

# Packet Plutocracy, Data Democracy, and the Bureaucracy

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In a predecessor article, the author showed how Federal Communications Commission (FCC) policy toward incumbent local exchange carriers (ILECs) will likely impede development of Internet-type packet-switched services, to the detriment of both customers and Internet service providers (ISPs) alike.<sup>1</sup> FCC policies making ILEC assets communal, confiscating ILEC investment, and socializing ILEC services have created a no-win situation where ILEC investment risk has been privatized while ILEC market opportunities have been socialized. The result has been underinvestment by ILECs in modernizing infrastructure, with advanced services effectively limited to those such as ISDN and ADSL that are designed to leverage off the existing public-switched network.

Such a result, were it perpetuated, would effectively frustrate a prime objective of Congress when it passed the Telecommunications Act of 1996: fostering nationwide deployment of advanced services. The Act encompasses twin visions whose inherent "multiple-personality" has been widely recognized by observers: full-bore market competition balanced with preservation and expansion of universal service. Tension arises from the concentration of market competition in higher-value segments of the telecom marketplace, with its inevitable consequence—driving prices of telecom competitive services closer to underlying cost. Such a result could undermine the current regime of support for universal service. To prevent this and relieve the

statutory tension, Congress mandated that universality be provided on a competitively neutral, explicit basis.

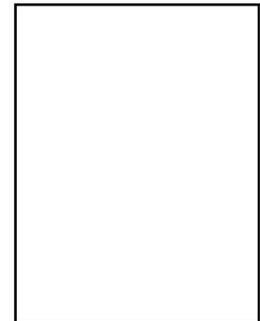
This article examines FCC policy concerning access to advanced services that risks perpetuating a plutocracy of high-end users while delaying diffusion to the mass marketplace. Packet plutocracy need not preclude data democracy. Market forces plus competitively neutral support can trump bureaucratic overkill.

## The Telecom Act: Are Advanced Services Too Important to Trust Markets?

Senator Ron Wyden once famously pronounced, while still a House Member, that competition was too important to be left to the marketplace. The Telecom Act, however, did not follow that advice. Its stated objective was:

[T]o provide for a pro-competitive, deregulatory national policy framework designed to rapidly accelerate private sector deployment of advanced telecommunications and information technologies and services to all Americans by opening all telecommunications markets to competition, and for other purposes.<sup>2</sup>

Among "other purposes," the Act contains two sections that pertain to advanced service deployment which, if



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How the FCC interprets the interplay between section 706 and its universal service mandate per section 254 could advance or delay rapid modernization of the PSTN infrastructure.

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wrongly applied, could work at cross-purposes with the Act's fundamental pro-competitive thrust:

- (1) Section 254 calls for preserving and ultimately expanding universal service.
- (2) Section 706 calls for the FCC and state PUCs to take steps, when and if necessary, to spur deployment of advanced services.

How the FCC interprets the interplay between section 706 and its universal service mandate per section 254 could advance or delay rapid modernization of the public switched telephone network (PSTN) infrastructure.

The FCC was charged by Congress with commencing an inquiry within 30 months of passage of the Telecom Act (i.e., no later than August 8, 1998) to address “the availability of advanced telecommunications capability to all Americans [with deployment] in a reasonable and timely fashion.”<sup>3</sup> If barriers to advanced deployment exist, “the Commission shall take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market.”<sup>4</sup> The FCC’s inquiry is to be completed within 180 days (i.e., no later than February 8, 1999), and is to place “particular” emphasis on the situation in America’s schools and libraries.<sup>5</sup> *Advanced service* is specifically defined in section 706(c) as “high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video communications.”<sup>6</sup>

The regulatory equation is further complicated by the long history of FCC efforts to regulate firms offering both voice and data telephony. The tale runs through three “computer inquiries” and has been unfolding for nearly one-third of a *century* (long enough so that the *footnote citation* alone for the proceedings from 1980 to date—covering just the second and third inquiries—runs *37 single-space lines*). Therein, the agency sought to divine how

best to regulate converging technologies of communications and computers (convergence was a hot topic even in 1966, when the first inquiry was commenced). Indeed, the interminable proceedings conducted by the agency illustrate the extreme difficulty of finding a regulatory scheme to deal with technological convergence.

