



Ana [Preston] Hunsinger
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INTERNET2 UPDATE & FUTURE GOVERNMENT SUPPORTED PROJECTS

Overview

- Internet2 Organization and Current Status
- Broadband developments in the US:
 - National Broadband Plan
 - Broadband Technologies Opportunities Program
 - United States Unified Community Anchor Network – U.S. UCAN
 - Participants and Community

INTERNET2 - UNPARALLELED HUMAN NETWORK

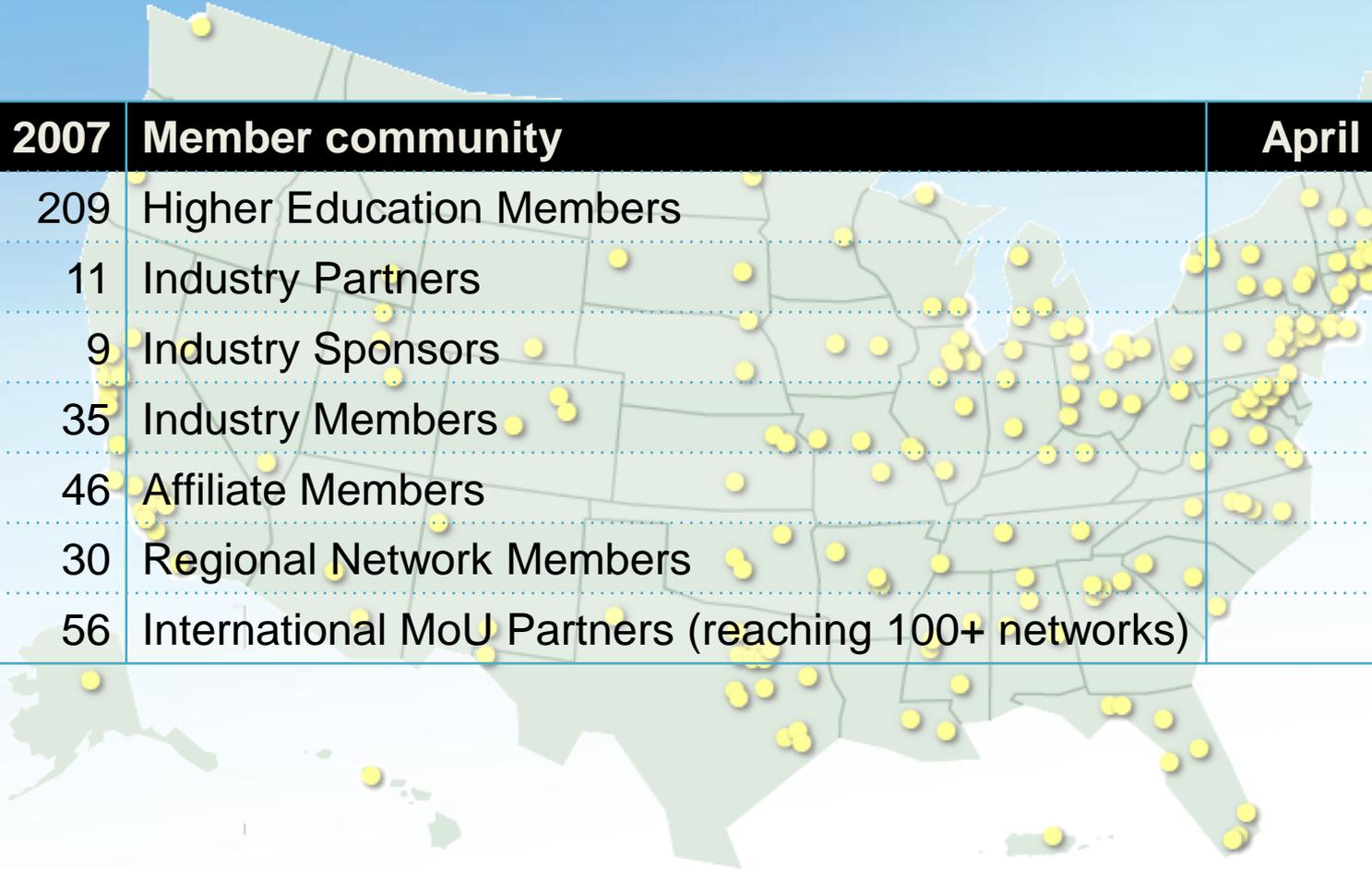


Internet2's unparalleled human network includes

- Over 330 member institutions
- Over 65,000 community members



Internet2 member communities



Oct 2007	Member community	April 2010
209	Higher Education Members	214
11	Industry Partners	10
9	Industry Sponsors	3
35	Industry Members	27
46	Affiliate Members	59
30	Regional Network Members	33
56	International MoU Partners (reaching 100+ networks)	56

Internet2 – Vision alignment Challenges and Opportunities

Advanced network and
network services leadership

Services at scale:
Services “above the network”

U.S. UCAN

National/Regional collaboration

Global reach and leadership

Research community development
and engagement

Industry partnership development
and engagement



Broadband Developments: Background and Context

- National Broadband Plan
- Concept of UCAN – Unified Community Anchor Network
- Implementing UCAN: Broadband Technologies Opportunity Program (BTOP)
- Proposal -- U.S. UCAN

National Broadband Plan

- On March 16, 2010, the Federal Communications Commission (FCC) delivered "Connecting America: The National Broadband Plan" to Congress, including over 200 goals and recommendations to the FCC, Congress and Administration.
- **Goal 4: Affordable access to at least 1 gigabit per second broadband service to anchor institutions**
- *www.broadband.gov*

“Unified Community Anchor Network” *(pp 154–55,194)*

- The federal government and state governments should develop an **institutional framework that will help America’s anchor institutions obtain broadband connectivity, training, applications and services.**
