

**Written Statement of Craig Mundie**  
Chief Technical Officer of Advanced Strategies and Policy  
Microsoft Corporation

Before the  
Senate Committee on Commerce, Science & Transportation  
Hearing on Rural Telecommunications  
March 7, 2006

Mr. Chairman, Senator Inouye, and Members of the Committee:

My name is Craig Mundie, and I am Chief Technical Officer of Advanced Strategies and Policy at Microsoft Corporation. I am pleased to appear before the Committee to discuss the critical issue of ensuring that Americans living in rural areas receive full access to — and, in turn, can readily benefit from — broadband capacity and the Internet-based offerings of the future.

Microsoft is both a significant bandwidth user and a leading provider of Internet-based products and services that use broadband connections. Our mission is to create new and innovative capabilities for consumers, for small and large businesses, for other technology providers and, of course, for government use. From our Windows Server System and developer tools, to our business and mobile solutions, to our entertainment oriented offerings -- like WindowsMedia Center Edition, our IPTV platform and Xbox — we are in a great position to give rural businesses, consumers and governments the tools they need to get the most out of what broadband offers. That is why we strongly support the development of robust, reasonably priced broadband services for all consumers in all areas of the country. The emergence of broadband platforms utilizing the Internet Protocol (IP) technology can deliver finally the long-discussed convergence of traditional telecommunications offerings and the newer Internet-based services and products. The time is near when consumers will no longer see the Internet as a distinct

medium (where they look for information “on the Internet” or make “Internet calls”), but rather they will simply communicate and receive content and services without even realizing it is being provided in an IP format or via the Internet.

As this Committee knows, however, while the promise of broadband is great, the reality has yet to meet the promise on a wide-scale basis. Clearly, broadband has not fully arrived for all Americans, and we cannot simply assume that the broadband of tomorrow will maximize the connectivity of all citizens. We cannot assume that the broadband of tomorrow will reach children in all areas of our country with the best educational tools, will provide their parents with a path to the world to compete, and will provide their grandparents with easy access to the best healthcare without always traveling great distances. All of these things are possible, but none is certain. It is imperative, therefore, that as this Committee considers how to modernize our laws so they reflect the technical and commercial realities of the Internet Age, we get our broadband policy right, for rural and urban areas alike. Policies that fall short could shortchange our national welfare and, equally important, our global competitiveness.

#### **The Benefits that Broadband Can Offer Rural America.**

Rural America in many ways exemplifies both the potential good that broadband can deliver and the risks inherent in failing to develop a sound broadband policy. Through the innovation of information technology companies, content providers, broadband providers and device manufacturers, digital services are increasingly available in a variety of forms, and the possibilities for connecting to those services in rich, unique, and more affordable ways are greater than ever before. Simply put, broadband can and has revolutionized how Americans do business, interact with government, learn and are entertained. With the right connections, distance can no longer be an obstacle to knowledge. Geography can no longer be an impediment

to the latest medical research. The great plains no longer would isolate communities from larger economies. With affordable technology as the equalizer, a child in rural Alaska can have access to the same information as one in suburban Washington, DC; an entrepreneur in North Dakota can develop a business that competes with Silicon Valley; and a rancher living 200 miles from downtown Billings can access medical advice as readily as a banker living two miles from downtown Boston.

These sentiments are not merely aspirational. Indeed, as I am sure the Chairman knows, a recent study evaluating the Alaska Federal Health Care Access Network Telemedicine Project provided the following conclusion:

Evaluation data demonstrated that telemedicine using the AFHCAN resources did increase rural and remote access to healthcare. It facilitated referrer-physician communication, enhanced patient education, improved quality of care for patients, and increased satisfaction of both providers and patients. The vast majority of providers indicated that the equipment was easy to use and made their work more fun. These are not [the] only factors that improved healthcare for patients, but also factors that should influence higher retention of healthcare personnel.<sup>1</sup>

The U.S. Department of Agriculture Distance Learning and Telemedicine program also provides a number of real world case studies of how broadband can deliver important educational and health benefits to Americans living in remote areas.<sup>2</sup> For example, under a U.S. Department of Agriculture grant, six isolated health clinics in the Redwood Coast area of California — which is in the far northwest quadrant of the state — will link to a hub site located in Eureka, California to provide specialty medical services. According to the USDA, the

---

<sup>1</sup> Executive Summary, Evolution and Summative Evaluation of the Alaska Federal Health Care Access Network Telemedicine Project, at 8, available at <http://www.alaska.edu/health/downloads/Telemed/03.ExecSummary.pdf>.