*Computer I* was predicated on locating a “bright line” between communication and computer offerings, with regulation based on “what” a service was—the Commission would regulate communication and not regulate data processing. *Computer II* jettisoned the jurisdictional approach in favor of regulating all activities of communications companies (ancillary jurisdiction over enhanced services offered by telcos). In effect, if the Commission could not decide exactly “what” it would regulate, it knew “whom” it regulated—it regulated telephone companies but not computer firms—i.e., AT&T, but not IBM.

It took the FCC five years to reach a final decision and reconsideration in *Computer II*; the result lasted but four years until round three was opened. In *Computer III*, the FCC turned to economic regulation, based upon whether a given service appeared to have monopoly or competitive characteristics. In effect, this last scheme targeted the “why” of regulation: The Commission would regulate where the marketplace realities pertaining to a given service appeared to justify protection against abuse of market power, regardless of definitional considerations. The mess lives on in proceedings arising out of a plethora of dockets and appellate court rulings—perpetuating not only the “why” of *III*, but also the “what” of *I* and the “whom” of *II*. Layers of *pentimento* live on underneath a canvas whose surface colors reflect the infinite nuance of bureaucrat would-be Rembrandts on a never-ending quest to illuminate every last elementary particle.

The Telecom Act’s “multiple-personality” problem is exemplified by its two-prong approach to advanced services:

- Section 706 directs the FCC to take steps to encourage deployment of advanced services, specifically, switched digital broadband services.
- Section 254 invites the FCC to add any advanced service to universal service for which the agency concludes universal availability to be in the “public interest.”

Congress thus gave the agency a charter beyond that of section 254’s preservation and expansion of universal service. Section 706’s directive is that the agency takes the necessary affirmative steps to spur innovation.

Section 254 provides for “an evolving level” of universal service, with FCC definitions guided by four factors:

- (1) Essential education, health, and public safety.
- (2) Residential subscription by a “substantial majority of customers.”
- (3) Deployment in the PSTN by carriers.
- (4) “Public interest, convenience, and necessity.”<sup>7</sup>

Collectively, these criteria give the FCC broad discretion; the states may recommend via the Joint Board and may extend universality to new services if not inconsistent with FCC rules.

But now comes section 706, directing that the FCC and each state PUC,

[S]hall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms) by utilizing, in a manner consistent with the public interest, convenience and necessity, price cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment.<sup>8</sup>

The just-adopted advanced services inquiry mandated by the Telecom Act, delayed until the very last moment permitted by Congress, frames the debate. The FCC issued a Memorandum Opinion & Order (Order), a Notice of Proposed Rulemaking (NPRM),<sup>9</sup> and Notice of Inquiry (NOI).<sup>10</sup>

The Order reaches conclusions of law on interpreting the Telecom Act as applied to advanced service offerings by ILECs.<sup>11</sup> The NPRM proposes rules based upon the Order’s legal analysis.<sup>12</sup> The NOI, issued as a separate document, seeks comment on broadband technology evolution, market evolution, and associated regulatory implications.

### Order

Central to the agency’s legal analysis is what constitutes “telecommunications service” and “information service” per the Telecom Act. It interprets the Act to follow pre-existing distinctions in the FCC rules so that Internet access can be treated as an information (enhanced) service, sitting atop the underlying digital subscriber line (DSL) transport telecommunications (basic) service.<sup>13</sup> Further, because the DSLAM (digital subscriber line access multiplexer) that routes calls to the IP network can route them to any customer on any public network, the FCC considers such traffic “telecommunications” per the Act.<sup>14</sup>

ILECs must condition loops to be free of bridge taps, loading coils, and “other electronic impediments”; *such loops must be provided even if the ILEC itself does not provide advanced services over a given loop* (and even if other advanced services offered by non-ILECs can be provided without conditioning).<sup>15</sup> Resale of ILEC offerings of end-user advanced services is required, and co-location costs must be minimized.<sup>16</sup> Advanced services were held to lie outside the ambit of FCC forbearance authority; the agency, contemplating regional Bell operating company section 271 applications for inter-LATA entry, has ruled that “[I]t is not clear from the text of section 706(a)... whether Congress intended [therein] an independent grant of forbearance authority

