Spectrum and Network Policy for Next Generation Telecommunications

A Report of the Eighteenth Annual Aspen Institute Conference on Telecommunications Policy

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Foreword

The 2003 Aspen Institute Telecommunications Policy Conference held two meetings. The April conclave focused on spectrum policy, and reform. The gathering in August considered how public policy might promote Next Generation Networks (NGN) with a particular focus on the incentives of carriers and content providers to expand their offering of bandwidth applications and content. This report provides a detailed exploration of the spectrum deliberations and the NGN discussions.

The goal of the April meeting was to find ways to encourage more efficient uses of the spectrum while preserving the commitment to reliability of service and public safety values. Conference participants suggested new management approaches, some of which were based on the concept of spectrum as an abundant resource. Such suggestions include facilitating dynamic frequency sharing through pool licensing (along the lines of ASCAP/BMI) and promoting the development of secondary markets where appropriate.

The August meeting debated the competitive structure of the telecommunications industry and its implications for building Next Generation Networks (NGN). The group identified three recommendation areas to encourage optimal development of the NGN: (1) operate the NGN on a price deregulated basis and begin addressing access regulation issues, (2) secure intellectual property rights of content suppliers, and (3) adjust the system of subsidized pricing to bring about competitively neutral pricing.

While each meeting debated various approaches to optimal public policy, both groups were in agreement on a broader point. Although there is no perfect way to solve the inherent tensions between the dynamic telecommunications field and the relatively static process of public policymaking, the public imperative is to ensure that policy is not an impediment to new uses and demands.

The statements and opinions in this text are those of our rapporteur, Robert M. Entman, and should not be attributed to any other participant, sponsor, or employer unless specifically stated in the text.

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We would also like to thank Robert Entman, our rapporteur, for his excellent representation of the deliberations as well as his assistance in developing the readings. We are particularly thankful to our conference participants (listed in an Appendix to this document) for their openness, constructive attitude, and willingness to grapple with the issues facing the telecommunications industry. Last, but certainly not least, we thank Sunny Sumter-Sana, project manager, Wadee Deeprawat, program coordinator, and Tricia Kelly, assistant director, for working behind-the-scenes to bring this conference and report to fruition.

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Spectrum Policy for Next Generation Telecommunications

Spectrum Policy for Next Generation Telecommunications

by Robert M. Entman

Introduction

The Aspen Institute's Conference on Telecommunications Policy held its spring 2003 meeting on April 21–22 to consider spectrum management and reform. The meeting came at a time of great ferment in the field, as government policymakers adapt approaches rooted in the early days of radio (a century ago) to rapidly advancing technology and changing market demand. Participants focused on constructing a useful analysis of the current needs and prospects for spectrum reform and developing innovative proposals for actions that might achieve the goals of spectrum efficiency and the rest while being politically realistic. Participants were briefed about the latest thinking and actions at the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA) on spectrum reform. Beyond discussing these issues, conference attendees sought to offer some fresh ideas of their own. Most notably the deliberations yielded:

- Ideas for freeing up new spectrum for alternatives to traditional "command and control" regulatory allocation and specific criteria for policymakers to use in deciding on which regulatory regime to apply to a given slice of freed-up spectrum.
- Concrete suggestions for encouraging government, military, and public safety agencies, as well as broadcasters, which currently hold wide swaths of spectrum, to move toward more efficient and flexible uses.

Technology is both blessing and curse in this context. It is rapidly altering the possibilities for frequency exploitation and thereby constantly throwing new challenges at policymakers and incumbent providers—challenges to which incumbent frequency holders sometimes respond with political and legal maneuvering to block or delay

new services and market participants. This resistance may be the biggest barrier to spectrum reform, and any discussion of new policy models must come to grips with ways of overcoming it. On the other hand, technology also provides enhanced opportunities to use spectrum more efficiently, making room for new providers without crowding the old. For example, because as much as 99 percent of even highly saturated bands may be vacant at any moment, "smart radios" can dynamically shift transmissions to take advantage of the fleeting openings (or "white space"). Such technologies allow for enormous increases in occupancy of a band, without interference. The goal of public policy should be to encourage these more efficient uses of the spectrum while also weighing other values, including reliability of service and promotion of new investment.

Setting the Scene

By way of framing the discussion, Nancy Victory, Assistant Secretary of Commerce and Administrator of the NTIA, described current issues in spectrum management. The old problem posed by managing a finite amount of spectrum is heightened in some ways by technology that is changing faster than ever. The relatively static processes of public policymaking tend to clash with a very dynamic field, making it even more imperative than before that government react quickly to ensure that policy is not an impediment to new uses and demands. Yet while government must be nimble, incumbent providers need a degree of certainty about government policy so they can invest and plan.

Furthermore, although spectrum is finite, it may not be scarce in the way the traditional regulatory paradigm assumes. Many conference participants suggested that we need a new way to think about spectrum—a conceptualization that sees the electromagnetic spectrum less as a "thing" that must be divided up among different licensees to protect everyone from interference and more as a resource that can be widely and flexibly exploited as long as there are sufficiently clear rules to guide users. As several attendees said, we don't speak about the "scarcity" of the color green or blue, which after all are just other frequencies on the spectrum that happen to be visible—nor do we grant exclusive licenses to colors. Some observers might criticize this analogy as imperfect, however. For instance, many communities have residential covenants that do prohibit the use of certain colors on houses, on grounds that the use of those color wavelengths "interferes" with the aesthetic rights and sensibilities of others and

diminishes property values for all. This reasoning is quite similar to that underlying regulation of electromagnetic spectrum.

In any case, policymakers must deal with a structure and process of regulation rooted in a paradigm of scarcity. They have to make decisions in a context that includes legal precedents, legislation, incumbent providers with vested interests and political clout, and other forces that make it hard to shift gears. In general, participants seemed to agree that although there is no perfect way to solve the inherent tensions and paradoxes, government can and should work toward more optimal spectrum policy. This effort involves making regulation more flexible to allow providers greater leeway in using spectrum assigned to them.

In particular, government should aim to reduce micromanagement of new services and technologies, facilitate frequency sharing, and rely on market mechanisms where appropriate. Promoting the development of secondary markets, including approaches such as leasing of spectrum rights to secondary users by the primary licensees, would be part of this initiative. Because government agencies control a large portion of the spectrum, they should participate in this move as well. Public safety, defense, and other government agencies, as well as broadcasters, might be shifted to new frequency bands and given incentives for more efficient spectrum utilization—such as paying usage fees while being allowed to lease or sell rights to secondary users.

New Approaches to Freeing Up and Managing Spectrum

For the past century, the government has used three basic models for allocating and managing spectrum access:

- Traditional "command and control," wherein government allocates frequencies according to a master chart of uses.
- Private property rights, such as auctioning segments of the spectrum, with or without flexibility to use the assigned band in ways other than originally licensed.
- Commons requiring neither a license nor payment (the current approach for WiFi and other 802.11 standards).

In each case there can be various approaches to how a particular model is run, but the basic choices presented are government issue, private property, or commons. The Aspen conferences on spectrum reform in 2002 and 2003 yielded, among other things, another, hybrid

model: Dynamic Frequency Access Licensing (DFAL). The DFAL model is made possible by new technologies that enable use of the underutilized dimension of spectrum—that is, the "white spaces" on frequencies that might be assigned but are unoccupied at specific moments in time or in particular geographic spaces. Participants at the conference discussed ways to free up spectrum, allowing more frequencies to be subject to one of the more flexible regulatory models.

Beyond the established precedent of spectrum auctions—employed mainly in allocating spectrum for cell phone and PCS uses—other versions of the property rights aired at the conference generally encouraged development of *secondary markets*. These secondary markets allow original licensees either to sell or lease part or all of their spectrum rights to new providers who might offer similar or different services on a noninterfering basis.

One way of developing secondary markets—suggested (in his individual capacity) by Peter Tenhula, who served as director of the FCC's Spectrum Policy Task Force, and endorsed by others—would be to allow spectrum brokers, who obtain rights from licensees to sell or lease large blocs of frequencies, operating akin to real estate brokers. As with real estate agents, spectrum brokers could be owners as well. Continuing with the analogy, a few participants supported an entity dubbed "Specky Mae." This approach would have a federally chartered, privately owned agency function analogously to how Fannie Mae operates in mortgage markets, obtaining and selling spectrum rights (as opposed to home mortgages) in ways that reduce costs and risks to investors. The fact that investment in spectrum is risky has been brought home to corporations that overbid for cell phone and 3G spectrum rights in Europe and North America. Many of those firms have suffered great damage to their balance sheets and stock prices. The investment community, in turn, appears unenthusiastic about providing capital for new investment in spectrum uses, which by definition means competition and innovation are suffering. A "Specky Mae" entity might be an effective means of spreading risk.

