Speech*].

22. For example, the legal status of IP telephony was formally brought before the FCC more than five years ago in the so-called ACTA petition. *See* The Provision of Interstate and International Interexchange Telecommunications Service Via the "Internet" by Non-Tariffed Uncertified Entities, *America's Carriers Telecommunication Association, Petition for Declaratory Ruling, Special Relief, and Institution of a Rulemaking*, RM 8775 (Mar. 4, 1996) [hereinafter *ACTA Petition*], *available at* http://www.fcc.gov/Bureaus/Common_Carrier/Other/actapet.html. The FCC has yet to formally define the status of such services in a rulemaking proceeding.

23. *See id.*; *Stevens Report*, *supra* note 16.

24. *See* MICHAEL KENDE, THE DIGITAL HANDSHAKE: CONNECTING INTERNET BACKBONES (FCC, OPP Working Paper No. 32, Sept. 2000), *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp32.pdf; *Stevens Report*, *supra* note 16; Inquiry Concerning Deployment of Advanced Telecomms. Capability to All Americans in a Reasonable And Timely Fashion, and Possible Steps to Accelerate Deployment Pursuant to Section 706 of the Telecomms. Act of 1996, *Notice of Inquiry*, 15 F.C.C.R. 16641 (2000). The backbone issue also came before the FCC in connection with the MCI-Worldcom merger, but the companies agreed to divest the MCI backbone in response to pressure from the Department of Justice prior to the FCC's final review of the deal. *See* Application of Worldcom, Inc. and MCI Communications Corp. for Transfer of Control of MCI Communications Corp. to Worldcom, Inc., *Memorandum Opinion and Order*, 13 F.C.C.R. 18025 (1998).

25. *See* Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, *Declaratory Ruling and Notice of Proposed Rulemaking*, FCC 02-77 (Mar. 15, 2002) (classifying cable Internet offerings as information services) [hereinafter *Cable Declaratory Ruling*]. *See also* Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, *Notice of Inquiry*, 15 F.C.C.R. 19287, 19288 (2000) [hereinafter *Open Access NOI*] ("The Commission has heretofore taken a 'hands-off' policy with respect to the high-speed services provided by cable operators."); John Borland, *Feds Struggle with New Cable Landscape*, CNET NEWS.COM, *at* http://news.cnet.com/news/0-1004-200-340307.html (Mar. 23, 1999).

With the Telecommunications Act of 1996 (1996 Act), Congress enacted the most sweeping revisions to telecommunications law since 1934. While the 1996 Act changed many things, it retained the horizontal model framework of communications policy. Congress effectively codified the FCC's basic/enhanced distinction in the 1996 Act's split between "telecommunications" and "information service":[16]

> 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.[17]
>
> . . . .
>
> The term "information service" means the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications . . .[18]

In 1996, the Internet and the World Wide Web were already a factor in public consciousness, but were far less significant than they are today. Moreover, the 1996 Act culminated several years of legislative effort, much of which occurred before the Internet existed in its present form. Consequently, the 1996 Act mentions the Internet only once, in the Communications Decency Act (CDA) restrictions on indecent online content.[19] The 1996 Act simply did not contemplate the radical changes the Internet would bring to the communications world.

C. "Unregulation" and the Internet

Absent clear Congressional guidance, the FCC formulated its own Internet policy within the legal constraints of the 1996 Act. The FCC avoided imposing traditional telecommunications regulation on Internet-based services through a careful process of decisions and non-decisions. It did so initially on a case-by-case basis. When commercial Internet service providers (ISPs) began offering service in the early 1990s, the FCC classified

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16. *See* Federal-State Joint Board on Universal Service, *Report to Congress,* CC Docket No. 96-45 (April 10, 1998), at 16-25, *available at* http://www.fcc.gov/Bureaus/Common_Carrier/Reports/fcc98067.pdf (last visited Mar. 22, 2002) [hereinafter *Stevens Report*] (concluding that the telecommunications/information service distinction is functionally identical to the basic/enhanced distinction).

17. 47 U.S.C. § 153(43) (Supp. V 1999).

