National Broadband Plan: National Purposes

March 11, 2010

The National Purposes mandate

American Recovery and Reinvestment Act, §6001(k)(2)(D):

"a plan for use of broadband infrastructure and services in:

- advancing consumer welfare
- civic participation
- public safety and homeland security
- community development
- health care delivery
- energy independence and efficiency
- education
- worker training
- private sector investment
- entrepreneurial activity
- job creation and economic growth
- and other national purposes."

The National Purposes mandate

American Recovery and Reinvestment Act, §6001(k)(2)(D):

"a plan for use of broadband infrastructure and services in:

- advancing consumer welfare
- civic participation
- public safety and homeland security
- community development
- health care delivery
- energy independence and efficiency
- education
- worker training
- private sector investment
- entrepreneurial activity
- job creation and economic growth
- and other national purposes."

Healthcare

Education

Energy and the environment

Government performance and civic engagement

Economic opportunity

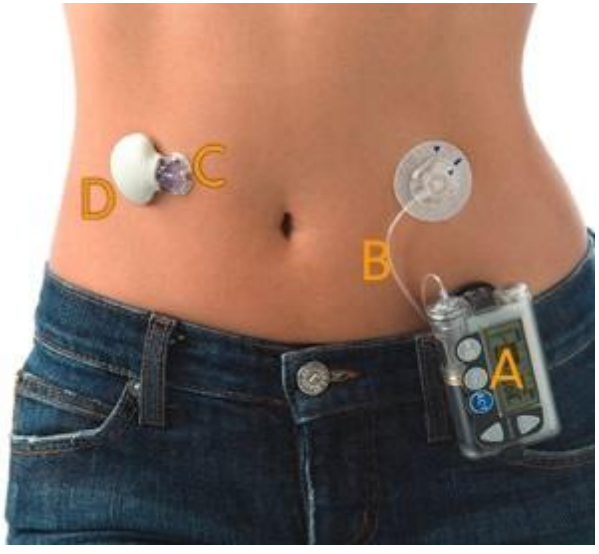
Public safety and homeland security

A vision for "high performance America"

- Make government more effective, efficient, and transparent
- Ensure that public investments are aligned and forward-thinking
- Create the conditions for innovation and America's competitive advantage in key strategic areas
- Unlock the value of data for new applications and research

Healthcare

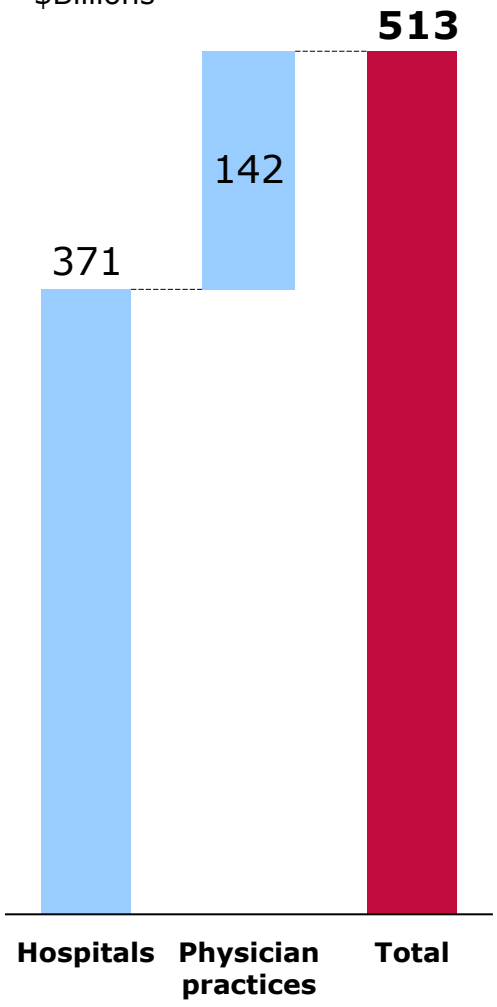
As a platform for innovation and information exchange, broadband helps improve health outcomes