The commons model allows shared, unlicensed uses of spectrum. Cordless phones at 900 MHz and 2.4 GHz are examples, as are the rapidly growing local wireless computer networks operating under the 802.11b WiFi standard. In these cases, the user buys equipment that meets the standard. Although interference occasionally poses problems

(e.g., cordless phone conversations can be heard on a neighbor's cordless), the equipment on unlicensed bands operates at low power with limited range, so most users enjoy high functionality with no need whatever for government intervention. It is possible for unlicensed commons to operate as an underlay on frequencies that already have licensed users of higher-power equipment.

The extraordinarily fast diffusion and success of WiFi networks has made the commons approach increasingly attractive. However, the very word "commons" does bring to mind the possibility of a "tragedy of the commons," wherein a common resource becomes so popular that users overrun capacity. Dale Hatfield, adjunct professor of telecommunications at the University of Colorado, suggested that some minimal regulation might be required in spectrum commons to control interference. As an example, he cited Canada, which requires registration of a WiFi system if it operates outdoors, to protect the original user from interference by a new WiFi system.

Another approach to commons management mentioned at the conference would be to employ a "public interest band manager" that would act as a kind of conservancy trust to ensure appropriate exploitation of the commons. This private entity would be more flexible and responsive than a government manager, ensuring maximum openness to innovation while minimizing interference or other problems. At the other end of the continuum of problems would be allocating spectrum to commons that for some reason never gets much use. As commons models are applied more frequently, to guard against such developments it might make sense to implement a "use or lose" requirement that would maintain the commons designation only for spectrum that actually does get sufficiently used, while reserving the option of reverting the spectrum to other uses where it fails to attract sufficient use.

The DFAL scheme—as explained by Eli Noam and Charles Firestone—combines aspects of both commons and private property rights with flexibility. Under the DFAL model, licensing is not an exclusive assignment of a frequency to a particular entity but a privately granted secondary access right, as in the ASCAP/BMI model that exists for the use of copyrighted music by radio stations and others. This approach would establish a rights licensing agency, as a private corporation of license holders, which would place into a common pool the available frequency space and time from a wide variety of spectrum

rights holders. Any user could employ any of those frequencies for brief chunks when they are unoccupied on a secondary basis for a usage fee paid to the new Spectrum Rights Corporation. The corporation would distribute the fees back to the owners on an as-used basis. The usage fee would be periodically adjusted to reflect demand/supply conditions and would vary by frequency bands. A similar system would be set up for government-held spectrum for private access during unused periods.

All of this activity would be voluntary for those who paid for their frequencies at auction or through lease. They would have an incentive to place their spare or "white" frequency time in the pool because they would be gaining additional revenue with no loss of present or future use of their frequencies. For new users, this system would enable unlicensed entry. Such entry would not be cost-free if demand for the frequency is strong.

As for those who received their frequency space free of charge, it makes sense to require the use of their unused, white space at only a small compensation to them—a kind of compulsory license or easement to their unused spectrum. There would still be the same user fee charged to the secondary unlicensed users. Half of the proceeds might go to the license holders. The rest of the fees could go for the improvement in the effective use of spectrum and for support of content and applications in the public interest. The private license holders would also receive full property rights for the spectrum they are actually using, with the rest going into the open access pool. Details on this point would, of course, have to be worked out.

Deciding which Model to Apply

These three general approaches, as well as traditional command and control, come in a variety of flavors and offer different advantages and risks that must be assessed as government decides what to do in particular cases. A second major goal of this year's spectrum meeting was to suggest criteria government should consider in determining which model to apply in particular cases. Judging from the conference dialogue, almost all observers believe that, in New York University law professor Yochai Benkler's words, "We should transition from a command and control system to one that includes spaces in which both commons and spectrum-pricing based systems can develop."

The largest initial problem in applying new forms of management to spectrum—the proverbial "elephant in the room" as policymakers consider what to do—is resistance from incumbent licensees. They often feel threatened by proposals to require them to shift or share frequencies. Proposals for reform therefore tend to run into stiff political and legal resistance, and this fact means discussions of spectrum policy must devise realistic means of reassuring or compensating incumbents. Decision criteria must take pragmatic note of the fact that incumbent licensees have political and economic clout that they can use to delay or prevent entry of new spectrum occupants.

Professor Benkler, in a written comment elaborating on the position he took at the conference, suggests the following fairly simple rule of thumb: Focus on the presence or absence of incumbents who need to be cleared. This guideline produces a two-part standard that recognizes the reality of incumbent influence:

- *Where there is an established incumbent, introduce a market in spectrum.* This market would immediately produce an actor on whom the market's incentive effects could operate, and both clearance and efficient utilization could commence immediately upon the regulatory change, without need for a separate auction or reallocation. In addition, there would be no need for clearance payments independent of, and prior to, the operation of the spectrum market itself.
- *Conversely, where there are no specific incumbents who need to be cleared, and thus no entity that could immediately respond to market incentives, permit operation of any device in a commons-type model.*

Benkler lists three particularly salient conditions under which incumbents pose no barriers and where commons therefore would be indicated:

1. *Allocated but unassigned spectrum.* Where the spectrum is allocated—meaning no one may use it without an assignment from the Commission—but is not assigned, there is no specific incumbent to be cleared. The most obvious and important example of this situation is the broadcast spectrum—in particular the television bands, where every municipality has swaths of spectrum in the category of allocated (to television services) but unassigned (to any specific station).

2. *Uses that cause no interference to, or displacement of, existing incumbent services.* In this case, there is no need to clear or adjust the incumbent service and hence no need for payment to occur in the transition.
3. *Frequencies already cleared without payment.* This situation happens, for instance, when a government user has been required by law or regulation to change its use or where the Commission has already cleared a band for some intended use.

According to these criteria, where for some reason there are no incumbents or any incumbents would face negligible impacts from new uses, unlicensed commons is the default regulatory approach because it allows the most flexibility and, presumably, the greatest opportunity for unbridled innovation and competition. In practice, most spectrum is already spoken for, so commons approaches probably would tend to operate as underlays to existing licensees, per condition 2 above. As long as the new unlicensed uses did not interfere—operated under a set "interference temperature" or threshold—this arrangement in theory should pose no problem to the licensed users.

As some conference participants pointed out, however, in practice licensed users might cry "interference" to block any potential competitor exploiting the incumbent's frequencies. Indeed, even a provider of an entirely noncompetitive service sharing a band with an incumbent shows the latter that it is missing a revenue opportunity. Because an incumbent calculates that the potential for future loss to competition is greater than the potential for future gain, it might prefer to offer any new service itself rather than opening the way for the competitor ultimately to expand its offerings and perhaps grab market share. Hence the need to consider strategies that give incumbents compensation, in the form of flexibility to lease or sell frequency rights, and approaches along the lines of the DFAL model. The advantage of the DFAL approach is that it does not require cooperation by incumbents who might be reluctant to deal with potential competitors. Instead, incumbents receive payments in return for a compulsory license or "easement."

Two incumbent users possess the political clout to limit policymakers' options for applying these or any criteria for reallocating spectrum or applying new spectrum management techniques: government users, and broadcasters. These two "elephants in the room" came under particular scrutiny at the conference. Those two categories of licensee occupy the

majority of spectrum in the most desirable range (30 MHz–3 GHz), for perfectly understandable but no longer applicable historical reasons.

The Government "Elephant"

Federal, State and local governments, the nation's largest users of spectrum, are not subject to the usual competitive market forces to encourage efficiency of use. Many governmental systems and uses are classified, and therefore unknown and susceptible to speculation and charges of inefficient usage. Furthermore, in these cases, the goals of national security and public safety often outweigh those of efficiency. In view of these conflicting values, it is important to take a hard look at how governmental uses of the spectrum can be managed to increase efficiency and effectiveness.

Most discussions of reform in managing government spectrum revolve around charging the government user fees and providing them with flexibility to sell or lease unused spectrum. In other words, government agencies get treated much like commercial users under a flexible rights/property rights regime. In theory, this approach offers the carrot of new sources of revenue to balance the stick of having to pay new fees. The more efficient the agency is in exploiting its spectrum, the more frequencies it has to put on the market, and the more it can fatten its wallet.