- One approach to ensure connectivity for facilities that serve public purposes is to **give a non-profit institution the mission and capability to focus on serving the broadband needs of public institutions...**
- Today...R&E networks provide high-speed (10 Mbps-1 Gbps) connectivity to 66,000 community anchor institutions. But...it is estimated that only one-third of anchor institutions have acces... **This model should be expanded to other community institutions.**

R&E networking today

- 66,000+ anchor institutions connected
 - 785 colleges or universities
 - 677 community colleges
 - 52,698 K-12 schools
 - 7,299 K-12 school districts
 - 3,482 libraries
 - 74 museums
 - 13 performing arts organizations
 - 234 health care organizations
 - 31 public media
 - 44 science centers, zoos, aquariums
- Average bitrate: 108.8 Megabits
- Median bitrate: 12 Megabits

Estimated anchor institution totals

Institution Type	Specifications	Total Count
Schools		
K12 schools	Buildings	132,436
Community Colleges	For-profit excluded	1,152
Colleges and Universities	For-profit excluded	2,176
Total - Schools		135,764
Libraries		
Central and branches	Public libraries	16,604
Bureau of Indian Affairs		160
Government Libraries		1,150
Total - Libraries		17,914
Medical and Healthcare providers		
Hospitals	Long-term care, acute care	15,316
Rural Health Centers		2,740
Ambulatory Clinics/Centers		40,398
Total - Healthcare		58,454
Public Safety		
PSAPs		6,150
Total of all Categories		218,282

What is the “R&E Networking Model”?

- Advanced networks tailored to specific needs of users
 - High capacity, uncongested, transparent, leading-edge network technologies (IPv6, multicast)—“advanced applications ready”
 - Priced to encourage, not discourage, new use, new applications, growth
- Networks owned, controlled and directed by their users
- Three tiers: national, regional/state, local
- Non-profit, public purpose
- Facilitating an active “community of users” as important as the network itself—self help, virtual help desk, experiments, collaboration, problem solving, training, etc. A people network that makes the technical network useful.

