

Network Nebraska—Education

SHLB Conference

*Network Nebraska-Education;
2013 NASCIO Cross Boundary
Collaboration and Partnerships
Awardee*

May 8, 2014

Network Nebraska-Education is in its eighth year of existence as a statewide network and now interconnects over 270 K-12 and higher education entities. With over 600 distance education courses and 20 gigabits of Internet being exchanged on an annual basis, it is an impressive project creating many educational opportunities. This session will explain more about its ability to serve community anchor institutions, its organizational structure, and lessons learned along the way.



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Websites:

<http://nitc.nebraska.gov/NNAG/index.html> (NN Advisory Group)

<http://www.networknebraska.net> (Network Nebraska)



“Never underestimate the power of a small group of committed people to change the world. In fact, it is the only thing that ever has.” ~ Margaret Mead

“It is amazing how much can be accomplished if no one cares who gets the credit.” ~ John Wooden

“Do all the good you can. By all the means you can.
In all the ways you can. In all the places you can.
At all the times you can. To all the people you can.
As long as ever you can.” ~ John Wesley

“If not now, when? If not me, who?” ~ Hillel the Elder

“Progress naturally breeds conflict, but not all conflict is progress’s offspring.”
~ Tom Rolfes



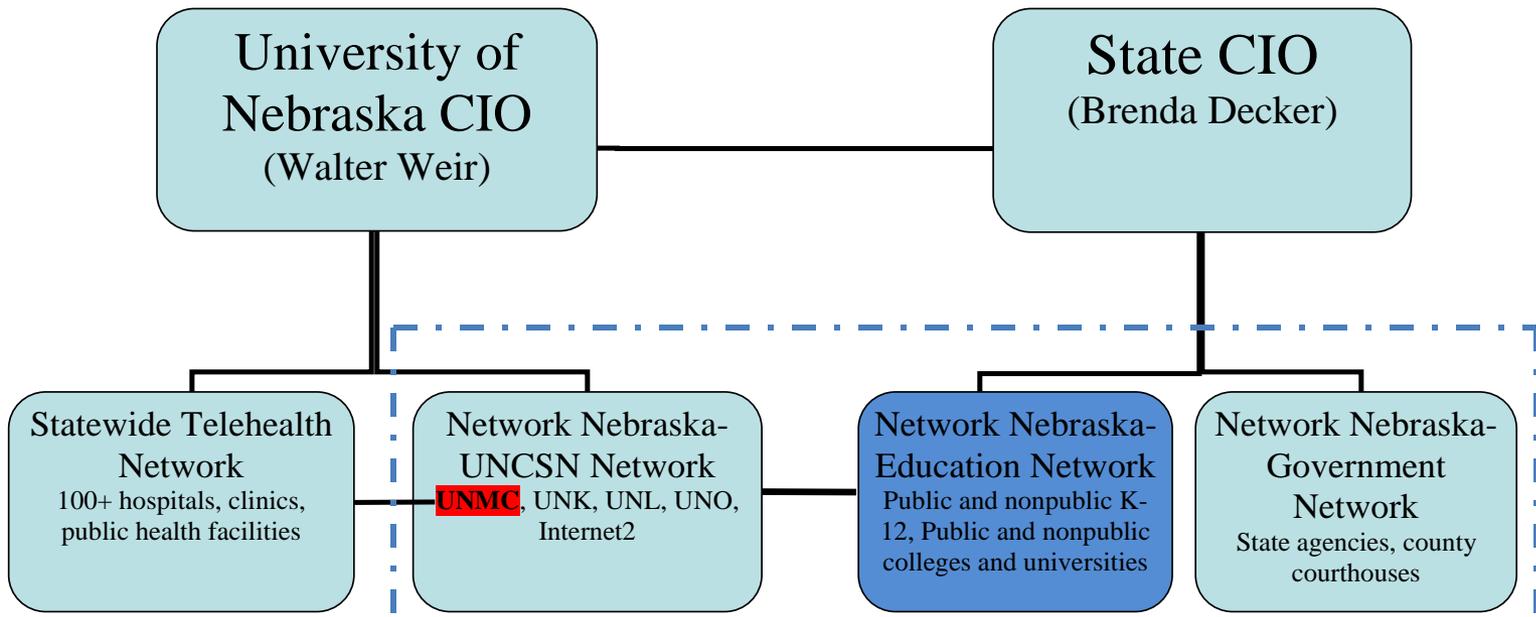
<http://www.nebraska.gov/>

A little bit about Nebraska:

- 77,358 square miles
 - 1,826,341 population (23.6 persons/sq. mile)
 - Cherry County (1 person/sq. mile; larger than states of CT, DE, RI)
 - Douglas County (1401 persons/sq. mile; City of Omaha)
 - 250 public school districts (300,000 students; Elba 70, Omaha 47K)
 - 165 nonpublic schools (45,000 students)
 - 268 public libraries
 - 1 public university system, 3 state colleges, 6 community colleges, 2 tribal colleges, 14 private colleges
-
- #4 in high school graduation rate; in the top 5 of ACT test scores
 - Unicameral, nonpartisan legislature
 - 100% public electrical power
 - Sits squarely over the Ogallala Aquifer
 - #1 in cattle production (6.6 million head)
 - #3 in corn production
 - Used to be #1 in college football 😊



- (N.R.S. 86-5,100) The Chief Information Officer, in partnership with the University of Nebraska, shall develop and maintain a statewide, multipurpose, high capacity, scalable telecommunications network to be called **Network Nebraska**. The network shall consist of contractual arrangements with providers to meet the demand of state agencies, local governments, and educational entities as defined in section 79-1201.01. *(LB 1208—2006 Session)* (“Network Nebraska” is shown inside the dotted lines)



Pre-Network Nebraska

Development

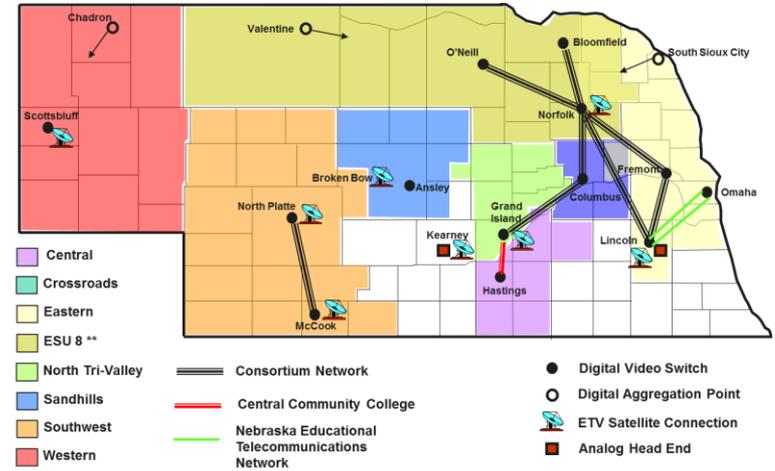
1992-2005

- 12 distance ed consortia
- Motion JPEG DS-3s (45M)
- No backbone interconnects
- 1 T-1 of Internet per school
- Fiber to 90% of districts

2006-present

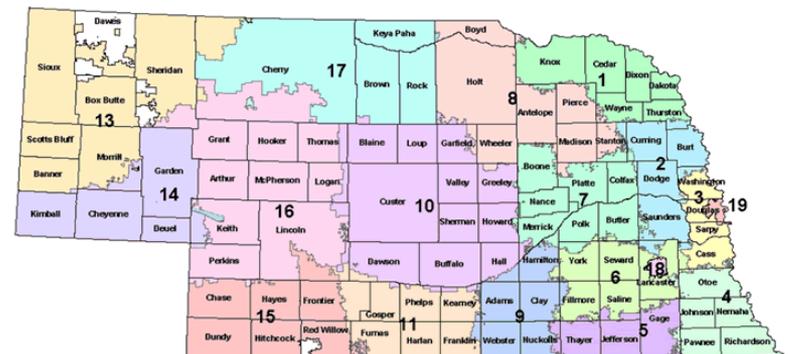
- 1 distance ed clearinghouse
- IP-based statewide network
- 1430-mile backbone
- Unlimited Internet
- Fiber to 99% of districts