Government agencies tend to object to any changes that might impose fees and open "their" frequencies to other uses, on two grounds. First, they fear that national defense (at the federal level) and police, fire, and rescue services (state and local) would become vulnerable to interference. When life and death is at stake, any decrement in reliability becomes unacceptable—and politically speaking, such objections are potent tools for resisting policy change. Second, even if protection on that score can be guaranteed—and it probably can—government agencies fear budgetary impacts, especially if they must pay new fees that might require them to cut back other areas of spending They have strong incentives to mount political opposition to fees, and, as with broadcasters, it becomes important to devise mechanisms to compensate and reassure government users. The problem with that objective is that the agencies universally fear that legislators would take control of any new revenues from frequency transactions, leaving the agencies the stick but no carrot—and a net decrease in their budgets. So the real problem is figuring out a way to insulate an agency's spectrum earnings from legislative control.

Conference participants came up with some innovative solutions to this conundrum. The first involves putting monies earned by leasing secondary rights directly into trust funds—endowments that would yield regular income for agencies to spend on various communication functions. In other words, the money would not go into the general revenue stream of the state or federal budgetary process but into a legally distinct entity that would be mandated to issue funds only for agencies' communication purposes. This arrangement should allow spectrum revenues to avoid the common fate of state lotteries, which many observers point to as the likely fate of government agencies that market spectrum. Although lotteries are almost always promoted as mechanisms for raising money to be spent on education, in virtually every state legislators have diverted lottery revenues for general budget balancing. The question is whether legislators would do something for spectrum revenues they have not done for "education" lotteries—namely, tie their own hands in advance by reserving monies to the original stated purpose.

A possible variant on the foregoing proposal that might be more sellable to legislatures would be a stipulation, at least for defense and public safety agencies, that all earnings from spectrum transactions go to an endowment to fund salary increases for military and public safety employees. Especially in the wake of the September 11, 2001, terrorist attacks, most Americans strongly support the military, police, fire fighting, and emergency rescue functions of government and recognize that government employees in those areas often are overworked and underpaid in light of the risks they take. This popularity might overcome legislators' reluctance to forego a source of revenue for the general treasury. Beyond the political allure of raising salaries for these essential public servants, tying spectrum revenues to salaries would give agency employees strong personal incentives to maximize efficiencies in frequency use.

Another proposal would be to remove government agencies from managing spectrum altogether. The General Services Administration (GSA) could take bids from private contractors to manage spectrum that is currently licensed to government users. The contractors' first obligation would be to provide upgraded service to the government agencies. Once that obligation is fulfilled, they would be permitted to keep any extra spectrum made available by enhanced efficiency to use, lease, or sell. There is a political advantage to this proposal in that

government contractors tend to be attractive to legislators as a focus of pork barrel spending and job creation. Thus, this proposal may enjoy enhanced political feasibility compared with other proposals to loosen agencies' grip over frequency space. However, agencies are sure to raise objections to turning over vital defense and public safety functions to private entities. This objection suggests that there would need to be strict enforcement of reliability and quality-of-service requirements.

A third suggestion involved consolidation of government users into specific frequency bands. Currently, different government agencies at different levels occupy different bands. Consolidating federal, state, and local users into common bands has several benefits. One is that new homeland security programs demand far closer coordination among different agencies within each level of government and across the levels. The September 11 attacks revealed stark deficits in the ability of first-responding agencies to communicate with each other, as well as the amount of information sharing and cooperation among different agencies with intelligence gathering and police functions. Frequency consolidation should make interoperability and cooperation more feasible. In addition, more government money is available for homeland security programs now; these funds could be used to help agencies bear the expenses of buying new, more efficient equipment and relocating to new frequencies. Another advantage is that consolidated government users would be able to act as "super buyers" who would command larger discounts on equipment.

Finally, Ed Richards of the Office of Communications in the United Kingdom described several new policies being tried there that might be applicable to the United States. As with broadcasters, however, British policymakers enjoy somewhat more flexibility to innovate without being stymied by status quo interests. That point notwithstanding, Richards commended three ideas to the attention of the conference. First, the U.K. is allowing government agencies the freedom to lease out spectrum they do not use in particular geographic areas or at particular times, with the right to keep all earnings with no strings attached.

Second, the U.K. is implementing administratively set incentive pricing for government agencies' spectrum use. The price is calculated by a formula administered by government, and even the Defense Department, after a period of resistance, has accepted it. The carrot here is that if the agencies can make savings after a few years, they will get to

keep the money. This bargain will be revisited and evaluated every few years, analogously to the way telephone price caps have been regularly adjusted by inflation and productivity factors.

The third option—and the one that seems most feasible in the American context—would be to institute internal mechanisms for buyouts of legacy investments by government agencies. For instance, police forces typically use old technology. In the U.K. they are permitted to make an investment case to the Treasury: "If you give us more money for more efficient technology, we will give back X amount of spectrum." This approach would appear to be a win-win option, allowing government agencies to upgrade their equipment with no decrement in service quality, yet also freeing up spectrum for new nongovernmental uses.

The Broadcasting "Elephant"

Participants frankly discussed the resistance of broadcast licensees, who can oppose any policy change that requires them to give up or share frequencies on grounds that such changes threaten "free" service to needy constituents—despite the fact that at least in the case of television, almost 88 percent of American households now receive television via cable or satellite rather than over the air. Broadcasters' objections have particular impact because politicians do not want to antagonize them.

One suggestion raised at the conference was to provide broadcasters full flexibility in the use of their frequency assignment, in return for which they would pay an annual fee for the term of the license (an alternative would set a fee for the license period up front). Because television broadcasters currently occupy a full 6 MHz of prime spectrum, encouraging them to share with others, offer new services on all or part of their frequency space, or perhaps even move entirely off-air could shift spectrum to higher, more valuable uses.

Because digital television signals occupy less frequency than analog signals for a given level of definition, participants proposed that television stations be required either to turn off their analog signals or to pay an escalating fee for continuing use of spectrum for analog broadcasting. That suggestion met with some opposition—not substantively but on grounds of political infeasibility.

In the United Kingdom, according to Ed Richards of the oversight agency Ofcom, broadcasters will be charged fees set according to several

criteria, including whether they can realistically change their behavior toward spectrum. Where possible, the goal would be to encourage broadcasters to adopt digital technology and stimulate their viewers to do the same (i.e., obtain digital receivers). Digital broadcasting technology, which is far more spectrum-efficient, opens great amounts of spectrum to other potential users. The problem with applying any U.K. model to the United States, however, is that policymakers themselves enjoy far greater flexibility in Britain, where neither partisan politics nor legal maneuvering provide incumbents nearly as much leverage for resisting change as in the United States. It is clear that freeing up spectrum currently occupied by American television stations will require creative and bold leadership from public officials.

Regulating Equipment, not Users

Another policy option that received considerable attention at the conference but does not fit under any of the aforementioned categories involves changing policy from its historically based exclusive focus on transmitters to a more inclusive view that also encompasses receivers. In earlier years there were technical limits on the sensitivity and selectivity of receivers, and transmitters tended to be relatively "sloppy," spilling over into adjacent frequencies. The focus therefore was on minimizing interference by providing plenty of buffering separation on either side of each assigned frequency and controlling the power of transmission, the geographic reach of its signal, and in some cases (especially broadcasting) the time of day. Now receivers—particularly those employing digital technology—can be far more sensitive and selective. This development enables transmitters to operate closer to each other and at lower power. Technological change therefore leads some analysts to urge that regulatory attention be turned to receivers and, in particular, to setting minimum standards for selectivity and sensitivity. This standard setting could be done by government or by encouraging private parties to develop such standards, given that many interference problems arise from insufficiently sensitive and selective receivers rather than any inherent physical problems with "scarce" spectrum. Improving receivers could do much to enhance frequency sharing.

Conclusion

Judging by the conference, there is broad consensus that government needs to implement new approaches to spectrum management that take account of changing demand and improving technology. Most participants also agreed on several points: introducing more market-oriented approaches to assigning spectrum rights, allowing users more flexibility, increasing the amount of unlicensed spectrum, and freeing up more spectrum for all of this by spurring broadcasters and government agencies to make more efficient use of their frequencies. They also generally agreed on letting "a thousand flowers bloom"—that is, allowing a variety of experiments in different uses of spectrum and ways of managing it. And they concurred that the optimal approach will probably involve a mixture of command and control, commons, and flexible rights models, rather than one-size-fits-all regulation.