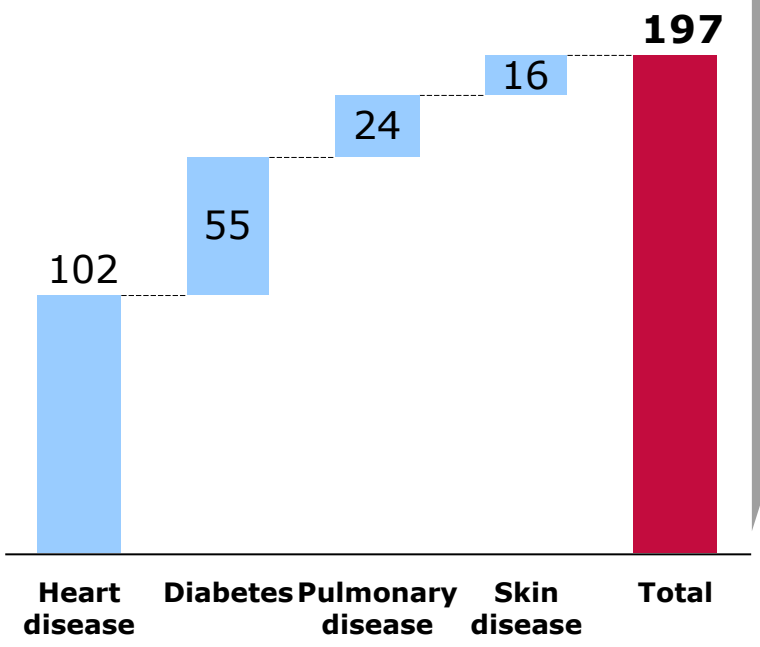
Source: AirStrip Technologies, Intel, Medtronic, CardioNet, Corventis

E-care could result in significant cost savings

Possible savings from implementation of electronic health records over 15 years
$Billions



Possible savings from implementation of remote monitoring over 25 years
$Billions



$700B in potential net savings over 15-25 years

Source: Health Affairs; Robert Litan

The U.S. ranks in the bottom half among developed countries on every metric used to measure health IT adoption

Gaps	*Issues*
Misaligned economic incentives	• Providers bear the implementation costs but do not receive proportionate benefits • CMS reimburses about $2 million in telehealth from a $300B+ budget
Outdated regulations	• Access to care is hindered by rules that limit where and how physicians can practice • Innovation is threatened by regulatory grey area
Lack of data and information access	• Data are often held in proprietary systems that make aggregation and exchange difficult • Regulations limit consumer access to personal health data
Insufficient broadband connectivity	• At least 3,600 small providers face a connectivity gap • Providers face dramatic price differentials for connectivity • About 90% of Indian Health Services sites have no more than a T1 line

Source: The Commonwealth Fund; Federal Register (CMS), CMS; OBI team analysis

Framework for recommendations

1. **Creating the incentives for broader health IT adoption and innovation**
2. **Modernizing regulations to increase access to care and enable health IT adoption**
3. **Driving innovative applications and advanced analytics**
4. **Ensuring all providers have access to affordable broadband**

Creating the conditions for broader adoption and innovation

1

Create incentives for adoption of e-care technologies

- Increase e-care pilots that evaluate cost savings & clinical outcomes
- Expand reimbursement for e-care under current fee-for-service model where outcomes are proven
- Provide Congress with a plan to realize the value of e-care

2

Reducing regulatory barriers to increase access to care and maximize value

- Revise credentialing, privileging and state licensing requirements to enable e-care

- Clarify regulatory requirements and the approval process for converged communications and healthcare devices

3

Improving the utilization of health data to drive innovative applications and advanced analytics

- Create next-generation interoperability across clinical, research and administrative data

- Ensure patients have access to and control over their health data

Ensuring all providers have access to affordable broadband

4

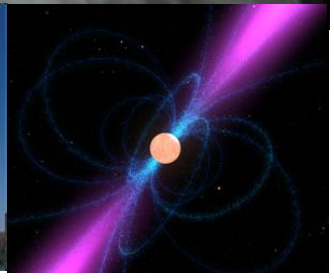
- Transform the Rural Healthcare Program
  - Subsidize ongoing broadband costs for delivery locations
  - Subsidize network deployment to delivery locations where existing networks are insufficient
  - Expand the definition of eligible providers
  - Require participating institutions to meet outcomes-based performance measures

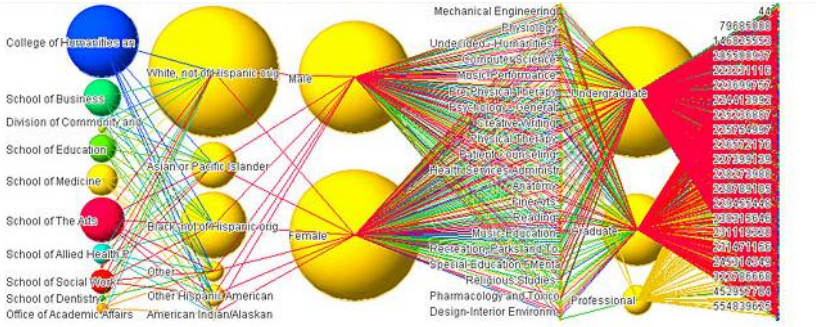
- Upgrade Indian Health Service broadband service