NEBRASKA DISTANCE LEARNING CONSORTIUMS



** ESU 8 is made up of four consortiums: Niobrara Valley, Learners Academy, North Central, and Northeast Nebraska

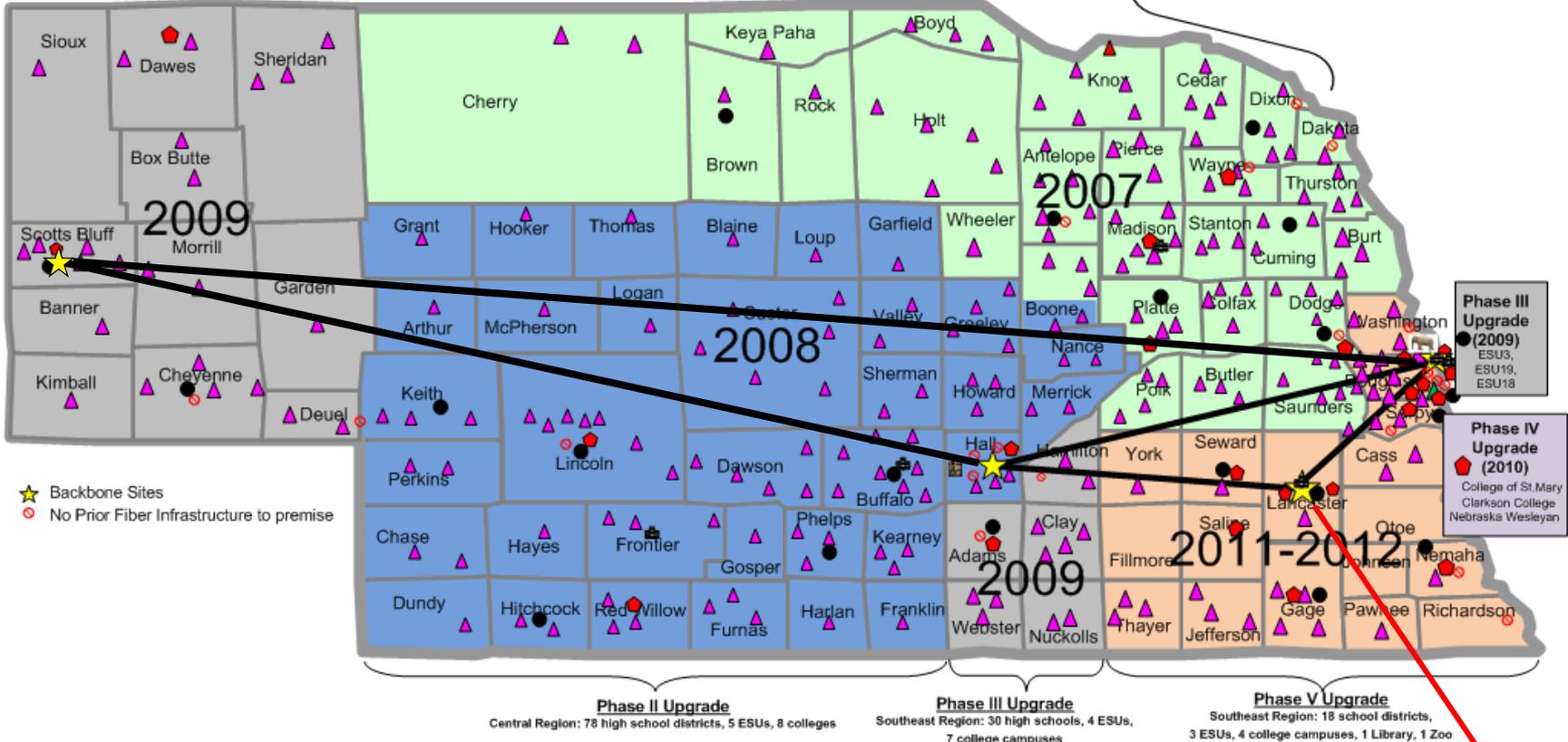
(1)



