



# NEW AMERICA FOUNDATION

## ***Building the 21st Century's Information Superhighway: A Concrete Broadband Build-Out Plan for Advanced Telecommunications Infrastructure*** *Presented by Benjamin Lennett & Sascha D. Meinrath, Open Technology Initiative*

U.S. technological leadership is in a state of decline. Once the unequivocal frontrunner in information technology and telecommunications, the U.S. has fallen from 1<sup>st</sup> to between 15<sup>th</sup> and 21<sup>st</sup> in the world in terms of broadband access. The most recent data (through June 2008) underscores the fact that the U.S. ranking remains stagnant. Such a dramatic decline has prompted calls for a “broadband Apollo project,” a nation-wide initiative to build advanced fiber-optic communications infrastructure to connect every community, constituency, and interested individual in the country.

In 2009, a focus on rebuilding the nation’s crumbling infrastructure provides a unique opportunity to jumpstart investment in broadband. Congress will develop a multi-year omnibus transportation bill to fund capital improvements of the national transportation grid. This transportation bill creates an opportunity for earmarking \$20-30 billion to upgrade and build out high-speed data communications infrastructure throughout the United States, thus improving competition among Internet Service Providers (ISPs), and increasing service options for residents, businesses, municipalities, and NGOs.

Although members of Congress and presidential candidates have all expressed interest in expanding broadband access, the discussion thus far has lacked a coherent means to bring about a substantial and concrete intervention. Integrating the build-out of high-capacity fiber and the repairing and building of transportation infrastructure provides an efficient and sustainable means to create a 21<sup>st</sup> Century information superhighway. A burgeoning coalition of public interest groups, private companies, and policymakers have galvanized around this common initiative – what is needed now is strong leadership to make universal, affordable broadband a reality.

The Open Technology Initiative has organized a coalition of Internet scientists, network implementers, and public interest groups to fully develop this plan for a national build-out of fiber infrastructure. We are looking for legislative visionaries to support and take ownership over this proposal. Though it is increasingly likely that some type of government investment in broadband will occur, critical questions have thus far remained unanswered; namely, what will this investment look like and how will it create a more open, democratic, competitive and universally accessible communications network, and how will it avoid reinforcing the deficiencies that have led to our current woeful international standing? The 21<sup>st</sup> Century Information Superhighway Initiative addresses these concerns with a concrete plan of action.



## The Challenge

While the Internet's backbone has remained a relatively competitive market (although with fewer and fewer competitors over the past ten years), last- and middle-mile infrastructures are increasingly owned and controlled by a single entity or a duopoly. As a result of the lack of last- and middle-mile competition, the number of Internet service providers has plummeted by 74% in the past half-decade; bandwidth speeds remain lower and pricing remains higher for Americans compared with our international competitors; and innovative solutions to solve the problems of broadband access, affordability, and adoption have been severely hampered. Between the 2005 *Brand X* Supreme Court decision allowing the FCC to eliminate common carriage, and the 2007 merger of AT&T and BellSouth (and the scheduled removal of several merger conditions in 2009), difficulties with creating demand-side aggregation and accessing backbone transport will become fundamental barriers to spreading connectivity in the near future. Thus, an intervention is needed to prevent even further degradation of our international competitiveness.

In addition, rural areas across the country continue to have little or no access to broadband, with many residents and businesses relying upon dial-up modems as their primary connection to the Internet. Many of these areas are reliant upon antiquated, legacy copper telephone infrastructures, which often lack the capabilities to deliver high-speed, broadband access. The lack of fiber middle-mile infrastructure has also limited deployment of wireless technologies, which continues to be the most immediate and cost-effective last-mile solution for rural broadband. Without a substantial investment to bring advanced telecommunications infrastructure to these areas, rural communities will continue to face considerable challenges to their economic development and will remain at a considerable disadvantage due to their lack of access to the social benefits provided by connectivity.

Unfortunately, the current nationwide economic decline will further diminish private investment in telecommunications infrastructure, thus creating conditions that perpetuate the digital divide, diminish our ability to gain parity with other advanced nations, and further hamper economic recovery and expansion. This financial fallout will impact not just the technology sector, but all sectors of the economy that benefit and rely upon high-speed communications. Such daunting challenges require a new approach and a bold plan.