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or...that the Commission [has] forbearance authority granted elsewhere...."<sup>17</sup>

*NPRM*

ILECs may offer advanced services via a separate subsidiary that would be considered non-dominant and not subject to section 251 rules.<sup>18</sup> In establishing detailed separation rules, the agency asked commenters to show how alternatives would address its concerns about discrimination and cost misallocation.<sup>19</sup> ILECs must provide sub-loop unbundling unless not technically feasible or there is insufficient space available at the remote location.<sup>20</sup> Further, because technology is merging switching functionality into multiplexing equipment, ILECs must offer co-location of such equipment. Comment is sought as to whether co-location should extend to circuit-switched equipment (in addition to packet-switched).<sup>21</sup>

*NOI*

The stated goal of the NOI is to make the deployment of advanced services "more efficient and more inclusive."<sup>22</sup> The prime focus, of course, is on bringing competition to residential, especially rural, customers, plus schools and libraries and "other customers who are traditionally thought to be less profitable."<sup>23</sup> Among the issues raised:

- (1) What regulatory barriers to advanced service deployment exist, and how can these be balanced against universal service, tariff, and network reliability considerations?<sup>24</sup>
- (2) Should there be a "social contract" arrangement for advanced residential services?<sup>25</sup>
- (3) Should any form of advanced service be added to universal service?<sup>26</sup>
- (4) What legal/regulatory model is best for advanced services?<sup>27</sup>

The NOI closes with three points:

- (1) Section 706 is a "top priority" for the agency.

- (2) There appears to be a "large demand" for advanced services already.
- (3) The FCC "is committed" to seeing the benefits of advanced services reach all Americans.<sup>28</sup>

In a related paper discussing advanced service offerings and regulation of cable providers, issued by the FCC's Office of Plans and Policy, the agency raises the prospect that cable providers might eventually be subjected to telecom-style rules. This includes those pertaining to interconnection, resale, and unbundling. Further, common carriage rules might be imposed if cable-provided Internet service is deemed essential.<sup>29</sup>

**Data Universality: The Haves, Have-Nots, and the "Digital Divide"**

Collectively, the Commission's advanced service documents raise policy questions concerning Internet access, in both economic and social contexts. The economic aspect is best symbolized by the surge this year in high-speed access offerings, the socio-political aspect in the debate over the schools program, and the September 11 online release of the *Starr Report*.

School access exposes the statutory tension between mandating diffusion of services and allowing the pace of the marketplace to decide. Even without "e-rate" discounts in place, some 80% of schools already have Internet access (albeit, not each individual classroom, where the figure is much lower).<sup>30</sup>

Release of the *Starr Report* generated a "hits" explosion at various Websites and, equally predictably, a network traffic jam of immense proportions (despite the report being "mirrored" at numerous Websites to spread the demand load).<sup>31</sup> The latter led not only to long delays for online users, but caused data corruption—dropped text and footnotes and formatting errors caused by the usual assorted cyber-gremlins—arising out of attempts to download a 445-page document.<sup>32</sup>

Despite such problems, the *Starr Report* online release raised anew the question of

access for info “haves” and “have-nots”—albeit the “haves” are growing, and now top 70 million adult Americans by one estimate.<sup>33</sup> A document whose dissemination might conceivably trigger events leading to an aborted presidency, and thus clearly of highest public import was available to online users the same day Congress made the report public. Concerns were widely raised about lack of universal access as well as, with no little irony, protecting school-age children from access to salacious material—what Congress sought unsuccessfully to ban via the Communications Decency Act (struck down by the Supreme Court).

Distilled to its info-age essence, the *Starr Report* merges “packet plutocracy” and “data democracy” with electro-politics. Are they mutually exclusive? Are they sequential steps common to marketplace diffusion of other major consumer products? Can the two co-exist? Put another way, will rapid price declines in the cost of computers and Internet access drive widespread market penetration fast enough to suit policy mavens? And if *perfect* equality of data access is not achieved, what degree of premium access, if any, will be viewed as acceptable? Does the existence of comparably priced alternatives (in economist parlance, imperfectly substitutable goods) render Net access a luxury item, and thus not suitable for mandating a universal entitlement?