Network Nebraska-Education Map by Year

Phase III Upgrade
Panhandle Region: 23 high school districts, 2 ESU offices, 1 college campus

Phase I Upgrade
Green Shading of Northeast Region: 87 high school districts, 5 ESUs, & 2 college campuses



★ Backbone Sites
○ No Prior Fiber Infrastructure to premise

Phase III Upgrade (2009)
ESU3, ESU19, ESU18

Phase IV Upgrade (2010)
College of St Mary
Clarkson College
Nebraska Wesleyan

Phase I – Green Shading on Counties
North Central/NorthEast Regions 2007

- ▲ 87 School Districts
- 5 ESU Offices (1, 2, 7, 8, & 17)
- ◆ 2 College campuses
- NU (UNO, UNL, UNMC, UNK)

Phase II – Blue Shading on Counties
South Central Regions 2008

- ▲ 78 School districts
- 4 ESU Offices (10, 11, 15, & 16)
- ◆ 7 College campuses
- 1 NU (NCTA)

Phase III – Gray Shading on Counties
Western/SouthEast Regions in 2009

- ▲ 42 School districts
- 6 ESU Offices (3, 9, 13, 14, 18, & 19)
- ◆ 8 College campuses

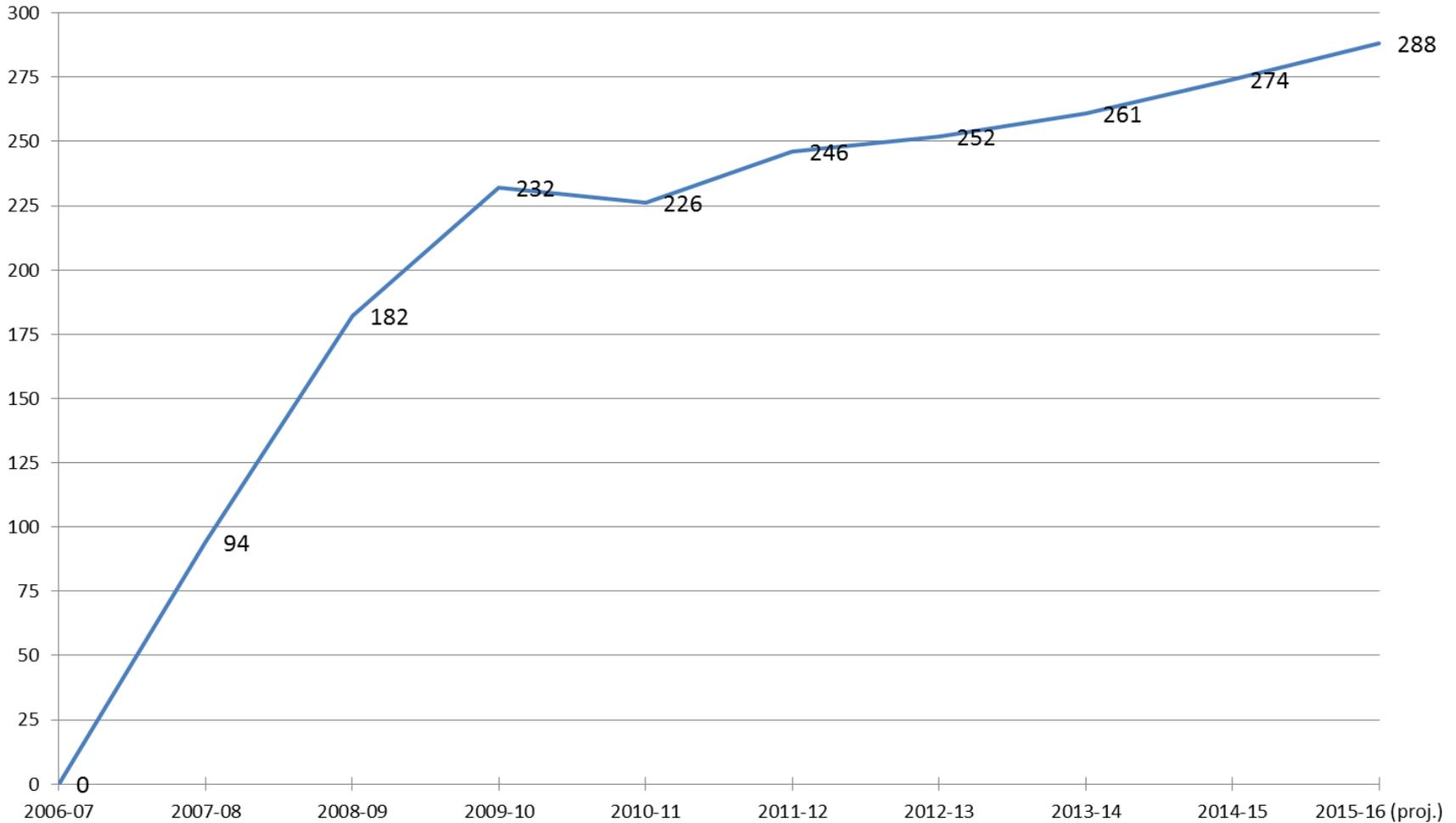
Salmon Shading on Southeast Region (2011-2012)