- Track and publish progress on broadband connectivity in healthcare facilities

Education

As a platform for information exchange, broadband helps personalize instruction so students learn more

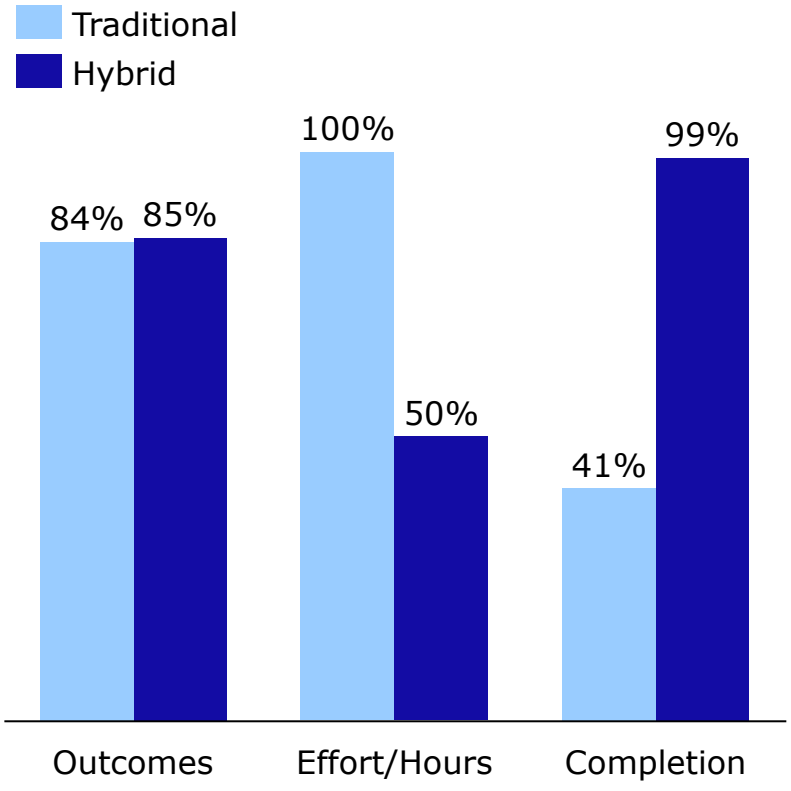




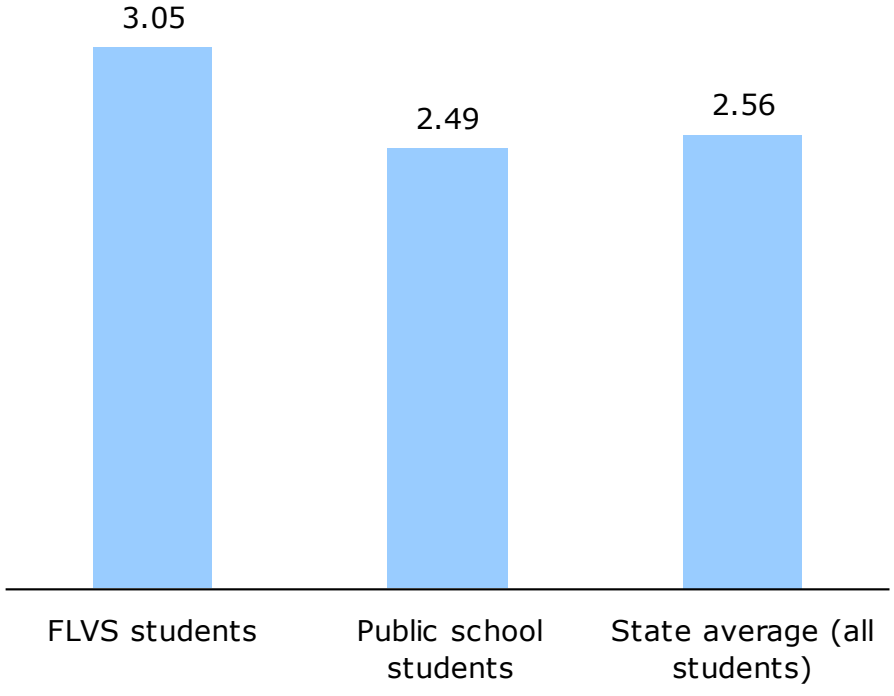
Source: National Radio Astronomy Observatory (NRAO) and NASA; John Lang; Hubert Lee

Online instruction pilots reveal significant opportunity to advance achievement

Comparison of results between traditional and hybrid instruction models
Percentages