Three-Tier Network Model

- Campus ↔ Regional ↔ National
- Regional Networks are the middle tier and bridge of the Three-Tier Model
- There is a critical role to be performed between the national networks and a campus



Who is The Quilt?



Who We Serve

- Higher Education
- K-12 Schools
- Public Libraries
- Healthcare Institutions; research hospitals, non-profit, for-profit
- National Laboratories
- Innovation Centers, e.g. research parks
- Community Development; museums, nonprofits, public t.v
- Federal, state, local government institutions and agencies
- Economic development offices and county extension offices



Important migration to Regional Optical Networks

- Now providing sufficient bandwidth to support new classes of end-to-end service
 - Ultra- broadband last mile connectivity
 - Connectors/Gigapops delivering unlimited bandwidth in a cost effective manner, and
 - Providing more value added services such as peering and dynamic waves



Regional R&E Network Services

- **Transport** – campus/school access; state/regional network backbone aggregation, internet services, national network connectors
- **Shared Services** – videoconferencing, voice, business continuity, middleware
- **Support** – technical training and expertise, consulting, community building
- **Applications** – instructional and curricular integration



ARRA – BTOP -2009

- American Recovery and Reinvestment Act
- Broadband Technologies Opportunities Program - BTOP
 - program administered by the National Telecommunications and Information Administration (NTIA) in the U.S. Department of Commerce.
- Funded in 2009 with \$4.7B by the American Recovery Act to enhance broadband connectivity to underserved areas and community anchor institutions
 - “Overall, Recovery Act investments in broadband are expected to create tens of thousands of jobs in the near term and expand economic development and job opportunities in communities that would otherwise be left behind in the new knowledge-based economy” (from analysis released by the National Economic Council last year)

Implementing UCAN: NTIA's BTOP funds community anchor connectivity

- 233 projects: Install or upgrade 120,000 miles of broadband networks
- Connect 24,000 anchor institutions
- Deploy infrastructure in areas with nearly 40 million households and 4 million businesses.
- Invest in more than 3,500 new or upgraded public computer centers in libraries, schools, community centers and other public locations.
- Invest in more than 35,000 new or upgraded public computer workstations.
- Make public computer center workstations and training available to more than 1 million new users.

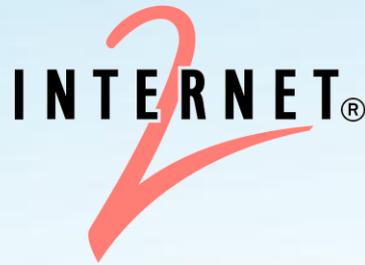
Source: <http://www.commerce.gov/news/press-releases/2010/09/27/secretary-locke-announces-recovery-act-investments-expand-broadband-i>



A United States Unified Community Anchor Network (U.S. UCAN) proposal



National Telecommunications & Information
Administration
Broadband Technology Opportunity Program (BTOP)



U.S. UCAN – Infrastructure program

- A leading generation national-scale infrastructure to support community anchor institution applications
- Fundamentally linked to (and dependent on) similar efforts at the regional, state and local level
- Enables new applications to have flawless performance at scale
- Transparent operations, finances and performance will create metrics to measure service excellent
- Community-owned infrastructure and community-driven priorities
- Tailored to community anchor expectations

Optical network topology (final draft)