Given the substantial agreement on policy direction, the greatest obstacles to reform are likely to arise from incumbents deploying political pressure to resist change in the status quo. In recognition of this reality, many of the policy ideas floated at the conference creatively combine mechanisms that should enhance effectiveness in spectrum management and ease the political pathway toward reform. Participants hoped that political leaders will find the will to seize on the considerable agreement that exists among policy specialists across the political spectrum to bring about reform in managing across the electromagnetic spectrum.

Network Policy for Next Generation Telecommunications

Network Policy for Next Generation Telecommunications

by Robert M. Entman

Introduction

The 18th Annual Aspen Institute Conference on Telecommunications Policy convened August 10–13, 2003, to consider how public policy might promote the Next Generation Network (NGN). That term roughly stands for telecommunications networks that offer faster transmission and more bandwidth providing a richer variety of content and applications and more mobility with less expense (per bit) to consumers. The meeting focused on the incentives of carriers and content providers to continue investing in and improving their products to create the NGN, as well as the closely related matter of users' willingness to pay for higher levels of service and greater choices of content.

This report is an interpretive discussion of the debates and working group reports produced at the conference. It does not summarize everything said there; instead, it attempts to extract some of the most provocative ideas, analyses, and recommendations that the rapporteur believes may be of particular use to policymakers and others involved in the telecommunications policy process.

The working groups produced reports that were discussed in plenary session. Their most important recommendations—not necessarily endorsed by every member of each group or by the entire conference—can be summarized as follows:

- Avoid retail rate regulation for Voice over Internet Protocol (VoIP), with federal preemption of state regulation if necessary. The ultimate goal would be operating the NGN largely on a price-deregulated basis. At the same time, begin addressing nettlesome issues of access regulation. These issues will remain controversial, as suggested by the inability of conference participants to agree on recommended access policies—although all agreed that it is vital that the NGN be open to diverse, competitive content.

- Develop, with some urgency, a way to secure the intellectual property rights of content suppliers in this age of inexpensive digital copying, without placing undue restrictions on the convenience and satisfaction of content consumers. This effort is vital to ensuring continued incentives for investment both in content production and in the NGN, which will distribute the content.

- Fix the system of internally subsidized prices once and for all, to bring about competitively neutral pricing and thus open the way to efficient development of the NGN.

The conference also featured an ongoing debate between what might be called the optimists and the skeptics. The core dispute revolved around the likely competitive structure of the industry in NGN mode: Are natural monopoly tendencies dominant? Is a duopoly the most likely scenario? Or is it realistic to envision three or even more "broadband pipes" competing to serve residential consumers?

The optimists pointed to recent and forthcoming changes in business practices and regulation that indicate a healthy recovery in the industry, with a significant amount of new investment eventually producing new services and a healthy level of competition—neither too much nor too little. In this scenario, the amount of regulation would shrink substantially. The skeptics believe that, far from being out of the woods, the industry—or at least a major chunk of it—faces a potential spiral of ruinous competition, commoditization, and underinvestment. In this view, the most likely outcome could be substantial consolidation of industry players, yielding just a modest degree of oligopolistic competition. That possibility might indicate a continued need for closer regulatory oversight.

This debate revealed the continuing uncertainties among industry experts over the basic question for the conference: How might regulation be adjusted to encourage optimal development of the NGN? In particular, are new regulations desirable now, in advance of clear knowledge of whether the NGN will develop into somewhat competitive facilities (with at least three separately owned "pipes") or whether it is more likely to feature only one or two (or perhaps what some participants termed "1.5") platforms?[1] The degree of future competitiveness participants envisioned seemed to guide their diagnoses and proposed policies for encouraging the NGN.

1. The 1.5 idea refers to a scenario of one dominant broadband provider (most likely cable) exerting considerable market power, facing a significantly weaker competing provider—perhaps incumbent local exchange carriers (ILECs) or a wireless platform.

Analyses and Recommendations for NGN Rates and Access

Avoid retail rate regulation for Voice over Internet Protocol (VoIP), with federal preemption of state regulation if necessary. The ultimate goal would be operating the NGN largely on a price-deregulated basis. At the same time, begin addressing nettlesome issues of access regulation. These issues will remain controversial, as suggested by the inability of conference participants to agree on recommended access policies—although all agreed that it is vital that the NGN be open to diverse, competitive content.

One working group, chaired by Howard Shelanski, professor of law at the University of California-Berkeley, focused its recommendations on two issues: *retail rate regulation* as telecommunications moves toward the NGN, with VoIP the likely vehicle for voice telephony, and *access* to NGN systems. The latter covers access for consumers and for competitive content providers.

Rate Regulation

The recommendations are as follows:

- The Federal Communications Commission (FCC) should declare all NGN broadband services/applications to be (relatively lightly regulated) Title I, as opposed to classifying them as Title II services subject to more traditional common carrier regulation.
- VoIP should not face retail rate regulation, even if it comes to supplant circuit-switched voice telephone service. If necessary, the Commission should preempt state rate regulation of any NGN services, including VoIP.
- If an incumbent local exchange carrier (ILEC) removes circuit-switched voice service from a customer desiring only voice and not data services, it must make a digital voice-only service available in the customer's market at wholesale. This requirement should ensure the availability of competitive service to anyone who simply wants voice telephony.
- The FCC should take a position recommending that states de-tariff bundled, circuit-switched service offerings by ILECs now, to remove regulatory burdens on ILECs that current VoIP providers and other competitors do not have to bear.

The working group looked ahead to when NGNs would provide VoIP. There was consensus among the group that states should not be able to

price regulate VoIP; after all, other (e.g., cable-based) systems would be offering competing service free of regulations. Regulation of all VoIP, even if technically possible, would probably slow competition and deployment of NGN services.

The group agreed that rate regulation of circuit-switched voice services, although perhaps not desirable, could be left in place, and, in any case, that there was little likelihood of changing that state-by-state regulatory regime in the relevant time frame. (The group nonetheless recommended that the FCC take a position favoring a reduction of ILECs' state tariffing obligations.) The working group felt, however, that state retail rate regulation should be eliminated as circuit-switched networks make the transition to broadband networks providing VoIP. Because some customers do not want any service beyond basic voice services, and the transition to NGNs should not impose undue costs on such subscribers, the group agreed that ILECs that decommission circuit switched service in favor of (unregulated) broadband and VoIP should be required to take steps to ensure that reasonably priced voice-only service remains available. It reached general agreement on a federal requirement that ILECs offer a wholesale voice service to any carrier that wants to serve consumers who want basic voice only. Alternatively, the ILEC would have to keep its old circuit switched phone service available.

The group's thinking was that the proposal for deregulating VoIP service would be a more realistic and more economically appropriate policy for the NGN world than demanding major changes to the current regime of regulating ILECs' voice service. The policy would create an incentive (or at least eliminate a deterrent) for ILECs to move forward with NGN deployment, while keeping some protections for consumers who are uninterested in broadband data services.

On these matters the larger conference had relatively little to say, although another working group (see below) did recommend more immediate changes in the regulation of circuit-switched voice service. With respect to access issues, more controversy arose; almost every participant in the conference chimed in.

Access

There are three specific issues:

- Should consumers be allowed to connect any equipment they

desire—in particular, equipment provided by an entity other than the broadband carrier—to the NGN outlet in their home?

- Should broadband providers be prohibited from blocking access to any content available on the Internet, which presumably will come to include most entertainment and information sources, not simply (as today) World Wide Web sites?
- Should broadband providers be allowed to block consumers' access to some destinations on the Internet? What about offering preferred (faster, more reliable) access to selected destinations?

The working group came up with the following recommendations:

- Subscribers to NGN services should presumptively have no restrictions on the devices they attach to the network, subject to an agreed, competitively neutral, quantified level of capacity utilization disclosed in the user's agreement with the network.
- Some devices might require higher than agreed bandwidth usage, perhaps interfering with the quality of the network for other users. If a user is employing more bandwidth/bits than normal or originally agreed, the broadband provider should be able to charge for a higher tier of service.
- With respect to ensuring end-to-end neutrality and nondiscrimination in users' access to websites or other Internet-based services, the group did not recommend any regulation at this point. Most members opposed regulation because of uncertainty over market developments, the high likelihood that the market will provide unblocked access options for consumers, and the possibility that in some cases blocking could benefit consumers. However, the group did recommend a regulation requiring NGN operators to disclose to consumers in advance any blocking of their access to sites or content that will occur.
- In plenary discussion, two other ideas were briefly advanced: relying on de facto legal agreements embodied in firms' public promises not to discriminate and having government announce a policy that would inform broadband carriers in advance of the consequences they would face if they act anticompetitively.