Comparison of Advanced Placement scores at Florida Virtual School and traditional instructional models
Advanced Placement Scores, 1-5 Scale



Sources: Carnegie Mellon, Open Learning Initiative, Lovett et al., and Joel Smith testimony to FCC, Florida Tax Watch

Gaps prevent education from taking full advantage of broadband

Gaps	*Issues*
Insufficient connectivity	• School and classroom bandwidth demands to rise dramatically over the next few years • 16% of public community college campuses have high speed broadband v. 91% of research universities
Limitations on online learning systems and content	• Regulations inhibit online learning: teachers often cannot teach across state lines; course accreditation is often based on "seat time", not outcomes • Limited supply of high quality online learning systems and digital content • Limited digital literacy skills among teachers and students
Limited data access & lack of transparency	• Only 37% of teachers have electronic access to achievement data for their students • Data integration is one of the most challenging problems facing schools

Source: Educause, US Department of Education

Framework for recommendations

1. **Upgrading E-rate**
2. **Supporting and promoting online learning**
3. **Unlocking the power of data to personalize learning and improve decision-making**

Upgrading E-rate

- Increase flexibility and bandwidth
  - Permit off-hours community use
  - Set goals for school and library connectivity
  - Support more flexibility in infrastructure development
  - Support more internal connections
- Improve program efficiency
  - Streamline application process
  - Improve cost efficiency and data collection
  - Collect better data
  - Index cap to inflation
- Foster innovation with pilot programs
  - Support wireless connectivity to devices on and off-campus
  - Award some funds competitively
- Improve connectivity of community colleges

Supporting and promoting online learning

- Increase supply of digital content
  - Develop standards for government-generated content
  - Make federal content digital
  - Provide incentives for publishers
  - Simplify copyright regime to encourage contributions
- Promote digital literacy
  - Support standards for digital skills
  - Fund integration of digital literacy and STEM into curriculum
- Expand online learning solutions
  - Remove regulatory barriers
  - Fund research & development and investment
  - Consider open license as option for federal investments

Unlocking the power of data to personalize learning and improve decision-making

3

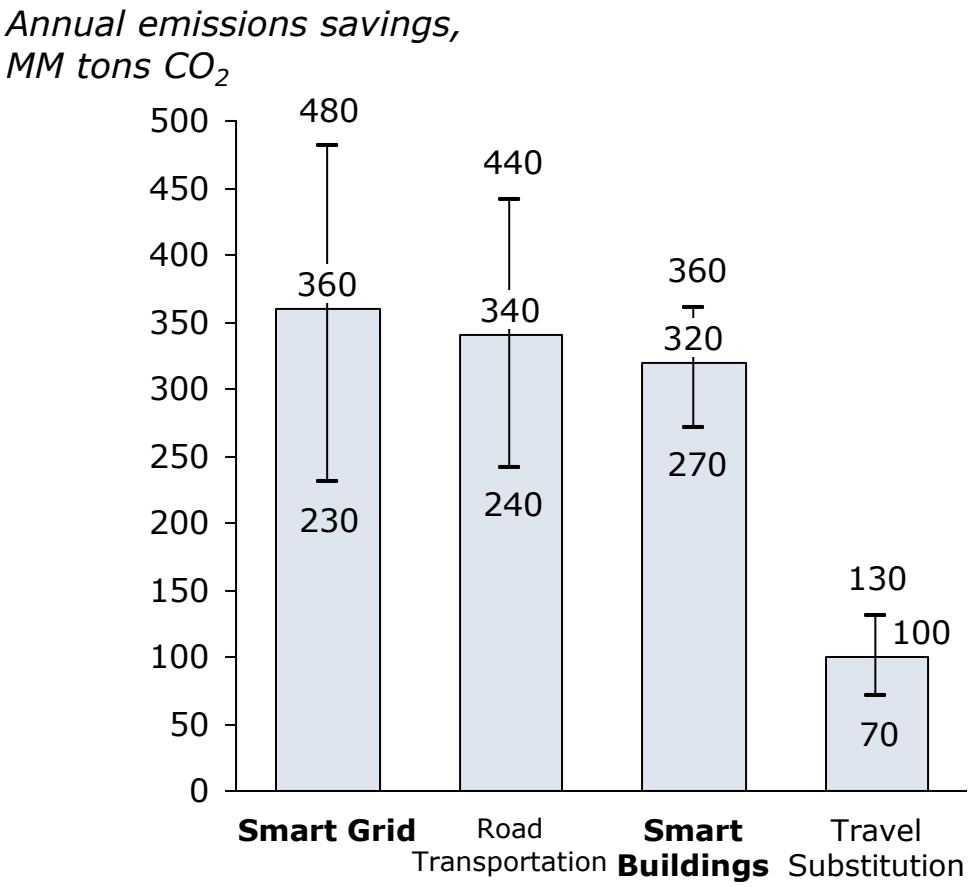
- Foster adoption of Electronic Educational Records
- Develop standards for financial data transparency
- Create an online RFP broadcast service to increase market information