## The Solution

As economic growth becomes increasingly linked to technological advancement, prosperity will migrate to countries willing to make the necessary investments to support 21<sup>st</sup> Century economies. Much as the construction of the interstate highway system linked the country with a network of freeways and efficient highways and transformed transportation in the 1950s, the construction of a fully interconnected information superhighway would transform and democratize advanced telecommunications. The United States can build a 21<sup>st</sup> Century information superhighway by leveraging existing transportation infrastructure – deploying fiber along roads and highways in public rights-of-way whenever construction occurs.

The 2009 omnibus transportation bill is expected to be a multi-hundred billion dollar allocation over a six-year time-frame and containing major projects in numerous congressional districts as well as general funding to maintain, expand, and improve the country's transportation infrastructure. The transportation bill provides a unique opportunity to earmark \$20-30 billion to upgrade and build-out high-speed, high-capacity communications infrastructure throughout the country. A national intervention to interconnect last-mile Internet service providers and major broadband consumers would spur competition for services, lower costs for end-users, and increase service speeds. It would, over time, increase options for last-and middle-mile interconnection and add robustness to alleviate what some observers believe to be an increasingly congested Internet backbone.

The 21<sup>st</sup> Century Information Superhighway Initiative would fund and mandate the installation of high-capacity, dark fiber bundles along all federal aid and direct federal highway projects. The Federal Highway Administration (FHA) estimates that 90 percent of the cost of deploying fiber along roadways are associated with digging up and repairing the road to install buried fiber (See “Telecommunications Handbook for Transportation Professionals”, FHA). Thus, it is both expedient and substantially cheaper to install conduit and fiber while a roadway is already being repaired or built.

Federal highway regulations already strongly encourage the accommodation of utility facilities in the right-of-way of Federal-aid or direct Federal highway projects when such use and occupancy do not adversely affect highway or traffic safety or otherwise impair the highway for aesthetic quality, and do not conflict with the provisions of Federal, State, or local laws or regulations (See 23 CFR 645(b)). Additionally, current Federal-aid highway funding can be utilized to offset the cost of accommodating a utility, including the cost of buried “utility tunnels” to accommodate telecommunication lines. Extending funding to deploy the conduit and fiber along Federal-aid and Federal highway projects would create, over the life of the transportation bill, substantial new options for interconnecting broadband infrastructure throughout the nation, decreasing bottlenecks, increasing competition, and spurring a new generation of broadband entrepreneurship.



## The Benefits

- **Increase high-speed broadband access across the nation.** In addition to promoting increased competition in services by providing the necessary middle-mile and backbone connections, the 21<sup>st</sup> Century Information Superhighway Initiative reduces barriers to market entry by lowering build-out costs for service providers. This broadband infrastructure would benefit everyone from private industry to rural telephone cooperatives and municipalities seeking to provide their communities with advanced telecommunication services, including broadband, IPTV, and high-quality voice services. The Initiative would also dramatically improve the reach and capacity of wireless broadband networks. For example, once a fiber build-out is completed along a highway or a major thoroughfare, wireless nodes could be easily connected, offering considerably faster speeds and capacity than many current wireless networks that lack ubiquitous wired backhaul. This infrastructure would facilitate the switch to intelligent transportation systems, a priority for the Department of Transportation (see below).
- **Promote economic growth and entrepreneurship, especially in rural areas.** The new growth sectors that will drive the U.S. economic recovery include medicine, agriculture, energy, and clean technology – all of which will greatly benefit from a major build-out of telecommunications infrastructure. With fiber running along a highway, a company that might not otherwise locate its offices in a rural area could build its own connection and purchase wholesale access to that link. Increased capacity also provides improved prospects for desperately needed distance learning, tele-health services, and telecommuting job opportunities.
- **Create a more secure and robust telecommunications network.** Currently, there are eight interconnection regions for the Tier 1 ISPs who control the core of the Internet. This relatively small number of interconnects are increasingly susceptible to equipment failure and potential security concerns. Facilitating the dramatic increase of interconnection points bolsters the redundancy and robustness of this critical national telecommunications network, helps eliminate points of failure, and thus creates a more secure and faster network.
- **Technological advancements in transportation.** The Department of Transportation (DOT) has expressed serious interest in utilizing wireless communications for an intelligent transportation system to manage traffic flows and improve safety. With fiber running along highways and interstates across the country, DOT would have ample access to the high-capacity network infrastructure necessary for these uses. As transportation infrastructures become increasingly “smart,” they will need broadband capacity. Laying fiber in a systematic manner whenever roads are being worked on is a proactive measure that will both lessen disruption and increase the efficiency of financial investments. By laying adequate fiber capacities for multiple services and users, this initiative creates the foundation for a diverse array of next-generation transportation infrastructures.