There was consensus in the working group that NGN operators should be free to invest in and develop proprietary applications and content.

Moreover, the group did not think that there should be any regulatory prohibition against preferential routing of traffic to such proprietary or other preferred sites. The group recognized that such preferential routing could be used for anticompetitive discrimination against rival, unaffiliated content or application providers. After debating a nondiscrimination rule to require the NGN operator to provide unaffiliated providers with routing of equivalent, preferential quality on a nondiscriminatory basis, the group concluded that there was not yet sufficient evidence of a competitive problem from such discrimination. Further, given the possible benefits for applications development and for consumers from selective, priority routing, the group held that routing should be left to unregulated commercial negotiation among networks and content/applications providers.

The working group did agree that the FCC should monitor this issue in case significant competitive problems ultimately arise. The group also suggested mandatory disclosure requirements about capacity constraints or other service limitations, as well as disclosure to consumers about the extent of any blocking or preferential access that would occur under a user's service plan.

In wider conference discussion, participants generally agreed that users presumptively should have no restrictions on their attachment of devices to the network. The only constraint should be a predisclosed capacity limit—that the consumer might be able to buy out of by upgrading to a higher tier of service—which should be quantified in terms of bits. This limit recognizes the need of NGN operators to protect the quality of service for all users.

Participants engaged in substantial debate, however, over whether the foregoing principle should be a rule or a policy statement or recommendation of the FCC. Some believed a rule would be desirable now, but there was strong dissent to this view. Speaking for the former view, Chris Murray, legislative counsel for technology, media, and information policy of the Consumers Union, argued that any deviation from end-to-end openness imposes serious costs to innovation. For instance, Microsoft has the resources to go to every cable system operator to get permission for consumers to plug their X-box into the cable set-top box. Smaller innovators, however, might not even get the capital to develop new equipment in the first place if venture capitalists know there is a risk the new guy on the block might be prevented from connecting. Therefore, participants

favoring regulation argued, operators should be required to allow any equipment hook-ups, as long as they impose no harm on the network. Such rules would maintain incentives for good behavior by broadband providers. On the other side were participants arguing that the market is likely to compel operators to allow nonharming equipment connections.

As far as whether NGN operators could block access to, or discriminate against, providers of applications and content services, the debate in plenary session was even more intense. Like the bulk of the working group, most participants seemed to feel that in some cases, blocking might be beneficial to consumers. Exclusive deals with content providers could lead, for example, to lower subscription prices for consumers who were willing to agree to that exclusivity and forego access to competing content. Nor did most attendees think it necessary to mandate that an NGN operator provide an "unblocked" option; they believe that the market would almost certainly force carriers to offer that option and that regulation at this point would be hard to design sensibly in the absence of a concrete problem with blocking.

Other participants however—especially those coming from content provider and consumer perspectives—believed that allowing such "walled gardens" could produce highly undesirable consequences. Preston Padden, executive vice president for government relations at the Walt Disney Company, commented, "We own no broadband pipe; we just want customers to get access to our content." Preferential treatment is not unacceptable *per se.* However, "If, say, Time Warner caches CNN so a customer gets a better interactive experience, ABC wants to be able to pay for the same caching opportunity for our news services." Without rights at least to purchase (at nonextortionate rates) similar treatment from Time Warner Cable, however, ABC's news programming would be placed at a disadvantage. Furthermore, although large companies such as Disney may have little trouble gaining access, Padden said he was fearful of where a failure to mandate access might lead for smaller content providers; for example, he pointed to "antisocial consequences" where pipe owners might decide to block customers' access to particular news and information channels.

Moreover, several participants noted—echoing some in the working group—that the architecture of the NGN is being established now, and they argued that allowing discrimination and blocking at the start could hurt nascent new services. That, in turn—as Jith Meganathan, a student

at Harvard Law School and guest scholar at the conference, noted—could undermine development of the NGN itself.

These points were countered by Howard Shelanski and others, who doubted whether government could figure out in advance how to regulate against undesirable discrimination or blocking when in many cases consumers might want options that involve such selectivity. Moreover, Shelanski pointed out, it might be that overall content will develop better if carriers do offer preferential routing and walled gardens.

Robert Pepper, chief of policy development at the FCC, commented that AOL's experience shows that walled gardens do not work in the marketplace. "People demand a back door," Pepper asserted. "So the real issue isn't blocking, it's preferential treatment." Yet as he and others observed, a reasonable concern with discrimination arises where a broadband carrier is vertically integrated (i.e., produces content itself). The problem is that if the FCC attempts to prevent discrimination against competitive content providers, "the process can be gamed forever—it becomes a regulatory morass." Furthermore, prohibiting vertical integration is almost certainly impossible and undesirable if the goal is financial health for as many NGN platforms as possible. Thus, any benefits of access regulation could well be outweighed by costs.

Joseph Waz, vice president for external affairs and public policy counsel at Comcast Corporation, suggested that "lifted eyebrow" oversight is all that's needed: "We know we're being watched by the FCC and Congress. And competitors would kill us if we blocked access to them. So government shouldn't be wasting time on regulating for hypothetical future problems." Preston Padden countered, "Either we have a neutral network architecture that allows all the people on the edge to innovate, or we're going to abandon open architecture and allow 'beachfront property' whether through blocking or preferential routing, and that allows those in the best spots to innovate more effectively. This second option isn't in the interest of anyone except the guy with the beachfront property."

Kevin Kahn, Intel Fellow and Intel's director of communications interconnect technology, added a further complexity in arguing that preferential routing may be a good option for *technical* reasons: An ISP may find it makes technical sense to choose certain sources for caching just to make the network work better. Moreover, he asked, "How do you even regulate if, say, Disney wants to pay an operator for preferential access to the cable?" For Kahn and other attendees, the specter of price regulation or unbun-

dled network element-type regulation looms if government gets into close oversight of access. All in all, then, Kahn—reflecting the sentiment of many others—argued that it becomes very difficult to create a regulatory apparatus that covers all of the possibilities without stifling innovation, investment, and the very development of a competitive NGN.

On the other hand, Dale Hatfield, a former federal official and currently an adjunct professor in interdisciplinary telecommunications at the University of Colorado, gave the following example of how tough the issues get: "If Vonage [a VoIP provider] gets to plug its equipment into cable modems, Comcast and other cable system operators will still be able to provide a better VoIP service. I'd like Vonage and Comcast to be in real competition. That means reasonable access for both." This idea calls to mind the equal access requirement imposed on the Bell Operating Companies (BOCs) after the AT&T divestiture in 1984. The requirement mandated that the BOCs provide equal access for long distance competitors such as MCI and Sprint, enabling them to physically connect their networks right at the local exchange switches and thus enjoy the same quality of connections as AT&T. There appears to be little doubt that this earlier equal access provision helped make long distance competition a reality in the 1980s. The problem is that today technology and consumer demand are subject to greater and faster changes and variability; indeed, companies dedicated mainly to long distance calling are now endangered species, as technology has largely erased cost differences between local and long distance telephony.

Competition, Regulation, and Financial Health

Obviously, running through the working groups and the larger plenary sessions was the question of where the industry is headed and, in particular, whether recovering the shaken faith of the investment community must involve economic consolidation that threatens visions of a truly competitive market—one that will not require much government oversight. There is a real tension then, among competition, financial health, and government regulation. In the pessimists' view, the very success of recent public policy at bringing about competition has induced ruinous price wars. For them, the solution may be consolidation: fewer competitors, less competition, and increased pricing power. Yet such an outcome could require more government oversight than a more competitive market, and few observers are enthusiastic about that.

This tension arose most directly in the discussions of NGN access policy. Most observers seemed confident that if there are three or more competitively owned broadband pipes, market forces will protect consumers from becoming reluctant prisoners in walled gardens or hapless victims of carriers' preferential routing or blocking. Consumers in this more competitive scenario will likely demand and almost certainly get whatever kind of access they want—for example, they would have a choice between walled gardens of various configurations and prices and fully open fields of play.

On the other hand, participants generally seemed concerned that in a world where consumers can choose between only one or two carriers (likely cable and ILEC-owned), the potential for discrimination that does not match consumer desires and interests will arise. A vertically integrated carrier that owns content services, or even a carrier that is simply being paid to give more favorable treatment to some services than to others, may have strong incentives to discriminate in ways that do not serve the interests of many or most of their consumers.