- Network infrastructure

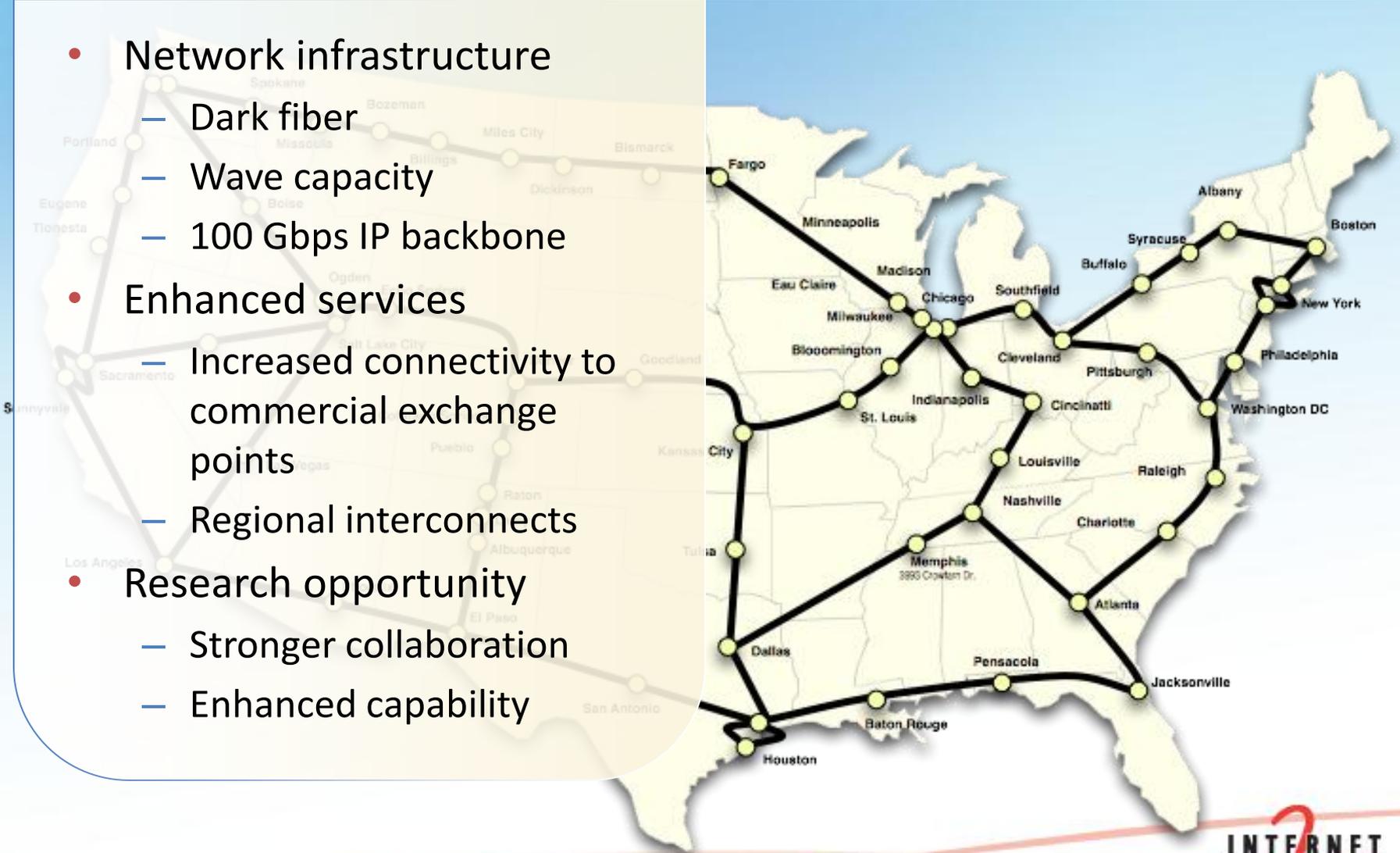
- Dark fiber
- Wave capacity
- 100 Gbps IP backbone