As for the *Starr Report*, newspapers around the country published the full text as an extra supplement—some the following day. Paperback copies went on sale within three days of online release.<sup>34</sup> The full video of the President’s grand jury testimony aired the same day it was released by Congress.

Thus, it is hard to see how lack of online access impaired anyone’s access to information of vital public import—this time. If there is a “digital divide” today, it is between those who can divide digits without the aid of a digital device, and those who cannot do so. *If online access becomes truly essential, a digital divide could emerge if network infrastructure investment by any class of providers is impeded.*

### **Network Investment: The Cost of Privatized Risk and Socialized Opportunity**

The steep price declines promised by the Internet, hailed as drivers of data access diffusion, are not without historical precedent. Between 1915 and 1930, the cost in terms of purchasing power parity of a 10-minute phone call between New York City and San Francisco fell 80%, from roughly 300 to 60 working hours.<sup>35</sup> During that brief period, federal telephone regulation actually traversed three distinct phases—pro-competition, federal operation, and pro-monopoly.<sup>36</sup> Yet, technology trumped regulatory models then. Will it do so again this time around, or will regulation forestall full realization of technology’s benefits?

High-speed Internet access services—ISDN, digital subscriber line, and cable modem access—ignited in 1998, with myriad offerings reaching the residential marketplace. One estimate is that:

- ISDN home penetration will triple in 1998 to 300,000.
- DSL services will reach 16,000 homes by end-1998, up from less than 1,000 at end-1997.
- Cable modem access will reach 200,000 homes by end-1998.

By 2002, 20% of homes with Internet access are projected to have either DSL or cable modem access.<sup>37</sup> At end-1998, two-way cable networks will have passed 44.8 million households (47% penetration); cable modem access already reaches 75,000 households in 67 markets.<sup>38</sup> Wireless data access is also expected to grow rapidly. One study projects that the wireless data market will jump from 1997’s \$2.7 billion to \$37.5 billion by 2002.<sup>39</sup> All major telecom firms, including GTE, have filed tariffs for DSL service, albeit with jurisdictional variations. GTE’s ADSL tariff, classed as interstate special access, was approved by the FCC on October 30.<sup>40</sup>

High-speed equipment for DSL is not part of the PSTN, but will, if the FCC’s position stands, be available to competitors for rental on an unbundled network element

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basis. Such offerings will, in the event, be subject to competition from cable, wireless, and satellite providers.<sup>41</sup> In other words, there will be more than one potential path to most homes for high-speed service, from its inception.

High-speed digital network investments, it should be noted, leverage primarily off the *existing* telephone and cable network infrastructures. Anticipated rapid increases in demand would come from early cyberspace adopters. Evidence of network *disinvestment* has been provided by the Economic Strategy Institute, which has released a study showing that total telecom network net investment *declined* 1.6% from 1991 to 1996, from \$117.25 to \$115.4 billion.<sup>42</sup> Net plant investment was actually negative in 1994 and 1995, but turned up in 1996.<sup>43</sup> Net plant modernization and maintenance investment was negative from 1992 to 1996, and ILEC digital investment trends were mixed by late 1996.<sup>44</sup> (Earlier this year, Commissioner Ness cited a 16% upturn in 1997 to show FCC policy success, but her figures include non-ILECs, thus masking ILEC results.<sup>45</sup>)

ILEC figures show a decline in one critical network area—fiber. According to Corning, the leading manufacturer of fiber optic cable, *ILEC fiber network investment declined 6.4% in 1996, after increasing 35% annually between 1983 and 1995.*<sup>46</sup> Figures compiled by the FCC for 1997 show that, in 1997, IXC fiber route mile growth (not investment) increased 16%, versus 14% for all ILECs and 13% for RBOCs. The RBOC figure was down “slightly” from 1996, but CLEC growth topped 50%.<sup>47</sup> ILEC fiber investment decline is further masked by an explosion in bandwidth per fiber, with 40 Gb/s systems in the market today and terabit systems coming soon. Thus, paradoxically, *fiber investment is declining while capacity increases.* This apparent anomaly is partly due to quantum advances in dense wavelength division multiplexing, optical amplifier, router, and semiconductor laser technologies that radically boost per-fiber “throughput” capacity. Also, it may reflect the diminishing economic value of pushing fiber deeper into the loop.