Beyond the immediate treatment of consumers are concerns about incentives for technical and content innovation in a market with two or fewer full-fledged competitors. Colin Crowell, telecommunications policy analyst for Representative Edward J. Markey (D-Mass.), observed, "If even Disney is worrying about discrimination, it may be hitting smaller companies even harder; maybe they are deciding not to even launch products because they don't have the ability to negotiate their way onto the system."

Crowell asked whether we should be willing to make "the leap of faith that government will come in and fix" any problems that do become serious. That leap must confront the possibility that by the time the FCC or Congress gets around to addressing any harms, it may be too late from a political standpoint. Entrepreneurs may enjoy a moral victory—a "posthumous vindication," as Crowell said—but having gone out of business (or never opened in the first place), potential competitors would not be significant political players, so there might be "no real political oomph behind reaching a solution." The incumbent carriers are politically powerful and well organized, so members of Congress or FCC commissioners might hesitate to confront them in the absence of organized, countervailing pressure. Thus, there is some reason to hesitate making the leap of faith, Crowell observed, and to worry and plan for a future with fewer than three broadband competitors.

On the other hand, Jack Zinman, senior advisor at the National Telecommunications and Information Administration, reminded conference participants that technology may offer more grounds for optimism on competition than most seemed to realize. Zinman pointed to the real possibility of broadband delivered over electric power lines and the potential for WiFi to develop into a platform for multiple broadband providers. He argued that it is important that government not create a self-fulfilling prophecy of limited broadband competition by overregulating or prematurely regulating.

This argument again illuminates the tensions among competition, regulation, and financial health. Justifiably or not, it is legitimate to worry that premature regulation would reduce investors' faith in the industry. Regulation could damage the ability of companies deploying NGN facilities (incumbents and entrepreneurs alike), and perhaps those producing content for the NGN, to raise the capital they need. Hence, the outcome would be fewer broadband competitors, fewer content options, and more potential for harm to consumers—the same scenario feared by participants who, reluctant to make the "leap of faith," favor earlier regulation. Making the case for refraining from early regulation, Marsha MacBride, chief of staff to the chairman of the FCC, concluded, "Remember, it's much harder to take a rule away than to put one in, and once the Commission issues a rule, players will figure out ways to arbitrage and game the situation. All we can do is strongly endorse having the government keep a sword hanging over the heads of NGN providers. The middle ground position is being vigilant from the start."

Two participants put forth intriguing ideas for structuring such vigilance. Kathy Brown, a former FCC official who is now senior vice president for public policy and external affairs with Verizon Communications, drew a historical analogy: "When we dealt with privacy, we decided in favor of self-regulation, with government holding a hatchet over the industry and threatening to regulate if they didn't protect privacy on their own. We now find that the notices of privacy that companies issue create de facto contractual relationships that are legally enforceable. Something similar might apply here." Taking this notion a step further than was articulated at the conference, the idea might be for government officials to "jawbone" broadband pipe owners to come up with voluntary published guidelines for treatment of consumers and suppliers of competitive equipment, applications and content. Like the privacy rules, these guidelines might serve as de facto bases for future legal protection.

One participant suggested a second, somewhat more direct and proactive step government might take. He proposed having government announce clearly and in advance just what consequences broadband carriers would face if the fears of some competitive content providers, consumer representatives, and others do come to pass. An advance agreement would help carriers plan investments and forestall a nasty, expensive surprise. If, say, three years down the road, officials conclude government needs to intervene, firms will have known all along what they will have do to meet the government mandate. This advance knowledge should help carriers plan their investment and the design of their networks. Government would be wielding a carrot and stick to give carriers—and their investors—predictability and understanding of the financial consequence if government does intervene. That consequence should give carriers incentives to refrain from anticompetitive actions and act as they would in a more fully competitive environment. Such assurances should help content entrepreneurs and other, smaller players get the investment capital they need as well.

Protecting Content Production

Develop, with some urgency, a way to secure the intellectual property rights of content suppliers in this age of inexpensive digital copying, without placing undue restrictions on the convenience and satisfaction of content consumers.

A second working group developed an original analysis of the basic problems confronting providers of content (i.e., intellectual property) in an environment in which rapid transmission and reproduction of large digital files could—precisely because of the presumed success of the NGN—become increasingly easy and less expensive. The group, chaired by Michael Katz, former U.S. Deputy Assistant Attorney General and Arnold Professor of Business Administration, University of California–Berkeley, came up with two major recommendations:

- Identify a lead federal agency, probably the Department of Commerce, to develop effective means of protecting content providers while maintaining consumer satisfaction. Ask the Secretary of Commerce or the Secretary's high-level designee to personally lead this effort and mediate among competing interests as appropriate. The lead agency should strongly consider

federal preemption of other regulators, while attempting also to secure international cooperation.

- Conduct a study, using forensic watermarking and other techniques, to determine if the major source of illegal copies is from within the content-provider value chain or from copies on which digital rights management (DRM) copy protection has been incapacitated.

The two major technological means of combating unauthorized copying and distribution are DRM and forensic watermarking. DRM involves encryption of digitized files so they require active decoding by the consumer's equipment before they can be played or watched. Watermarking refers to coding of nonencrypted files so that unauthorized copies lacking the watermark trigger active blocking by "edge" devices (monitors, computers, stereos, game machines). The advantage of DRM solutions is that they can be implemented by the content industry without requiring much broader cooperation. Watermarking, on the other hand, requires more extensive coordination and cooperation by the consumer electronics industry and/or networks.

The working group agreed on two assumptions with respect to technological solutions. First, content providers will pursue DRM and forensics to the greatest economically practical extent. Second, content providers, telecommunications providers, consumer electronics manufacturers, and computer companies will work to develop technological means of increasing the costs and difficulty of in-the-clear copies (i.e., copies for which DRM software has been defeated), with the understanding that the content providers will bear the vast majority of the costs. Any solution must account for the fact that the Internet is a global phenomenon. Consensus broke down on cost recovery (including system performance issues and effects on the ability to innovate) and on whether the second—rather costly and complex—option really is necessary given the relative capabilities of DRM and watermarking.

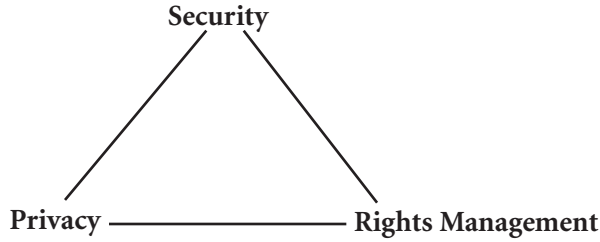
This discussion raised the key question: Is piracy a "killer application" for telecommunications, computing, and consumer electronics and therefore the fundamental obstacle to overall industry consensus toward a solution? In other words, are there significant segments of the industry (as there surely are of the consumer base) that would just as soon see file swapping continue to flourish? If the answer to this question is yes, can policymakers (subject to political pressures from all these actors) do

something constructive to change the answer? Possible approaches include the following:

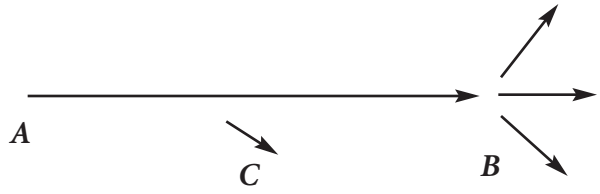
- Make other industry participants liable along the lines of the Digital Millennium Copyright Act (DMCA).
- Create government pressure through jawboning (e.g., hold meetings of relevant chief executives with high government officials).
- Use the threat to take government intervention absent industry consensus. An important issue is whether such a threat can apply appropriately balanced pressure.

Conceptual Analysis of Protection Issues

Confronted with the three interrelated areas of security, privacy, and rights management, the working group sought a common thread:



They identified and diagrammed a basic question: Can network users be confident that information will go only to the parties selected by the network users for approved uses?



A wants to be able to send information to *B* (1) without *C* obtaining the information and (2) and without B forwarding to other parties or itself for unauthorized purposes.

Strong encryption (over a trusted terminal) provides a technological solution to problem (1), although it then raises issues for law enforcement. (The need for law enforcement to intercept certain messages may override the information sender's private interests.)

There are two cases to consider with respect the retransmission problem (2):

- *B* is trusted and/or can be monitored and punished for transgressions (e.g., credit card companies and health care providers),
- *B* is not trusted and hard to monitor/catch (e.g., teenagers downloading pirated music and movies).