Energy and the environment

As a platform for innovation, broadband helps consumers understand and manage their energy use

A smarter grid and smarter homes can have significant impact on carbon emissions and customer bills

A Smarter Grid and Smarter Buildings offer significant emissions savings opportunities



- Providing consumers energy information could reduce consumption by 5-15% (a $60-$180 annual savings per home)
- Dynamic pricing and smart home technologies can reduce peak demand by 27%-44%

Sources: "Smart 2020: Enabling the Low Carbon Economy in the Information Age. United States Report Addendum", GESI and BCG, Nov. 2008; Google; Faraqui and Sergici

Broadband and national energy challenges

Gaps	*Issues*
Lack of broadband to the smart grid	• Utilities' private networks are often narrowband solutions that can't support growing number of endpoints • Unlicensed spectrum solutions may be suboptimal for mission-critical control applications • Commercial data networks are not ubiquitous or universally reliable during emergencies
Limited consumer access to energy data	• Less than 1% of customers have real-time access to their digital energy consumption data • Of 17 million smart meters to be deployed, only ~35% will provide customers energy data access
Inefficient energy use in ICT	• Emissions from ICT growing 3x faster than rest of economy • Data centers' electricity use to double by 2011
Distracted driving; lack of intelligent transportation systems	• Increased potential for distracted driving with broadband applications in the car • Intelligent transportation systems can help prevent accidents and save lives

Source: Google; eMeter; GE; Smart 2020; EPA; Smart 2020

Framework for recommendations

1. **Integrating broadband into the smart grid**
2. **Expanding consumer access to energy information**
3. **Accelerating sustainable information and communications technology (ICT)**
4. **Making transportation safer, smarter, and cleaner**

Integrating mission-critical broadband into the smart grid

1

Pursue three paths for providing connectivity:

- Commercial networks
  - Investigate reliability and resiliency of commercial networks as part of a smart grid
  - Reduce impediments and financial disincentives to use
- Public safety networks
  - Enable utilities to have secondary access to proposed public safety broadband network
- Private networks
  - Consider smart grid requirements in identifying new uses for spectrum

Expanding consumer access to energy information

- Ensure customers have access to their digital energy information
  - Real-time information
  - Historical consumption, price, and bill data

- Ensure customer access to and privacy of their digital energy information
  - Allow customer-authorized 3rd party access

Accelerating sustainable information and communications technology (ICT)

- Focus on the energy efficiency and environmental impact of the communications industry

- Set energy goals for federal data centers
  - Meter to get baseline data on energy use
  - Incorporate Energy Star rating program

Making roads and highways safer, smarter, and cleaner

- Focus on methods to reduce distracted driving
  - Consumer outreach
  - Working with industry on next generation of in-vehicle communications technology

- Deploy vehicle-to-vehicle intelligent transportation technology to help prevent accidents and potentially save energy

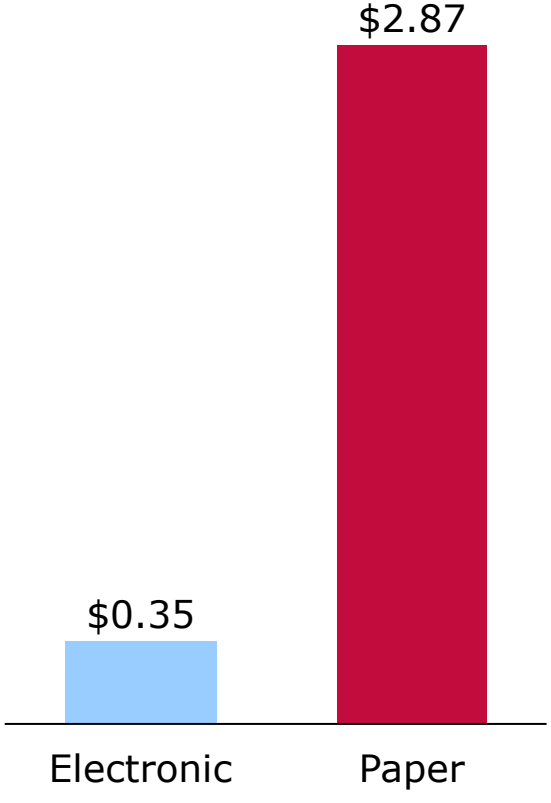
Government performance and civic engagement