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### **Data Access: Packet Plutocracy, Data Democracy, Markets, and Mavens**

The FCC’s advanced services posture further undermines incentives for network investment by incumbent carriers, by continuing agency policies of making assets communal, confiscating investment, and socializing services. As noted above, ILECs would, should the proposed rules be adopted, be required to share scale and scope economies, and even provide network enhancements requested by competitors although not available to the ILEC itself. The NPRM proposes extending the basic/enhanced service rules into switching equipment hitherto deemed exempt from such regulation. And the NOI raises data access universality issues, including possible regulation per “social contract” between ILEC and regulatory agency. Once again, the FCC plans to privatize ILEC risk while socializing ILEC opportunity, a burden not placed on non-ILECs.

Regulation as envisioned by the FCC clearly aims to jump-start and micro-manage the transition to data democracy—accelerating the pace at which universal access is expected to emerge via the marketplace. Thus, school and library funding was front-loaded by former Chairman Reed Hundt, in advance of settling fundamental issues as to how to equitably fund universal service. And ILECs must offer, if the FCC’s view prevails, services to entrants that their own networks do not provide to themselves. The packet plutocracy, in this vision, is not only high-end users but also selected *suppliers* of advanced services.

By contrast, a market-oriented vision concedes that diffusion of services follows economic rationality: a temporary plutocracy—the business market—gives suppliers sufficient revenue surplus to extend service into the mass market. A passing plutocracy drives ultimate democracy. But for this to happen, pricing for residential services must be competitively neutral with universal service support provided explicitly, per the Telecom Act. Preserving opportunities created by regulatory arbitrage runs contrary to the pro-competitive goals of the 1996 Act.

FCC policies run the risk of undermining data democracy by impeding ILECs, whose networks are the most inherently democratic, undercutting their profitability by enabling entrants to arbitrage price disparities created by regulation. Under FCC rules as proposed, DSL service could wind up a loss leader for ILECs, who might have to offer one-stop shopping packages to keep high-end residential users as customers but would, in this event, be forced to accept DSL investment confiscation as the price of competing. This is not what the drafters of the Telecom Act had in mind, and its ironic result could well be to prolong packet plutocracy and delay data democracy for residential users not served by new entrants, over 99.5% of whom target business markets.<sup>48</sup>

Further, the FCC exempts cable companies from socialization of their in-place networks, although many providers still enjoy a terrestrial cable service monopoly in their franchise areas (satellite competition to date is limited to around 5% of the market); program access rules apply only to content providers. The resulting competitive asymmetry favors their incumbent networks over those of local exchange carriers. Given that the Telecom Act mandates competitive neutrality, the present regulatory disjunction runs counter to that goal.

True competitive neutrality would dictate treating carriers similarly situated in like fashion. Either subject cable to regulation or deregulate ILECs. The prime justification for the current state of affairs is that basic cable service, unlike telephony, is not “essential”; thus, the Act set a three-year sunset for rate regulation of basic cable, which will increase cable’s edge. Cable responded: *In 1997, cable fiber investment topped RBOC fiber investment for the first time.*<sup>49</sup>

The advantage new entrants have is amply illustrated by the bundling strategy of an ISP—RCN Corporation. RCN will package multi-service offerings, discounting cable and making profits from telephony, targeting the 40% of nationwide users who are clustered in 6% of the nation’s geographic

area (the Boston/Washington, DC and San Francisco/San Diego corridors).<sup>50</sup> This pricing flexibility is a hallmark of competitive strategy, one still largely denied by the FCC to the ILECs.