<sup>2</sup> For information on recent DLT grant awards and past success stories, see <http://www.usda.gov/rus/telecom/dlt/dlt.htm>.

clinics served over 21,000 patients in 2003. Under another USDA grant, the Elko County School District in northeastern Nevada undertook a project to link the main town of Elko to four end-user sites for the purpose of extending additional Advanced Placement (AP) courses into rural schools. The project has the potential to reach approximately 1,475 students.

Likewise, information technology providers and non-governmental organizations have helped deliver the quality-of-life and educational benefits of high-speed Internet access to Native American tribes. In an example that strikes close to home, the Bill & Melinda Gates Foundation collaborated with Verizon and a development organization for Northwest tribes to deliver Wi-Fi broadband service to a reservation in the Cascade Mountains. The delivery of this Wi-Fi service provided the families on the reservation with a private network to share information about grant applications, health information and local news; enabled telecommuting to jobs in the Seattle area which increased the time tribal members spent with their families and in their community; and provided the tribal members with the opportunity to enhance their education through distance learning classes.

As each of these examples demonstrates, connecting individuals to each other and to innovative services and content in reliable, efficient and useful ways provides invaluable tools for self-improvement and can unleash a tide of economic and social benefits. This conclusion is borne out by economic data. A recent economic study concluded that “broadband access does enhance economic growth and performance.”<sup>3</sup> Specifically, the study found that communities in

---

<sup>3</sup> William Lehr, Carlos A. Osorio, Sharon E. Gillett, and Marvin Sabu, Measuring Broadband’s Economic Impact, Presented at the 33rd Research Conference on Communication, Information, and Internet Policy (TPRC), Sept. 23-25, 2005, available at <http://www.tprc.org/TPRC05/Sat1040Sess05.htm>.

which mass-market broadband was available “experienced more rapid growth in (1) employment, (2) the number of businesses overall, and (3) businesses in IT-intensive sectors.”<sup>4</sup>

This data and the experience of the last decade also tells us something else that is very important about broadband and connectivity — namely, that the young entrepreneur living in Fargo, North Dakota with the dream for a business does not have to leave home to make it happen. That is a profound change from what rural America has seen over the past decades. Thus, a small enterprise software company -- Great Plains Software -- with an innovative leader named Doug Burgum, can make a home in Fargo and develop his good idea into a billion dollar company — one that I’m pleased to say Microsoft acquired five years ago. He showed that with today’s technology you don’t have to leave the farm community to make it big in the information economy. Other rural states from Maine to Montana have similar stories of high technology companies sprouting up. This is arguably the greatest long-term potential benefit of broadband — the ability to innovate, wherever you are, and to deliver your innovations to others, wherever they are.

**Policy Measures that Can Support Broadband Deployment and Use in Rural America.**

As I noted, the experience of rural America also highlights the risks inherent in failing to develop a sound broadband policy. It does so because, quite simply, broadband deployment cannot be taken for granted. Further, just because broadband is deployed does not mean it will deliver on its full potential. These risks — that broadband will not be deployed or, if it is, it will not provide the necessary kind of access — tend to grow as the difficulty of delivering

---

<sup>4</sup> Id.

the “last mile” of broadband increases. And that certainly is the case in remote areas of the country. As a recent study concluded, there is a real lag in high-speed Internet penetration in rural households, and, as a consequence, Americans living in rural areas generally utilize the Internet less frequently than urban and suburban users.<sup>5</sup>

To close this gap, the broadband policy that we develop must ensure not only that broadband is extended to rural Americans, but that it is done efficiently and effectively. I would like to highlight four core policy objectives that Microsoft believes should serve as the basis for an effective broadband policy to benefit the nation – both rural and urban America.

1. Unlicensed spectrum

*First*, traditional wireline technology (telco or cable) presents only a partial solution to the challenge of broadband deployment in rural areas. The cost of the “last mile” will still be high, and, as a result, citizens living in the most remote areas will still face the challenge of how to get broadband services. Often, the last mile can be much longer than a mile, or even in rural areas where homes are closer together, the population density may be too low to attract traditional providers. To help address this problem, the Committee should look to spectrum reform to ensure that wireless broadband connections can provide an alternative means to deliver broadband to all consumers, especially those in rural areas.

As I have testified previously to this Committee, unlicensed technologies can support the transmission of data at high speeds for a low cost. That value proposition — higher speeds with relatively cheap and fast deployment — is especially compelling in rural areas where

---

<sup>5</sup> Pew Internet and American Life Project, *Rural Broadband Internet Use*, at 2, available at [http://www.pewinternet.org/pdfs/PIP\\_Rural\\_Broadband.pdf](http://www.pewinternet.org/pdfs/PIP_Rural_Broadband.pdf).

distance is so frequently the enemy of network efficiencies and a major cost and delay driver for broadband deployment. With unlicensed spectrum and smart wireless rules, Internet access and other types of community communications can be provided in many areas at comparatively lower costs. Over the last few years, Wi-Fi technology has proliferated in densely populated urban areas and in commercial settings, such as book stores and coffee shops, where there is a clear demand to provide consumers with more convenient wireless Internet access in places away from home and office. There is no technological or even economic reason, in my view, that someone sitting in a living room in a small town in the White Mountains should not have the same efficient and affordable access to broadband as someone sitting at a Starbucks in downtown Seattle.