- Enhanced services

- Increased connectivity to commercial exchange points
- Regional interconnects

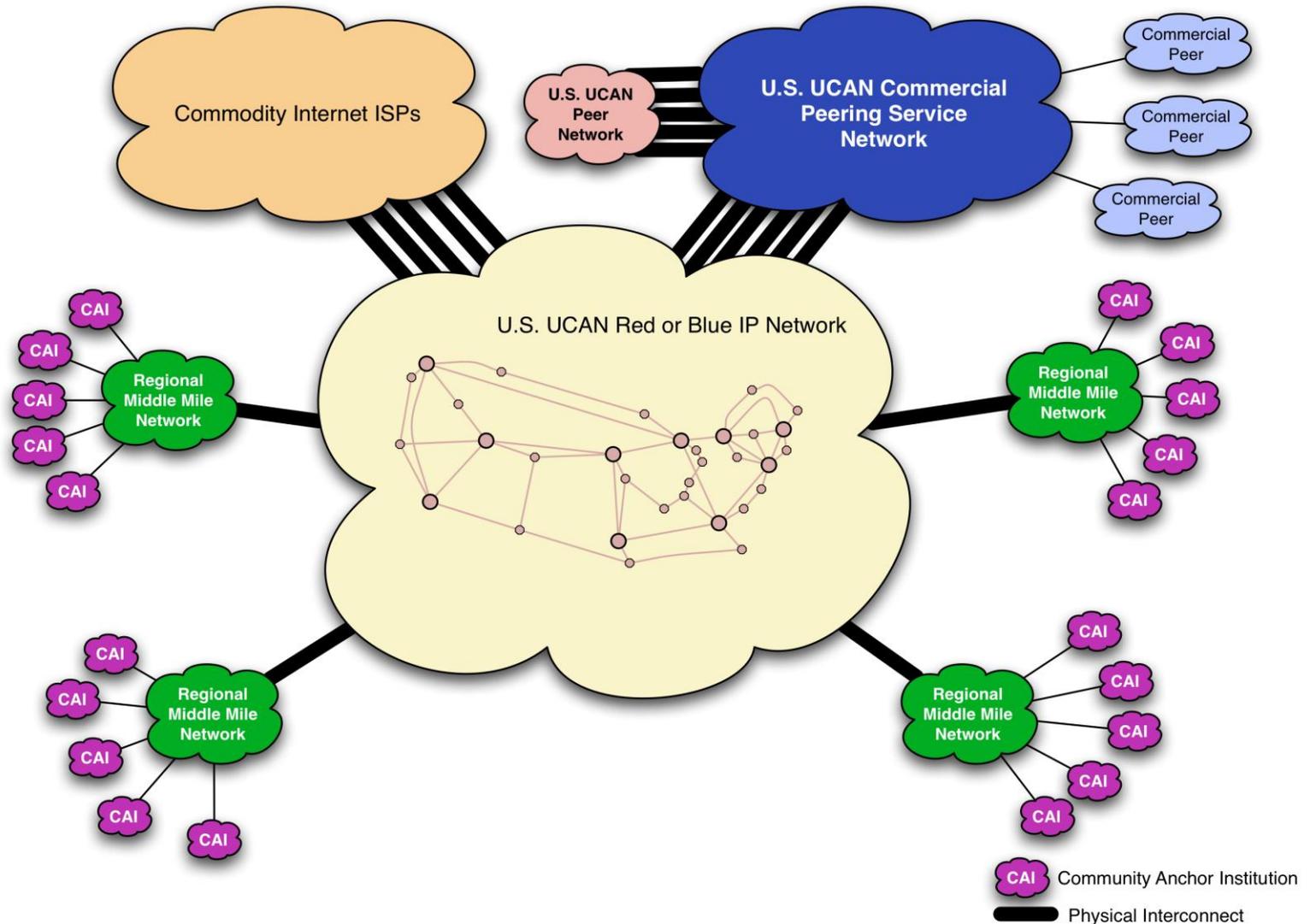
- Research opportunity

- Stronger collaboration
- Enhanced capability



U.S. UCAN Logical Topology with Regionals

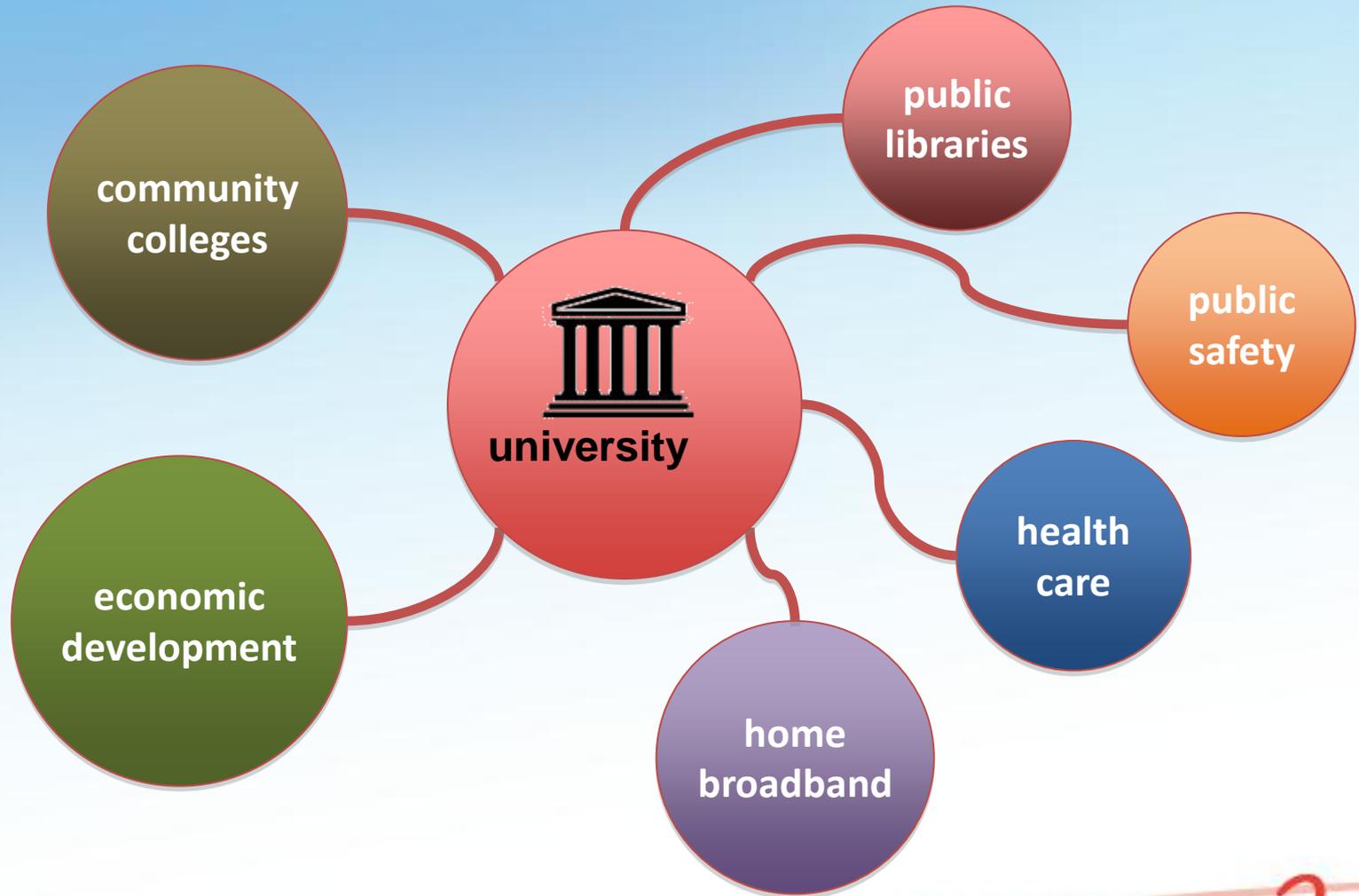
Figure H: U.S. UCAN Peer Network Access



Reconnecting with our community

- U.S. UCAN can't be *only* about network connections
- Higher education must *reconnect with our community*
- We must provide leadership—and economies of scale—in above-the-network, toward-the-community services
- We must remove the network as barrier to a whole new range of users
- We must identify and mobilize our programs to provide value for a whole new generation of citizens
- We must fulfill our missions in a new, technology-driven world