The FCC has spent a goodly portion of the past one-third-century chasing electrons and photons around the circuit-switched public networks in an effort to make their passage conform as closely as possible to regulatory categories and jurisdictional boundaries.<sup>51</sup> Daunting as that task is, it pales beside trying to do the same in a packet-switched world where end-to-end circuits are supplanted by packets traveling divergent routes from point of origin to be reassembled at point of destination. In its finer moments, the FCC realizes this.<sup>52</sup> Its latest effort, proposing yet more bit-chasing from one piece of equipment to another in the ILEC networks, will not increase that tally.

Alas for data democracy, the FCC has had few finer moments in its take on advanced services policy. Indeed, the FCC cannot even reconcile its data and voice policies: to not regulate IP voice telephony runs counter to its regulation of non-IP voice and to regulate IP voice contradicts its IP data posture. Under “look like a duck, walk like one,” it would regulate IP voice; under “cheap IP,” it would not do so.

What makes the agency’s intent to micro-manage market transition especially inappropriate is that network and market evolution is more fluid than ever. Five years ago, the Internet was still the preserve of a few hundred thousand nerds, and not even on the radar screen of software titan Microsoft. It is a given today that the telecom future is less predictable than ever before. To micro-manage market evolution in such a period smacks of unbounded regulatory hubris.

The inability to foresee the impact of communications technologies has been a constant for more than a century. The telephone was envisioned as a business device, not a way for teenagers to consume uncounted hours of adolescent life. Radio was to save ships, not to bring music and

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news to millions. Television was to be an educational tool, not a medium of lowest-common-denominator mass entertainment. Computers were for nerds, not for office work or home hobbies, and cellular was for time-tormented executives, not equally busy soccer moms.

As for the Internet, who knows? Not the Net's originators.<sup>53</sup> Not industry suppliers. Not the science community. Not consumers. And surely not regulators at the FCC or anywhere else. In the presence of an astonishing internetworking phenomenon that sprouts like global kudzu, we are all bemused spectators and scrambling participants. We do not know what strategies will ultimately succeed, or if they do, how long before they too fall by the wayside. But we can predict with high confidence that regulatory micro-management of such a fluid and complex phenomenon cannot succeed.

The FCC, like Senator Wyden, believes that competition is too important to be left to the marketplace. It is one thing, however, to seek to achieve valued social goals by regulation when market competition has failed to produce the outcome. It is another to preempt operation of market forces by hobbling one group of providers and aiding others. The Telecom Act contemplated the possibility of the former, upon evidence that social goals are not being met through market forces alone (and many observers doubt that the market will serve the most remote users for some time to come). But the Act expressly prohibits the latter and prescribes, with detail, how to supplement market forces in the event they do not fully satisfy social goals.

By providing necessary support that is explicitly identified and equitably apportioned, the pursuit of social objectives does not undermine the pro-competitive vision enshrined in the Act. FCC policy should—indeed to be lawful it must—reflect this carefully crafted Congressional design. nto

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<sup>1</sup> J. C. Wohlstetter, "Packet Policies: Petabits, Photons, Phonemes and the Feds," *New Telecom Quarterly*, Vol. 6, No. 1 (February 1998):3-13.

<sup>2</sup> Telecommunications Act of 1996, *Conference Report*, Report No. 104-458 (January 31, 1996).

<sup>3</sup> Act, sec. 706(b). "Inquiry" means an FCC Notice of Inquiry (NOI) that raises issues and invites comment, rather than propose formal rules as is done with a Notice of Proposed Rulemaking (NPRM).

<sup>4</sup> *Id.*

<sup>5</sup> *Id.*

<sup>6</sup> *Telecom Act*, sec. 706(c).

<sup>7</sup> *Telecom Act*, sec. 254(c). The conferees explain that 254(c) instructs the FCC "to take into account advances in telecommunications and information technology," and also apply the four criteria; the agency may promulgate a different definition of universal service for schools, libraries, and health care facilities. *Conference Report*, p. 131.