What is needed to make this happen? In a word: access to spectrum and, specifically, access to spectrum below 1 GHz. The equipment exists today to deliver wireless broadband in coffee shops and hotels using unlicensed bands. And wireless Internet service providers (or WISPs) are attempting to use variants of that technology to bridge the last mile in rural communities. The problem is that the spectrum available today for unlicensed use does not propagate well over long distances. Signals can be obstructed by foliage and walls, and the physics of today's WiFi spectrum dictate that the signal fades over distance.

Designating spectrum below 1 GHz for unlicensed use will have many benefits. Deployment of unlicensed devices is fast; it's efficient. The technology empowers innovators and consumers. It also gets the FCC out of the job of picking technology or service provider favorites. Instead, it lets the market decide — or lets the community, or even individuals, do it for themselves. That means innovation is faster, and competition — not the Commission — pushes companies to innovate and deploy new services. Moreover, because unlicensed bands are

open to anyone who buys a compliant device at a retail store and attaches it to the network, the capital investment comes when it is needed and is fueled by individuals and businesses, not by larger network operators. And because buying blocks of spectrum at auction is not required, the cost of entry for these services is lowered. Thus, the cost of providing these services is extremely low relative to the substantial benefits that can accrue as the result of broadband Internet access.

Congress and the FCC can do more to encourage alternative wireless broadband connections using unlicensed spectrum by allocating sufficient spectrum below 1 GHz. And we applaud members of this Committee, including the Chairman, who have introduced legislation that would have the FCC do just that. Spectrum below 1 GHz has excellent propagation characteristics. The same spectrum used to deliver high-quality TV and radio signals long distances to your home would do an excellent job delivering high-quality Internet services. The problem of propagation losses would be overcome.

We recognize that using spectrum below 1 GHz for this purpose raises concern among incumbents about the potential for interference. Therefore, in addition to making spectrum available, we also support the adoption of new spectrum-sharing rules to address that potential and the use of smarter radios to more efficiently use the spectrum.

Before proceeding to the next topic, I should emphasize that the last few months have also demonstrated how deployment of broadband over unlicensed spectrum can enhance public safety – especially in times of emergency. In the immediate aftermath of hurricane Katrina, I sent a team of mine to Hancock County, Mississippi – which is where the eye of the hurricane hit. My team did what they could to help establish wireless networks in conjunction with students and faculty from the Navy's post-graduate school out of Monterrey, California.

While the situation was chaotic, representatives from the school, other companies and my team were able to establish wireless connectivity between a handful of governmental facilities that had been left standing, as well as in the parking lots of aid-distribution centers. The sites were networked together, and from them, people were able to access the Internet and even make phone calls. The lesson from this experience could not be more clear. Not only does high-speed access over unlicensed spectrum have great potential to support a multiplicity of routine tasks, but it can serve as a critical resource in times of crisis.

2. Universal service funding reform

*Second*, clearly the question of how to pay for broadband deployment in rural areas needs to be addressed. Microsoft recognizes the importance of the decades-old universal service funding policy to the ubiquitous telecommunications infrastructure that we enjoy today; but we also see the current funding mechanism as outdated and in need of reform. Any new funding mechanism must be stable, sustainable, easy to administer and competitively neutral. We believe that a connections-based assessment mechanism has the greatest potential to satisfy these objectives. In essence, this approach would authorize the FCC to assess a flat fee on each end-user “last mile” wireline or wireless connection. This approach is much easier to administer than a numbers approach, and it does not artificially tilt consumer decisions. It also is more sustainable than a revenues approach. We envision a connections-based approach working thus:

- The end-user would be assessed a USF fee on his or her bill, and the provider of the connection would collect and remit the fee.
- The FCC could tier the fee according to the size/capacity of the connection. For example, high bandwidth connections could be assessed a larger fee as compared to voice-grade connections.
- Technological and competitive neutrality would need to be maintained in the way that tiers were defined and assessed. For example, DSL and cable modem should generally have the same assessment when competing for

the same consumer. The FCC also could exempt certain connections, such as for Lifeline consumers.

- The FCC then would calculate the amount of the per connection assessment by dividing the amount of USF support by the number of connection assessments.