The trusted group case can readily rely on legal prohibitions of retransmission or misuse. This case does not raise issues that are specific to Next Generation Networks. Hence, the focus should be on finding solutions for the nontrusted, hard-to-monitor case. The criteria for evaluating potential solutions to this specific problem are as follows:

- Performance costs: It is important not to limit technological evolution and innovation. The entertainment industry recognizes that virtually all protection schemes could lead to different generations of consumer electronics being incompatible with various protection systems as networks, equipment, and watermarking evolve,
- Other costs, such as equipment or operating costs,
- Respect fair use by *B*,
- Respect privacy of *B*.

Because the major concern is with *mass* online distribution of pirated content, it is relatively easy to identify distributors of illegal content. There are, however, three remaining difficulties: Some distributors may reside outside of any cooperating jurisdiction; there may be a huge number of them (e.g., peer-to-peer distribution); and some of them may make uninviting enforcement targets (e.g., content providers may fear making enemies of their teenage customers by enforcing laws that conflict with customer group norms).

If the real culprits are peer-to-peer participants in sharing pirated material, the most realistic mechanism may be to intimidate all but the most aggressive from participating. There is mixed evidence on how well intimidation already is operating in response to the raft of lawsuits filed by the Recording Industry Association of America (RIAA). Although use of Kaaza—the most popular file-sharing software—appeared to be down by about one-third over the 11 weeks after the RIAA announced its intention to bring the suits (June 2003), polls showed majorities of consumers believing that some swapping is ethically defensible. Yet much unauthorized copying and distribution remains: Kaaza alone still had more than 4 million users during the second week of September 2003.[2] This copying threatens the economic interests and perhaps the viability of content providers—and, by extension, the very future of the NGN, whose raison d'etre is ever-improving content.

Other targets of enforcement might include content industry employees who create and distribute unauthorized duplicates of first copies; ISPs; and Internet search engines that make it easier for users to find pirated copies. To address the problems of unauthorized copies originating with the manufacturer, forensic watermarking can play an important role. On the other hand, focusing on ISPs is more problematic because widespread monitoring of users is costly and raises privacy issues. One alternative would be legislation giving content providers the right to demand that ISPs/carriers stop serving customers whom content providers identify as distributors of pirated content. This approach assumes, of course, that content providers can readily identify such customers reliably; it seems likely that many broadband users will find ways to thwart identification. With regard to search engines, although the Digital Millennium Copyright Act (DMCA) suggests the possibility of holding them responsible if they make it easier to find (and thus obtain) pirated copies online, the potential for interfering with legitimate searches and otherwise obstructing the business of the search engines and their users would seem to make this option less desirable.

In the face of these daunting dilemmas, the major conclusion apparently shared by most if not all conference participants was to place this issue at the top of the agenda of an executive branch agency, most likely the Department of Commerce. The feeling was that only having a single agency with a public mandate to (in Preston Padden's words)

2 Amy Harmon and John Schwartz, "Despite Suits, Music File-Sharers Shrug Off Guilt and Keep Sharing," *New York Times* (September 19, 2003), A1.

"start knocking heads together" can produce an acceptable solution—one that all relevant industry segments as well as consumers can live with. On the other hand, participants acknowledged that there may be political risks in this course, as different industry groups with the clout of large campaign contributions press for advantage.

Nonetheless, Kevin Kahn argued, government must get involved, particularly if there is to be any enforceable agreement on watermarking. Detecting watermarks requires a particular architecture for displays—and that, Kahn said, will demand federal legislation. Even with this accomplished, however, blocking of unauthorized imports could remain a problem that is likely to require high-level attention from the federal government. Getting a bill through Congress will probably require sufficient "head knocking" to yield a broad supporting coalition.

Transition Pricing and Universal Service

Fix the system of internally subsidized prices once and for all, to bring about competitively neutral pricing and thus open the way to efficient development of the NGN.

Whereas the group emphasizing rate deregulation and access in the NGN assumed that rationalizing ILECs' landline local telephony rates would face daunting political obstacles, a third working group—chaired by Eli Noam, professor of business and law at Columbia University—bravely focused on rate rebalancing and the universal service subsidy system. This group developed a manifesto in favor of adjusting universal service and other subsidies currently built into the telecommunications regulatory regime in ways that both maintain support for those (relatively few) users who need them to remain on the network and encourage efficient investment and development of the NGN. The ultimate goal is deployment of advanced infrastructure across every geographic region and socioeconomic group. The keyword for policy here is neutrality. In this context, neutrality means regulators should maintain an agnostic stance that treats similar issues across all technologies and platforms equivalently.

The group endorsed some general principles to govern prices: rebalance retail prices, with safety nets that prevent rate shock, and structure wholesale prices to ensure uniform intercarrier compensation rates. One participant described the purposes as eliminating nongovernment subsidies in NGN platforms, while seeking to maintain universal service

while ensuring the subsidies are neutral across technologies and platforms; achieve uniformity of intercarrier compensation; and rebalance local retail rates. These goals must be achieved, he said, through a reasonable period of transition that cushions users from extreme rate increases and otherwise weighs the public interest.

The working group focused with particular intensity on universal service. It suggested that policymakers consider the possibility of a platform-independent subsidy that goes directly to households demonstrating need, enabling them to have one primary voice-grade line. Whether that turns out to be a landline supplied by an ILEC or a cable telephony or wireless telephony service would depend on particular market conditions and user needs. Depending on prices and services, individual users might decide to use their subsidies for a cell phone or basic service from an ILEC, for instance. The subsidy could be portable, traveling with users if they move to new areas.

One problem with the idea of subsidizing users rather than (as is traditionally done) carriers, however, is that rural carriers could face increased levels of subscriber churn and unpredictability; any new universal service program would probably need to address this issue. Although for now the subsidy should be limited to voice-grade service that would enable users to connect with the Internet at 28.8 kilobits per second (kps), as the NGN develops this structure should be revisited, and subsidized service levels might be upgraded to include access to faster bit rates. Perhaps ultimately the subsidies could be extended to some kind of government support for universal broadband access. Such support programs might involve subsidies for public access points to broadband rather than an effort to subsidize all universal service households individually.

Though conference participants appeared generally to support these basic points, they did not develop recommendations in further detail. Almost every year, the Aspen conference finds itself strongly recommending that universal service be targeted narrowly to users in genuine economic need and funded from general government revenues or, failing that, from the least distorting, most efficient internal subsidy mechanism possible. There is no more consistent consensus in the 18-year history of the conference—which goes nearly all the way back to misty memories of the days when AT&T and its Bell Operating Company progeny held a near monopoly. Yet year after year, that very same con-

sensus produces rueful laughs and sighs around the room at the shared assumption that these seemingly essential steps are politically infeasible. That assumption is rooted in the notion that rural constituents—especially the influential ones who, in the main, do not need subsidies—will not allow their congressional representatives to do anything that might raise their rates.

Perhaps now is the opportune time to urge the interests so ably represented at the conference to join together and press optimistically for an innovative approach to universal service. The approach should make it possible to upgrade universal service to include broadband (without undue economic distortion) as that service ultimately becomes as necessary as voice service is considered today. In fact, a new approach that encompasses the foregoing pricing principles is almost certainly a prerequisite to reaching the point that universal service can be modernized and upgraded—a point that should be emphasized to rural constituencies. If leadership from the top can knit together a winning coalition for intellectual property protection (as suggested above), leaders should be able to do something similar for universal service.

Conclusion

The mood of this year's conference probably can be summarized as cautious, mild optimism. This assessment represents a positive shift from the 2002 conference, when pessimistic views were more dominant. Several participants continue to see a serious financial crisis threatening the future of the industry and therefore any hopes for near-term deployment of the Next Generation Network. Yet just as many, if not more, seemed to believe that growing investor confidence and innovations in management, technology, content, and applications will combine with expanding demand—especially for broadband connectivity, mobile telephony, and information and other services. Assuming a supportive regulatory environment, the more optimistic crowd held that these forces will together fuel a healthy comeback: We will build the NGN, and the consumers will indeed come. Although consensus was elusive for several of more specific recommendations, the conference did yield some useful new ideas for public officials hoping to craft that supportive policy context.

APPENDIX

Eighteenth Annual Aspen Institute
Conference on Telecommunications Policy
SPRING MEETING

Spectrum Policy: Moving the Agenda

Aspen Wye River Conference Centers • April 21–22, 2003

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Note: Titles and affiliations are as of the date of the conference.