## The Key Elements

The key to this proposal is a fundamental commitment to building an open platform for competition, allowing a multitude of service providers and services to utilize the infrastructure in a non-discriminatory manner, and ensuring that this public investment is as beneficial as possible to the maximum number of potential users.

The 21<sup>st</sup> Century Information Superhighway Initiative is composed of six key facets:

1. Fiber bundles of between 144 and 288 strands should be laid to ensure ample capacity for the foreseeable lifespan of the equipment. An easily accessible ductwork and conduit system should be installed to allow for additional fiber bundles to be deployed;
2. Common carriage on these conduits must be mandated. Any entity (lessor) can bid to build, operate, and maintain the roadside fiber assets; however, they must allow wholesale access and common carriage along both these links as well as any additional links necessary to reach an open interconnection point to any and all entities (lessees);
3. Lessors must provide AUP-free use of these fiber assets and any additional links necessary to reach an open interconnection point to lessees;
4. Lessees include any and all entities, including municipalities;
5. A system must be set up to accurately assess and map the build-out process, enhancing transparency and providing critical information for operators, service providers, lessors, and lessees seeking to utilize fiber facilities and provide services in particular areas; and,
6. To ensure a long-term return on investment for taxpayers, a revenue sharing agreement must be implemented wherein lessors contribute, on a yearly basis, to a “Digital Excellence Fund.” This fund could mirror the “Community Technology Fund” negotiated as part of the Pacific Telesis/SBC merger in California, in which the merged entity provided \$50 million over ten years to NGOs to bring technologies to traditionally underserved communities. The Fund should also support continuing Information Superhighway build-outs and provide funding for digital literacy and educational programs to increase broadband adoption.

To maximize competition and technological innovation, it is imperative that no matter who owns, builds, or operates information Superhighway fiber, that all facilities remain open, accessible, and transparent. This entails either a multi-tier separation plan whereby operators that offer wholesale fiber connections and business fiber connections are not service providers; or could allow for a service provider to vertically integrate as an owner/operator, but with clear requirements to provide for wholesale access to end-to-end transport services. The 21<sup>st</sup> Century Information Superhighway Initiative requires that its fiber infrastructure be technologically neutral and that easily accessible interconnection links and equipment be made available on a non-discriminatory basis, allowing for a diverse array of services to utilize the resource and ensuring the infrastructure does not become obsolete or antiquated as technology advances.



## Next Steps

Many members of Congress are interested in supporting broadband but have lacked a coherent plan to move from discussion to action. Linking fiber build-out to spending on transportation infrastructure is a viable plan of action. The next steps are to shape a legislative proposal that ensures adequate broadband for future needs, benefits as many parts of the country as possible, and serves as a platform for maximizing competition (rather than reinforcing practices which have led to our country's woeful broadband standing among industrialized nations). To that end, immediate next steps include:

- Continuing outreach to a broad-based coalition of for-profit companies, non-profit and public interest groups, business associations and foundations that have expressed interest in promoting a national broadband buildout. A natural coalition of rural groups, public interest organizations, foundations, unions, business associations, and private companies exists who would benefit from this initiative.
- In consultation with interested Congressional staff, develop a detailed blueprint for a 21<sup>st</sup> Century Information Superhighway that further details this plan for legislative action. The blueprint would include cost estimates for fiber deployments and descriptions of benefits including economic analyses of the plan's potential to create jobs and stimulate economic recovery and growth.