18. *Id.* § 153(20).

19. The CDA was later struck down by federal courts. *See* Reno v. ACLU, 521 U.S. 844 (1997).

puServe, began to operate *on top of* the voice network. The companies that offered these services were not providing phone service, yet they were delivering something to customers through regulated communications networks. Such services did not fit within the existing horizontal categories. Therefore, pressure mounted for regulators to decide what to do with them.

To resolve this conundrum, the FCC launched the Computer Inquiries.[12] As a result of these proceedings, the FCC essentially added a new horizontal category, enhanced services, carved out of the existing Title II rules.[13] Thereafter, the FCC distinguished basic services from enhanced services, where basic services are subject to full-blown common-carrier regulation and enhanced services are not. Over two decades, the FCC struggled to refine its framework for enhanced services, particularly with regard to the provision of those services by incumbents (especially pre-divestiture AT&T, then known as the Bell Operating Companies). When the FCC developed the interstate access charge system, for example, it defined enhanced service providers (ESPs) as end-users, thus not subject to per-minute access charges.[14] This "ESP exemption," first enacted in 1983, has been the subject of vigorous debate and lobbying ever since.[15]

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hybrid communications and computing services primarily apply to telecommunications.

12. There have been three Computer Inquiries, each with numerous orders, court reviews and reconsideration orders. *See* Regulatory and Policy Problems Presented by the Interdependence of Computer and Communications Servs. and Facilities, *Notice of Inquiry*, 7 F.C.C.2d 11 (1966) [hereinafter *Computer I*]; Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry), *Final Decision,* 77 F.C.C.2d 384 (1980) [hereinafter *Computer II*]; Amendment of Section 64.702 of the Commission's Rules and Regulations (Third Computer Inquiry), *Report and Order,* 104 F.C.C.2d 958 (1986) [hereinafter *Computer III*]; *see also* Computer III Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services, *Notice of Proposed Rulemaking*, 10 F.C.C.R. 8360 (1995) (recounting the history of the Computer Inquiries); OXMAN, *supra* note 4. Most of the activity in these proceedings concerns the conditions under which AT&T and its progeny, the RBOCs, may offer computer-based services, and how they must interact with other companies offering such services.

13. The basic/enhanced distinction made its first appearance in *Computer II*, but it drew on concepts the FCC had earlier articulated in *Computer I*. *See* OXMAN, *supra* note 4.

14. *See* MTS and WATS Market Structure, *Memorandum Opinion and Order,* 97 F.C.C.2d 682, 711-22 (1983).

15. Internet service providers (ISPs) are considered enhanced service providers (ESPs), allowing them to purchase local services from local exchange carriers out of flat-rate local tariffs rather than usage-based interstate access tariffs. *See Id.* at ¶¶ 75-90; WERBACH, *supra* note 1, at 50. When, in 1996, the FCC last sought comment on eliminating the ESP exemption, it received several hundred thousand email messages in response. *See* Jeff Pelline, *Coalition Frowns on ISP Access Fees*, CNET NEWS.COM, *at* http://news.cnet.com/news/0-1005-200-316620.html (Feb. 14, 1997).

nications along geographic lines. The FCC has jurisdiction over interstate services, while state public utility commissions and local authorities oversee intrastate communications.[9]

The horizontal model presumes that regulators can assign every service to a specific category. In the era of analog networks, this model was relatively easy to implement, as each service had discrete physical plant and outputs. For example, telephone networks carried voice, while over-the-air television networks carried broadcast video. Where one company provides two different services, as in the case of a Regional Bell Operating Company (RBOC) that owns cellular telephone licenses in addition to offering wireline telephony, the company must apply the appropriate rules for each of its services. Within each category, services may be split geographically, as with basic telephone service, which includes state-regulated local service and FCC-managed interstate access. This separation complicates the regulatory picture, but does not compromise the stovepipe picture of horizontal categories.