Eighteenth Annual Aspen Institute
Conference on Telecommunications Policy
SUMMER MEETING

The Telecommunications Sector: Regulatory Roadmap for Next Generation Networks

Aspen, Colorado • August 10-13, 2003

List of Conference Participants

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Commissioner
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Minority Senior Counsel
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Note: Titles and affiliations are as of the date of the conference.

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About the Author

Robert M. Entman, Professor of Communication at North Carolina State University (NCSU), received a Ph.D. in political science from Yale and an M.P.P. in policy analysis from the University of California at Berkeley. His research and teaching interests focus on political communication and communication policy.

Among his books are *Democracy Without Citizens: Media and the Decay of American Politics* (Oxford, 1989); *Mediated Politics: Communication in the Future of Democracy* (Cambridge, 2000, edited with W.L. Bennett); and *The Black Image in the White Mind: Media and Race in America* (Chicago, 2000, with A. Rojecki). *Black Image* won the Mott/KTA prize for best book from the Association for Education in Journalism and Mass Communication; the Lane Award for best book in political psychology from the American Political Science Association; and the Goldsmith Prize from Harvard University. Dr. Entman received the Alumni Outstanding Research Award from NCSU in 2002.

A former NSF Graduate Fellow and NIMH Post-Doctoral Fellow, Dr. Entman was the Lombard Visiting Professor at Harvard during the fall 1997 semester, and he taught previously at Duke and Northwestern. His most recent book *Projections of Power: Framing News, Public Opinion, and Foreign Policy*, was published in November 2003 by the University of Chicago Press, and he is working on *Private Lives in the Public Sphere,* which explores media and presidential scandals. With Lance Bennett, he edits the book series *Communication, Society and Politics* for Cambridge University Press.

The Aspen Institute Communications and Society Program

www.aspeninstitute.org

The Communications and Society Program is a global forum for leveraging the power of leaders and experts from business, government and the nonprofit sector in the communications and information fields for the benefit of society. Its roundtable forums and other projects aim to improve democratic societies and diverse organizations through innovative, multidisciplinary, values-based policymaking. They promote constructive inquiry and dialogue and the development and dissemination of new models and options for informed and wise policy decisions.

In particular, the Program provides an active venue for global leaders and experts from a variety of disciplines and backgrounds to exchange and gain new knowledge and insights on the societal impact of advances in digital technology and network communications. The Program also creates a multidisciplinary space in the communications policymaking world where veteran and emerging decision makers can explore new concepts, find personal growth and insight, and develop new networks for the betterment of the policymaking process and society.

The Program's projects fall into one or more of three categories: communications and media policy, communications technology and the democratic process, and information technology and social change. Ongoing activities of the Communications and Society Program include annual roundtables on journalism and society, international journalism, telecommunications policy, Internet policy, information technology, and diversity and the media. The Program also convenes the Aspen Institute Forum on Communications and Society, in which CEOs of business, government, and the nonprofit sector examine issues relating to the changing media and technology environment.

Conference reports and other materials are distributed to key policymakers and opinion leaders within the United States and around the world. They are also available to the public at large through the World Wide Web.

Charles M. Firestone is executive director of the Aspen Institute Communications and Society Program. Prior to joining the Aspen Institute in 1989, Mr. Firestone was director of the Communications Law Program at the University of California, Los Angeles (UCLA) and an adjunct professor at the UCLA Law School. He was also first president of the Los Angeles Board of Telecommunications Commissioners. Mr. Firestone's career includes positions as an attorney at the Federal Communications Commission, as director of litigation for a Washington, D.C. based public interest law firm, and as a communications attorney in Los Angeles. He has argued several landmark communications cases before the United States Supreme Court and other federal appellate courts.

Previous Publications of the Aspen Institute Conference on Telecommunications Policy

The following publications were all authored by Robert M. Entman

Balancing Policy Options in a Turbulent Telecommunications Market

This report assesses the future of communications regulatory paradigms in light of desirable changes in spectrum policy, telecommunications market environments, and regulatory goals. It suggests four models of regulation, including government allocation, private spectrum rights, unlicensed commons, and a hybrid system of dynamic spectrum access. It also addresses how changes in spectrum and other telecommunications policies, and new business realities, might affect current regulatory regimes for the telecommunications industries. The publication includes an essay on spectrum management, "The Current Status of Spectrum Management" by Dale Hatfield.

2003, 79 pages, ISBN Paper: 0-89843-370-3, $12.00 per copy.

Telecommunications Competition in a Consolidating Marketplace

In the telecommunications world, what would a fully competitive environment look like? What communications initiatives should policymakers develop—considering the ultimate welfare of the consumer—to implement change in the regulatory climate? This report explores ways to reshape the current regulatory environment into a new competitive space. It addresses competition not only within but across separate platforms of communications such as cable, wireline telephony, wireless, satellite, and broadcast. This publication also includes an essay on an innovative approach to wireless regulation, "Opening the Walled Airwave," by Eli M. Noam.

2002, 64 pages, ISBN Paper: 0-89843-330-4, $12.00 per copy.

Transition to an IP Environment

This report examines a "layered approach" to regulation. By viewing telecommunications in four separate layers—content, application, network, and data link—policy discussions can address concerns in one layer without negatively affecting useful existing policy in other layers. The report also includes "Thoughts on the Implications of Technological Change for Telecommunications Policy," by Michael L. Katz.

2001, 78 pages, ISBN Paper: 0-89843-309-6, $12.00 per copy.

Six Degrees of Competition: Correlating Regulation with the Telecommunications Marketplace

This report addresses the basic conceptual questions of what should be the nature of regulation in a competitive, broadband future. It also examines how fundamental policy questions such as interconnection, mergers, spectrum allocation, jurisdiction, universal service, and consumer protection should be handled in the interim. The report also includes "Regulation: The Next 1000 Years," by Michael L. Katz.

2000, 65 pages, ISBN Paper: 0-89843-279-0, $12.00 per copy.

Residential Access to Bandwidth: Exploring New Paradigms

This report explores policy initiatives that would encourage the widespread deployment of residential broadband services throughout the United States. It identifies our regulatory system as one of the chief obstacles to achieving ubiquitous broadband deployment and offers a new regulatory model to overcome these barriers.

1999, 35 pages, ISBN Paper: 0-89843-256-1, $12.00 per copy.

Competition, Innovation, and Investment in Telecommunications

This report considers how public policy can foster investment, competition, and innovative services in local exchange telecommunications. The volume also includes "An Essay on Competition, Innovation, and Investment in Telecommunications," by Dale N. Hatfield and David E. Gardner.

1998, 52 pages, ISBN Paper: 0-89843-235-9, $12.00 per copy.

Implementing Universal Service After the 1996 Telecommunications Act

This report summarizes the Conference's suggestions for universal service policy options, generally, and financing options for schools and libraries, specifically, which were submitted to the Federal-State Joint Board on Universal Service in September 1996. The report includes an appendix with sections of the Telecommunications Act of 1996 that relate to universal service. $10.00 per copy.

The Communications Devolution: Federal, State, and Local Relations in Telecommunications Competition and Regulation

In the context of landmark communications legislation, this report examines the forces shaping the competitive world of telecommunications, and offers federal, state, and local regulators a roadmap to resolving jurisdictional disputes and promoting effective competition.

1996, 64 pages, ISBN Paper: 0-89843-190-5 $10.00 per copy.

Strategic Alliances and Telecommunications Policy

The report examines the underlying trends and motivations in the emergence of strategic alliances in the provision of telecommunications. It then

explores the implications of these alliances, suggests tools and methods of analysis for viewing these alliances, and addresses, from a public policy perspective, what remedies and actions might be advisable in the near and long-term future.

1995, 26 pages, ISBN Paper: 0-89843-170-0, $10.00 per copy.

Local Competition: Options for Action

This report sets forth the compromise universal service funding plan arrived at by conference participants. It also describes approaches to removing barriers to local competition and addresses issues associated with competition in other fields by incumbent carriers. It includes an essay by Eli Noam entitled, "Reforming the Financial Support System for Universal Service in Telecommunications."

1993, 38 pages, ISBN Paper: 0-89843-150-6, $10.00 per copy.

Competition at the Local Loop: Policies and Implications

This report examines the trend toward greater competition in telecommunications, with new competitors such as cellular telephone, paging, cable television, private telecommunications providers, personal communications service experiments, satellites, and long-distance providers. It seeks to develop sound options for future public policies and addresses issues of universal service and jurisdictional control and preemption.

1993, 28 pages ISBN Paper: 0-89843-130-1, $10.00.