The value of broadband in mobilizing government and citizens to help society

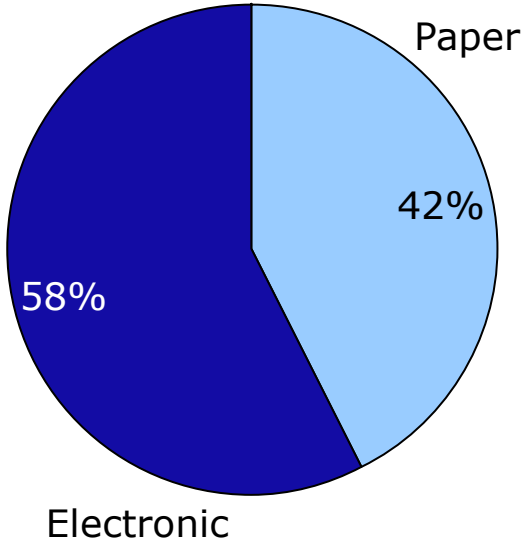
Source: Mashable, US Department of State DipNote

Significant opportunities exist for cost savings through broadband for government performance

Comparison of costs of processing tax returns
$ per user



Comparison of filers by hand v. e-file
Percentage



$333M in savings over 5 years

Source: IRS Inspector General

Gaps persist in government adoption and deployment of broadband

Gaps	*Issues*
Inefficient service delivery	• Government lags in adoption of Internet technologies compared with private sector, hindering quality of service • Government often fails to share information across silos in ways that improve service delivery
Limited access to information and tools for civic engagement	• Data is often not sufficiently accessible online • Government fails to fully engage citizens using broadband-enabled technologies • Overseas military more than twice as likely to experience voter registration problems as general public
Limited leverage of government resources for broadband	• State and local governments can't take advantage of savings in federal communications contracts • Federal grants encourage the development of duplicative, stove-piped broadband networks

Source: OMB; Pew Center on the States

Framework for recommendations

1. **Transforming government service delivery**
2. **Increasing the quantity and quality of civic engagement**
3. **Using government assets to improve broadband deployment**

Transforming government service delivery

- Improving government efficiency and productivity
  - Explore use of cloud computing to reduce costs
  - Use competitions to gather ideas for improving quality and efficiency using broadband
  - Encourage greater use of social media

- Enable citizen-centric online services
  - Enhance authentication for online services
  - Enable individuals to access and verify their personal data held by government agencies
  - Expand efforts to provide integrated benefits online

Increasing the quantity and quality of civic engagement

- Make the federal government more open and transparent
  - Release more government data and information on digital platforms

- Create a more robust digital public media ecosystem
  - Support public media's transition to digital platforms for content and delivery

- Engage citizens using online and social media channels
  - Implement broadband-enabled tools to increase civic participation

- Engage citizens to increase innovation in government

- Modernize democratic processes

Using government to improve broadband deployment

- Improve ability of federal buildings serve as anchor tenants for unserved and underserved communities
- Open federal NETWORX contracts to state and local governments
- Encourage greater review and coordination of broadband grants
- Target federal funding to areas where broadband solutions are outcomes-oriented and holistic