For most of the twentieth century, companies that controlled physical infrastructure of communications also controlled service definitions. Regulators generally granted these providers *de jure* or *de facto* monopolies within a defined area. This arrangement was consistent with the horizontal model, which focuses on conceptual distinctions between services offered rather than the internal structure used to provide those services. Regulating by categories held up even after the post-*Carterphone* deregulation of telephony, culminating in the court-ordered breakup of AT&T. Although end-users and competitive carriers gained the ability to plug into the network in new ways,[10] these new participants still could fit into familiar horizontal boxes.

B. Classifying Computing

The introduction of computers into communications networks challenged the horizontal model.[11] Data services, such as store-and-forward voice mail or value-added networks like Com-

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9. *See* 47 U.S.C. § 152(a) (Supp. V 1999) ("The provisions of this act shall apply to all interstate and foreign communications by wire or radio . . . .").

10. *See* Use of the Carterfone Device in Message Toll Tel. Service, *Decision*, 13 F.C.C.2d 420 (1968); Hush-A-Phone Corp. v. United States, 238 F.2d 266 (D.C. Cir. 1956).

11. Digitalization came to wireline telephone networks much sooner than to wireless (which only changed over in the last five years or so) and broadcast (which has only begun to switch to digital television). Telephone networks are also relatively ubiquitous and inherently bi-directional, which made them the preferred platform for most computer-driven applications. Consequently, existing policies for

and explains how the model highlights the critical issue of interfaces that the traditional approach buries.

I. The Existing Regulatory Framework

Before discussing the future of communications policy, it is useful to understand its present.[4] The Internet creates particular tensions with the outdated but deeply rooted structure of the current regulatory framework.

A. Horizontal Categories

Traditionally, communications policy was organized around horizontal divisions between service categories and between geographic regions.[5] The Communications Act began with a catch-all jurisdictional grant to the FCC in Title I, then defined two basic regulated categories: Title II common carriers (wireline voice telephone companies) and Title III users of radio spectrum (radio communications and subsequently television broadcasters).[6] Over time, new services arose that did not fit the existing paradigm, most prominently cable television services that were both wired and broadcast. In response, the FCC and Congress simply created new horizontal categories with different rules.[7] For example, Congress added Title VI to accommodate cable television services.[8] The Communications Act also divided commu-

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4. For a more thorough treatment of the basis for the current regulatory framework, see Jason Oxman, The FCC and the Unregulation of the Internet (FCC, OPP Working Paper No. 31, July 1999), *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp31.pdf and John Nakahata, *Regulating Information Platforms: The Challenge of Rewriting Communications Regulation from the Bottom Up*, 1 J. Telecomms. & High Tech. L. 95 (2002).

5. The divisions are horizontal in the sense that they may be visualized as a series of stovepipes lined up next to one another.

6. *See* Communications Act, *supra* note 3.

7. *See, e.g.*, Cable Communications Act Of 1984, 98 Pub. L. No. 549, 98 Stat. 2780 (codified as amended at 47 U.S.C. §§ 521-73 (Supp. V 1999)) [hereinafter Cable Act of 1984] (establishing a new regulatory category for cable television); Telecommunications Act of 1996, 104 Pub. L. No. 104, §§ 3(41), 3(48)-3(51), 110 Stat. 56, 59-60 (adding new definitions of information services and categories related to telecommunications). The organization of the FCC into subject-area Bureaus, and the introduction of new Bureaus such as Cable Services, tracks the horizontal framework. When it comes to its operational structure, the FCC appears to recognize that the horizontal model isn't appropriate for the coming Internet era. The FCC's recent restructuring revamped the Bureau structure to a limited extent. *See FCC Approves Reorganization Portion of Reform Effort*, FCC News Release, *at* http://www.fcc.gov/Bureaus/Miscellaneous/News_Releases/2002/nrmc0202.html (Jan. 17, 2002); Fed. Communications Comm'n, Strategic Plan: A New FCC for the 21st Century (1999), *at* http://www.fcc.gov/21st_century/draft_strategic_plan.pdf (Aug. 12, 1999).

8. *See* Cable Act of 1984, *supra* note 7.

switched voice telephony, policy-makers could sweep Internet-related challenges under the rug. Now, the days when legislators and regulators could simply ignore the Internet's unique demands are over. With over 100 million active U.S. Internet users[2] and Internet protocol (IP)-based offerings competing directly with traditional services, the time for a coherent Internet policy framework is fast approaching.