There are a number of advantages to this approach. To start, it does not run the risk of arbitrage through bundling, in which bundled packages of services could either minimize contributions or distort the marketplace based on the level and amount of USF assessments. Rather, a connections-based approach is completely neutral. The only way to avoid the assessment is to forego any connection whatsoever, and if you do connect, the assessment will not vary depending on the type of connection. The assessments also will be competitively neutral between providers of connections on a similar capacity. Importantly, a connections-based assessment would be more stable and sustainable than an alternative predicated strictly on a methodology that applies to today's world but may be obsolete tomorrow (i.e., a numbers-based approach). Indeed, connections can be expected to grow as both the population and new sources of deployment grow. Finally, we believe that a connections-based approach offers significant administrative and transparency benefits. In particular, because the approach will centralize assessments into a single set of providers in contact with end users — in contrast to an approach that divides assessments among hundreds of providers operating over the same connection — it will reduce administrative costs and make the assessment easier for consumers to understand.

In terms of distribution, we also support a competitively neutral approach. And we believe that, here, Congress should not forget that spectrum policy also can play a role. To the extent more spectrum is made available for the creation of unlicensed, wireless broadband

connections, costs for digging trenches and for stringing wires can be eliminated for the benefit of all types of providers.

3. Connectivity Principles or Net Neutrality

*Third*, it is imperative that consumers be able to access any Internet site and use any lawful application or device with a broadband Internet connection — just as they have been able to do in the narrowband world. This principle, which sometimes is referred to as “net neutrality” or the “Connectivity Principles,” is really about letting consumers decide, and not network operators, what content and services succeed or fail on the Internet. Connectivity Principles are important as a policy matter — especially in rural areas -- because they determine whether consumers drive decisions on innovation and technology, or whether one lets the network operators affect those decisions. We are pleased that the network operators are investing in technology and innovation, and we are proud partners with them in offering content and services to the public. We just think that other companies should continue to be able to offer Internet content and services as well.

I first raised this issue with the Committee in October 2002, and I identified four core principles that should be protected by Congress. These are the ability of consumers and providers (1) to offer and access content without interference; (2) to use applications and services on the Internet; (3) to attach any nonharmful personal devices to the network; and (4) to obtain clear information about their service. It is imperative that these principles be established by statute in such a way as to ensure that the consumer always has access at some reasonable price to a level of network performance sufficient to access the evolving services of this next generation Internet. Network operators should not be able to offer preferential use of the network to their own services or those of specific network services unless the consumer has the

potential to buy the meaningful capacity for use with services, devices and applications of their choice.

The broader community feels very strongly about this issue. Recently, over 70 major Internet and technology companies, including Yahoo!, Google, eBay, Amazon.com, and Interactive Corp., have come together on net neutrality and are calling on Congress to ensure that the Internet remains a platform open for innovation and progress.

In the past, Congress ultimately has intervened in the business activities of the historical network providers to ensure that the consumers had choice and reasonable pricing over time and to further ensure that each network operator could not discriminate against particular connections or offerings that consumers desired. Congress should act now to ensure that such consumer protections carry forward gracefully to the converged network we call the Internet, which will quickly inherit the union of all the other networks' capabilities and services and also allow the creation of many new businesses and services that we cannot reasonably forecast. These hallmarks of consumer expectations have been, and remain, fundamental to the success of the Internet. These basic features defined consumer, private sector and governmental experiences on the Internet, and we agree with others in the industry that these principles should be carried forward to the Internet broadband future.

4. Targeted deregulation

*Fourth*, we support providing greater incentives for broadband deployment through targeted deregulation. Like many others, we recognize that certain legacy requirements in the Communications Act and in the FCC's implementing regulations do not fully account for the architectural and commercial realities of today's telecommunications landscape. Thus, through the High Tech Broadband Coalition, we supported unbundling relief for the incumbent

carriers. We likewise recognize that the current system of video franchising needs reform to streamline entry for new competitors and to rationalize regulation for all providers.

**A Broad, and a Long, View.**

Broadband has the power to transform society, and nowhere is that power greater than for rural communities. If you get the broadband policy right, I think ten years from now members of this Committee could look back and see that a comprehensive and visionary broadband policy may have had as great, or greater, an impact on reshaping and renewing rural America as a major farm bill did in years gone by. The right policy can create the opportunity for rural communities to be an easily-reachable stop on the Internet, and these communities in turn could feed network hubs in rural states. Such a network would deliver better and more efficient services and create opportunities for learning, public services, public safety, communication and innovation, which in turn can lead to a virtual cycle of economic and social growth within our rural communities. There is no reason that we cannot foster the development of more Great Plains Software companies, more innovative health and wellness solutions, and more Advanced Placement courses for students in small communities. Broadband technology means that rural Americans can reach, and be reached, by the rest of the country and the rest of the world without ever having to leave home.

Microsoft looks forward to working with the Committee to achieve these goals.

Thank you again for the opportunity to appear before you today.