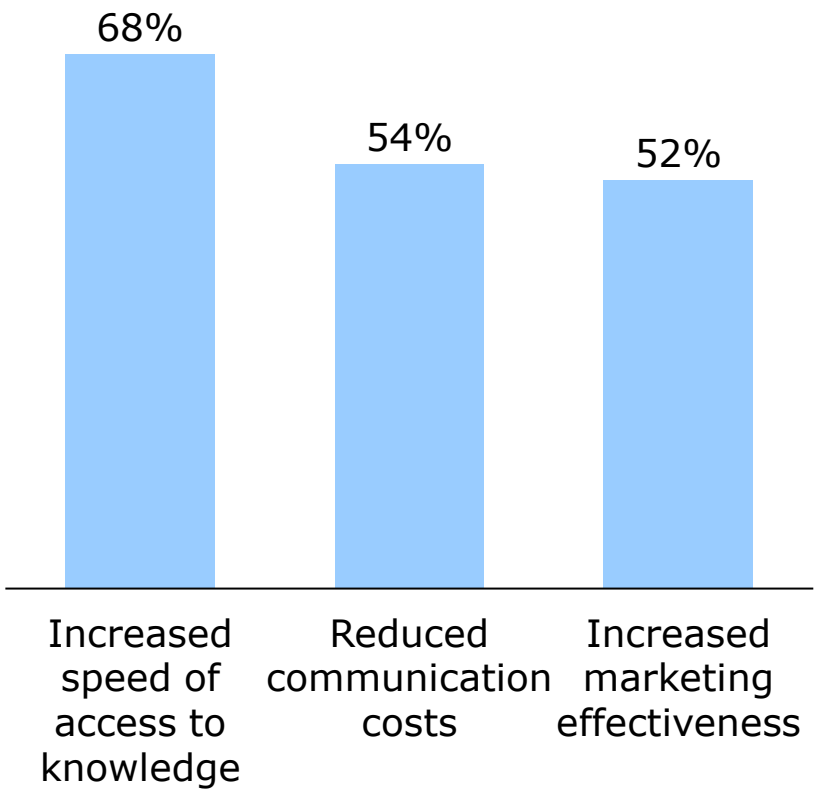
Economic opportunity

Broadband brings economic opportunity to job seekers, small businesses, and communities

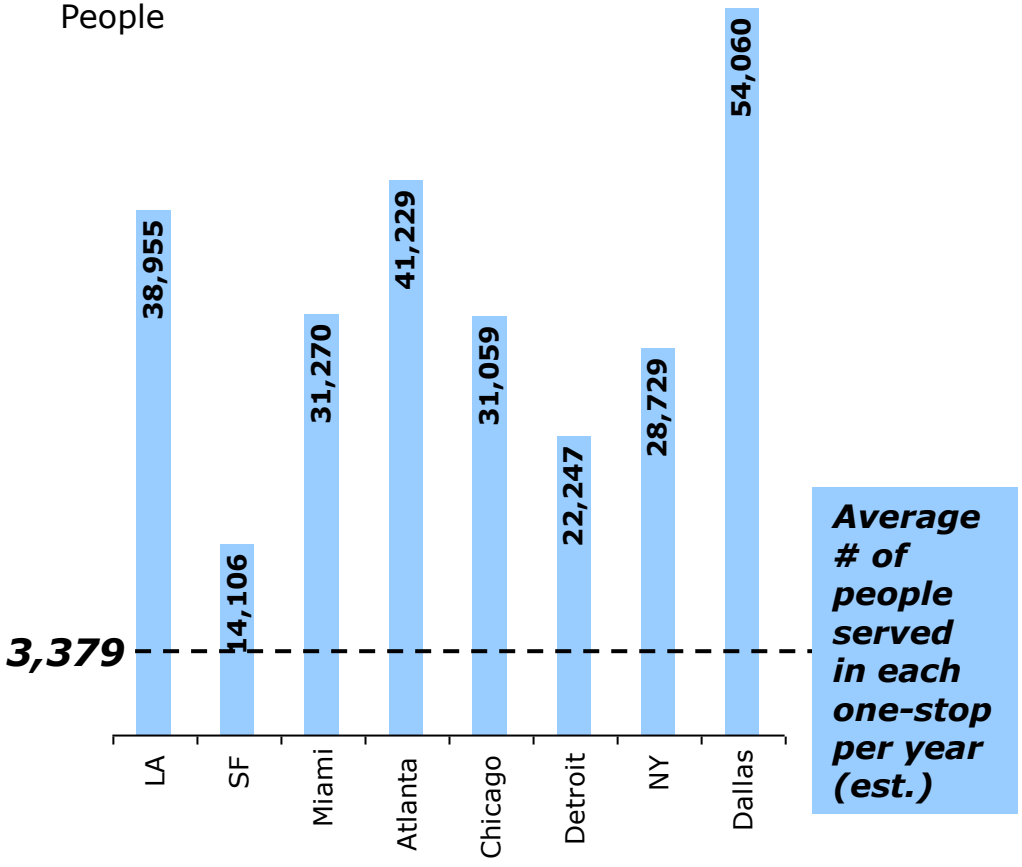
Source: Denton Public Library, Louisiana State University, ScienceRoll

Broadband can improve productivity and relieve pressures felt in workforce development system

Survey results of small businesses after implementing web-based technology tools
Percentage of users



Unemployed population per one-stop in major metro areas, 2008[1]
People



Source: McKinsey Quarterly; Department of Labor, http://www.careeronestop.org, FCC analysis

Gaps persist in fully utilizing broadband to open up new economic opportunities for Americans