Higher education: Serving our civic fabric



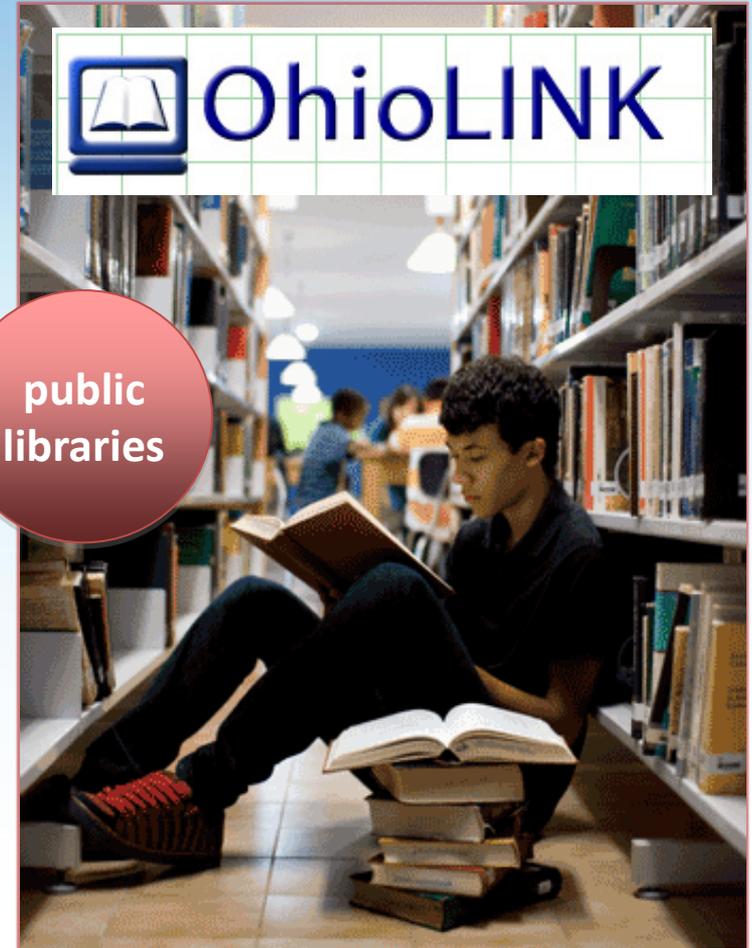
Higher education and health care

- OARNet together with Ohio State are connecting rural hospitals to Nationwide Children's Hospital in Columbus.
- Fragile premature babies at rural hospitals are receiving clinical assessments via HD videoconferencing from leading specialists.



Higher education and libraries

- OhioLINK, a consortium of 88 Ohio university libraries, and the State Library of Ohio, works to provide 600,00 Ohio students, faculty and researchers with library resources for teaching and research.
- OhioLINK provides access to:
 - 48 million books and other library materials
 - Millions of electronic articles
 - 12,000 electronic journals
 - 140 electronic research databases
 - 55,000 e-books
 - Etc.



Higher education and public safety

- State of New Jersey and NJEdge.net received \$39.6M BTOP award to build interoperable wireless public safety broadband network.
- More than 160 law enforcement agencies and 200 fire departments and trauma centers will use the network.
- The network will give first responders access to new, life-saving applications and capabilities.



NJEdge.Net

INTERNET

Further Resources

- <http://www.usucan.org>
- <http://www.internet2.edu/government/opportunities.html>
- <http://www.commerce.gov/news/press-releases/2010/09/13/secretary-gary-locke-announces-recovery-act-investments-expand-broadb>
- From Fall 2010 Internet2 Member Meeting:
 - The path forward
<http://events.internet2.edu/2010/fall-mm/agenda.cfm?go=session&id=10001401>
 - One Gigabit Project - <http://events.internet2.edu/2010/fall-mm/agenda.cfm?go=session&id=10001402>
- www.thequilt.net