<sup>8</sup> *Telecom Act*, sec. 706(a). Noteworthy here is an action taken by the conferees, deleting the following sentence from the Senate version: "The Commission may preempt State commissions if they fail to act to ensure reasonable and timely access." In place of FCC preemption coupled with a phrasing that presupposes state PUCs would drag their feet as to innovation, the final section 706(a) passed by Congress substitutes joint FCC-state PUC supervision of section 706 requirements ("The Commission and each State commission with regulatory jurisdiction over telecommunication services shall..."). In other words, the FCC and state PUCs are co-equal partners, jointly tasked with section 706 responsibilities. *Conference Report*, p. 210.

<sup>9</sup> *In the Matters of Deployment of Wireline Services Offering Advanced Telecommunications Capability*, CC Docket Nos. 98-147, 98-11, 98-26, 98-32, 98-78, 98-91, CCB/CPD No. 98-15 RM9244 (rel. August 7, 1998).

<sup>10</sup> *In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Service to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, CC Docket No. 98-146 (rel. August 7, 1998).

<sup>11</sup> *Order*, paras. 32-82.

<sup>12</sup> *NPRM*, paras. 83-196.

<sup>13</sup> *Order*, paras. 36-37.

<sup>14</sup> *Id.*, paras. 42 and 187-189.

<sup>15</sup> *Id.*, paras. 53 and 152.

<sup>16</sup> *Id.*, paras. 60-64.

<sup>17</sup> *Id.*, para. 70. Several RBOCs have filed petitions for reconsideration with the Commission.

<sup>18</sup> *NPRM*, para. 86.

<sup>19</sup> *Id.*, para. 97.

<sup>20</sup> *Id.*, paras. 173-174.

<sup>21</sup> *Id.*, paras. 129-130.

<sup>22</sup> *NOI*, para. 1.

<sup>23</sup> *Id.*, para. 8.

<sup>24</sup> *Id.*, para. 67.

<sup>25</sup> *Id.*, para. 71.

<sup>26</sup> *Id.*, para. 73.

<sup>27</sup> *Id.*, para. 77.

<sup>28</sup> *Id.*, para. 85. The NOI seeks comment on customers' willingness to pay for those new services for which the agency already presumes "large demand." *Id.*, para. 63.

<sup>29</sup> B. Esbin, *Internet Over Cable: Defining the Future in Terms of the Past*, OPP Working Paper #30, paras. 90-99 (August 1998).

<sup>30</sup> Some school officials are having second thoughts about applying for funding in 1999 after experiencing the joys of dealing with the federal bureaucracy (in this case, the newly-chartered Schools and Libraries Corporation). One supervisor reported having to make 83 changes to e-rate applications in 75 days; another noted that it took 120 hours of paperwork to complete an application for funding. "Slow E-Rate Disbursements Criticized At House Hearing," *Communications Daily* (September 17, 1998):2.

<sup>31</sup> abcnews.com reported two million hits on Friday, September 11. This is nearly triple its daily hit rate of 700,000. *Communications Daily* (September 15, 1998):9.

<sup>32</sup> "Data Traffic Surge Follows Posting of Clinton Report on Internet," *Communications Daily* (September 14, 1998):2-3. Matters were not helped when, in a telecommunications equivalent of Murphy's Law, an Amtrak derailment cut a WorldCom fiber cable in Atlanta. The Library of Congress, which posted the report at its *Thomas* Website, used the same model IBM server that handled two billion hits in two weeks (roughly 143 million hits per day—nearly six million per hour) at the Winter Olympics in Nagano, Japan.

<sup>33</sup> E. Weise, "America's on Line: 70.5 Million Adults," *USA Today* (August 25, 1998):D1. That represents 35% of adult Americans. The *Starr Report* is (alas) available also to kids.

<sup>34</sup> The author priced a 500-page package of letter-size copy paper at the local Office Depot. Prices ranged from \$3.49 to \$9.99, depending upon paper stock quality. In round numbers, the price range for the 445-page document was \$3 to \$9. The author purchased a copy of the *Starr Report*, plus the White House's "pre- rebuttal" for \$5.99 on Monday, September 14, three days post-online release.

<sup>35</sup> E. S. Rubenstein, "Keeping Up With the Gateses," *American Outlook* (Hudson Institute, Summer 1998), p. 34. The 10-minute conversation cost \$69 in 1915, compared with a 23 cents per hour average wage.