This article describes what a new regulatory framework might look like. Rather than mechanically applying outmoded categories to novel converged services, regulators should reformulate communications policy with the Internet at the center. Tactical steps will be necessary to avoid disruptions during the transitional period. Beyond that, the best place to start is with the technical architecture of the Internet itself, which differs in important ways from that of traditional telecommunications and broadcast networks. The horizontal service and geographic classifications that have governed communications regulation since the passage of the Communications Act of 1934[3] (Communications Act) should be reconceived in terms of vertical layers. Different policy approaches should be used for each layer, and regulators should turn their attention from pricing to the openness of interfaces between layers and competing services.

This article first describes, in Section I, the existing framework of horizontal categories and the Federal Communications Commission's (FCC's) current approach to the Internet. Section II analyzes the failings of the current framework, using the examples of reciprocal compensation and broadband open access. Section III suggests an alternate course of action for policy-makers. This approach begins with tactical "muddling through" during a transition period, and ends with a restructuring of communications policy around a vertical four-layer model. Finally, Section IV describes briefly how the layered model reframes some of the difficult questions identified previously,

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2. Nielsen/NetRatings estimates the active U.S. home Internet audience at 105 million in February 2002, out of a total home Internet audience of 167 million. *Average Web Usage*, NETRATINGS, *at* http://pm.netratings.com/nnpm/owa/NRpublicreports.usagemonthly (last visited Apr. 3, 2002). Over 40 million Americans access the Web from work, though many of these are also home users. *Average Web Usage*, NETRATINGS, *at* http://pm.netratings.com/nnpm/owa/NRPublicReports.Usages (last visited Apr. 3, 2002). Nielsen/NetRatings estimates the global home Internet audience at 455 million in January 2002, of which 260 million are active users. *November 2001 Global Internet Index Average Usage*, NETRATINGS, *at* http://www.netratings. com/ corporate/corp_hot_off_the_net.jsp (last visited Apr. 3, 2002).

3. Communications Act of 1934, Pub. L. No. 73-416, 48 Stat. 1064 (codified as amended at 47 U.S.C. §§ 151-615b (Supp. V 1999)) [hereinafter Communications Act].

ing the interfaces between layers or otherwise constraining higher-level competition. The *Computer II* structural separation requirements and the *Computer III* non-structural safeguards are in effect such rules. The FCC's rules governing collocation and line sharing for DSL services are also in this category.[109]

Conclusion

The layered model addresses all four of the shortcomings of the current structure in the age of the Internet.[110] Focusing on vertical layers removes the assumption that service boundaries are clear, and are tied to physical network boundaries. It implies a more granular analysis within each layer, moving from overarching policy goals to specific cases rather than applying categories that bring with them laundry lists of requirements. It brings the issues of interconnection between networks, and between functional layers within those networks, to the forefront. And it recognizes the significance of network architecture as a determining factor in shaping business dynamics.

This article attempts to outline frameworks and highlight issues, rather than propose specific policy outcomes. More analysis is necessary to understand exactly what a vertically-layered communications policy regime would look like, and how it could best be implemented. The project of redefining communications policy will take many years. It means changing administrative rules and structures, and it may also require new legislation. There is a window of opportunity to create the new regime before the old one comes crashing down. It is an opportunity that we should not miss.

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109. *See* Deployment of Wireline Serv. Offering Advanced Telecomms. Capability and Implementation of the Local Competition Provisions of the Telecomms. Act of 1996, *Third Report and Order in CC Docket No. 98-147 and Fourth Report and Order in CC Docket No. 96-98*, 14 F.C.C.R. 20912 (1999) (line sharing for DSL); Deployment of Wireline Serv. Offering Advanced Telecomms. Capability, *First Report and Order and Further Notice of Proposed Rulemaking*, 14 F.C.C.R. 4761, 4784-85 (1999) (collocation).

110. *See supra* text accompanying note 81.