Gaps	*Issues*
Under-skilled workforce; fragmented system	• Over 50% of today's workforce lacks a post-secondary education, which many jobs require • Workforce support system is a "confusing maze…programs spread across…agencies" • Career Centers are overtaxed, each serving an average of 3,000 people in cities with high unemployment rates
Limitations on telework	• Tax and regulatory barriers prevent some employees from teleworking • Limited standards, policies, and infrastructure for teleworking in the federal government
Sub-optimal broadband utilization among small businesses	• Almost all businesses use broadband, but only 32% use their websites to sell products • Small businesses are less likely to adopt key applications such as e-commerce, CRM, and video conferencing
Lack of scale in economic development efforts	• Federal economic development funding is fragmented: $76B spread across 14 agencies and 250 programs • 57% of all federal support for R&D happens in only 50 colleges and universities

Source: Council of Economic Advisors; Workforce Alliance; SBA; Initiative for a Competitive Inner City; FCC Business Adoption survey; Brookings Institution; NSF

Framework for recommendations

1. **Creating a robust national employment assistance platform**
2. **Promoting telework through federal policy**
3. **Expanding efforts to train and equip SMEs with broadband applications**
4. **Utilizing broadband to enhance economic development tools and planning**

Creating a robust national employment assistance platform

1

- Deliver employment assistance programs on a scalable online platform
- Provide workforce with anytime, anywhere e-learning tools to drive enrollment in post-secondary education and job training programs
- Guide users to pursue individualized job training and long-term career paths

Promoting telework through federal policy

- Remove current tax and regulatory barriers for telework
- Make the federal government a leader in telework policy
- Deploy next-generation communications technology throughout federal government to make telework easier

Expanding efforts to train and equip SMEs with broadband applications

- Expand current efforts to train small businesses on key IT applications
- Launch public-private partnership to provide technology training for small disadvantaged businesses and small businesses in low-income areas
- Support entrepreneurial development programs with broadband tools and training
- Use broadband to bring greater scale and effectiveness to existing federal support programs for small businesses

Utilizing broadband to enhance economic development tools and planning

4

- Integrate broadband assessments into economic development grant programs
  - EDA's regional development planning process
  - Enterprise Community/Empowerment Zone programs
- Create a national data warehouse & knowledge management tool
  - Integrate federal sources of economic data, available federal grants, and knowledge management tools
- Support development of regional technology transfer centers

Public safety and homeland security

As a platform for efficient information flow, broadband can change the future of public safety communications

Current State → Future goal

Gaps persist in fully utilizing broadband for public safety and homeland security purposes

Gaps	*Issues*
No nationwide public safety network	• No nationwide, interoperable broadband wireless network that is ubiquitous, redundant, and resilient • Few public safety agencies have access to commercial wireless mobile broadband • Commercial broadband does not support public safety requirements and is not cost effective
Outmoded 9-1-1 system	• 9-1-1 services utilize varied legacy communications networks • Few public safety agencies have access to broadband services to support next-generation 9-1-1
Outmoded alerting system	• Current distribution technology limits amount of audio/visual to Americans over broadcast channels • FEMA has taken steps to develop IPAWS but clear implementation milestones are needed
Critical infrastructure vulnerabilities	• Companies reported $265M+ in cyber crime-related losses • Communications providers subject to frequent attacks on critical IP-based infrastructure • Insufficient incentives and safeguards for security of critical communications assets

Source: Internet Crime Complaint Center

Framework for recommendations

1. **Creating a nationwide interoperable broadband wireless public safety network**
2. **Transitioning to a next-generation 9-1-1 system**
3. **Developing a comprehensive next-generation alerting system**
4. **Enhancing security measures to safeguard networks and core infrastructure**

Creating a nationwide interoperable broadband wireless public safety network

1

- Ensure network capacity and resiliency
- Leverage commercial technologies to capture economies of scale
- Create an Emergency Response Interoperability Center to ensure interoperability nationwide
- Fund network construction, operation, and evolution

Transitioning to a next-generation 9-1-1 system

- Identify costs and recommend congressional appropriations
- Enact a federal regulatory framework to ensure nationwide standards
- Conduct proceedings to address IP-based communications devices, applications and services for next-generation 9-1-1

Developing a comprehensive next-generation alerting system

3

- Examine all issues associated with a next-generation alerting system

- Ensure coordination between agencies that have overlapping jurisdictions over alerting

Enhancing security measures to safeguard networks and core infrastructure

4

Cyber security

- Examine creating voluntary cyber security certification program for communications services providers
- Explore extending outage reporting to broadband service providers
- Create a cyber security information reporting system

Critical infrastructure

- Ensure survivability of critical infrastructure
  - Understand capacity and vulnerabilities of core infrastructure
  - Address networks' preparedness to deal with pandemics or incidents of high network stress/overload
  - Develop priority network access and routing rules
  - Understand reliability and resiliency issues in broadband networks