<sup>36</sup> The three phases were: (1) a pro-competitive phase during which, per a 1913 agreement between AT&T and the Justice Department, the Bell System was prohibited from acquiring independent properties; (2) a brief period during and after World War I when the federal government, through the Postal Service, assumed responsibility for the nation's telephone system; and (3) an embrace of impending monopoly with passage of the Willis-Graham Act in 1921, thus allowing the Bell System to resume purchasing independent companies and unifying major urban telephone systems. For a solid discussion of the World War I-inspired government takeover, albeit focused mostly on wireless, see S. Douglas, *Inventing American Broadcasting: 1899-1922* (Baltimore, MD: Johns Hopkins University Press, 1987), pp. 268-285.

<sup>37</sup> M. Mills, "Phone Firms Race to Speed Web Access," *Washington Post* (January 21, 1998):C11. The estimates come from International Data Corporation.

<sup>38</sup> "Mass Media," *Communications Daily* (January 30, 1998):9. Source: National Cable Television Association.

<sup>39</sup> A. Sachdev, "Credit Cards Go Wireless," *St. Petersburg Times* (January 26, 1998):8. (The article does not identify the source of the estimate.)



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<sup>40</sup> *In the Matter of GTE Telephone Operating Companies, GTOC FCC Tariff No. 1, GTOC Transmittal No. 1148*, Memorandum Opinion & Order, CC Docket No, 98-79 (adopted October 30, 1998).

<sup>41</sup> *Id.*, p. 21.

<sup>42</sup> E. R. Olbeter, *Is America Investing in Communications Networks?*, Economic Strategy Institute, Slide 6 (presented at *America's Broadband Future*, ANA Westin Hotel, March 3, 1998). The full PowerPoint slide presentation is available at <http://www.econstrat.org/pubtcom.htm>.

<sup>43</sup> *Id.*, Slide 8.

<sup>44</sup> *Id.*, Slides 10-11.

<sup>45</sup> *Why Investment Matters*, Economic Strategy Conference (Washington, DC, March 3, 1998). Her apparent source, *Investor's Business Daily*, conflated local and long distance plant, and domestic and overseas also.

<sup>46</sup> Telephone conversation by author with representative of Corning.

<sup>47</sup> J. M. Kraushaar, *Fiber Deployment Update: End of Year 1997* (Industry Analysis Division, Common Carrier Bureau, September 4, 1998). Fiber route miles = route miles × fiber cables × fibers per cable.

<sup>48</sup> "Number of CLECs Exceeds Incumbent Telcos," *Communications Daily* (September 22, 1998):1. Strategis Group sees CLEC's taking 12% of business telecom revenues in 1999, up from 8.5% in 1998 and 5% in 1997.

<sup>49</sup> "Telephony," *Communications Daily* (March 3, 1998):8. Cable installed 3.44 million kilometers, versus 3.38 million kilometers for the RBOCs. Source: Report by Telecommunications Industry Association and Multimedia Telecommunications Association. The total telecom industry figure for 1997 was 6.13 million kilometers. (This may partly reflect the limited earlier deployment by cable of fiber, and thus favorable network economics.)

<sup>50</sup> Interview with RCN Corporation CEO David McCourt, *Telecom Business Conference on Internet Telephony*, New York City, August 31, 1998 (author's contemporaneous notes).

<sup>51</sup> The author recalls an FCC staffer lamenting at an open meeting during *Computer III* that the laws of physics were inconvenient to the achievement of the agency's regulatory objectives. When in doubt, blame Einstein.

<sup>52</sup> *In the Matter of Federal-State Joint Board on Universal Service*, Report to Congress, CC Docket No. 96-45, paras. 87-93 (rel. April 10, 1998). Therein, the FCC notes that blending IP and PSTN telephony traffic complicates regulation, so that identifying voice packets for purposes of imposing access charges on IP voice may prove impossible.

<sup>53</sup> The Net was military in origin and then later dedicated to applications for the scientific research community; commercial considerations were surely the last thing on the mind of the Internet's creators.