- ▲ 18 School districts
- 3 ESU Offices (4, 5, & 6)
- ◆ 4 College campuses
- Henry Doory Zoo
- Grand Island Public Library

Internet2
(K.C. GigaPop)



Network Nebraska-Education Membership by Year





- **Network Nebraska-
Education CURRENT
Partners (274)**

- 236 public school districts
- 17 Educational Service Units
- 10 public colleges
- 7 nonpublic colleges
- 2 tribal colleges
- 3 nonpublic schools
- 1 public library

- **Network Nebraska-
Education POTENTIAL
Partners (448)**

- 15 public school districts
- 7 nonpublic colleges
- 159 nonpublic schools
- 267 public libraries



At what speeds are they connected?

WAN Transport to the backbone	10Mbps-90Mbps	100Mbps-900Mbps	1000Mbps	2000Mbps+
	35 districts 1 public library	155 districts	45 districts	3 districts
Internet Access	26-50 Kbps/student	51-75 Kbps/student	76-100 Kbps/student	100+ Kbps/student
	20 districts	200 districts	18 districts	0 districts



E-rate: Who bids? Who files? Who gets billed? Who pays the undiscounted portion?

Type of Service	Who bids and contracts?	Who files E-rate?	Who is the billed entity?	Who pays the balance?
Local LAN circuits	K-12 schools & Libraries	K-12 schools & Libraries	K-12 schools & Libraries	K-12 schools & Libraries
WAN Circuits to the backbone	State of Nebraska	K-12 schools & Libraries	K-12 schools & Libraries	K-12 schools & Libraries
Statewide backbone	State of Nebraska	State of Nebraska	State of Nebraska	K-12 schools & Libraries
Statewide Internet	State of Nebraska	State of Nebraska	State of Nebraska	K-12 schools & Libraries



- **Network Nebraska-Education (p1)**
 - **\$1.3M Budget (2014-15)**
 - \$700K for administration
 - \$190K for backbone
 - \$325K for Internet access
 - **Statewide Backbone (2014-15)**
 - 1293 miles
 - 2 Gbps, scalable to 10Gbps
 - 5 major aggregation points
 - Will be carrying 21.1 Gbps of Internet
 - **Completely self-funded by the 274 participants**



- **Network Nebraska-Education Division of Labor (p2)**
 - **State Office of the CIO/Administrative Services**
 - Procurement, vendor contracts, vendor relations
 - Accounts payable, accounts receivable, E-rate filings
 - Participation records and forms submission
 - Personnel support 7% surcharge (\$76K) on all cash flow
 - **University of Nebraska/Technical Management**
 - Network management, traffic shaping, Internet access
 - Routers and routing, automatic notification service
 - Core network aggregation facilities
 - Personnel support budget limited to \$200K/year



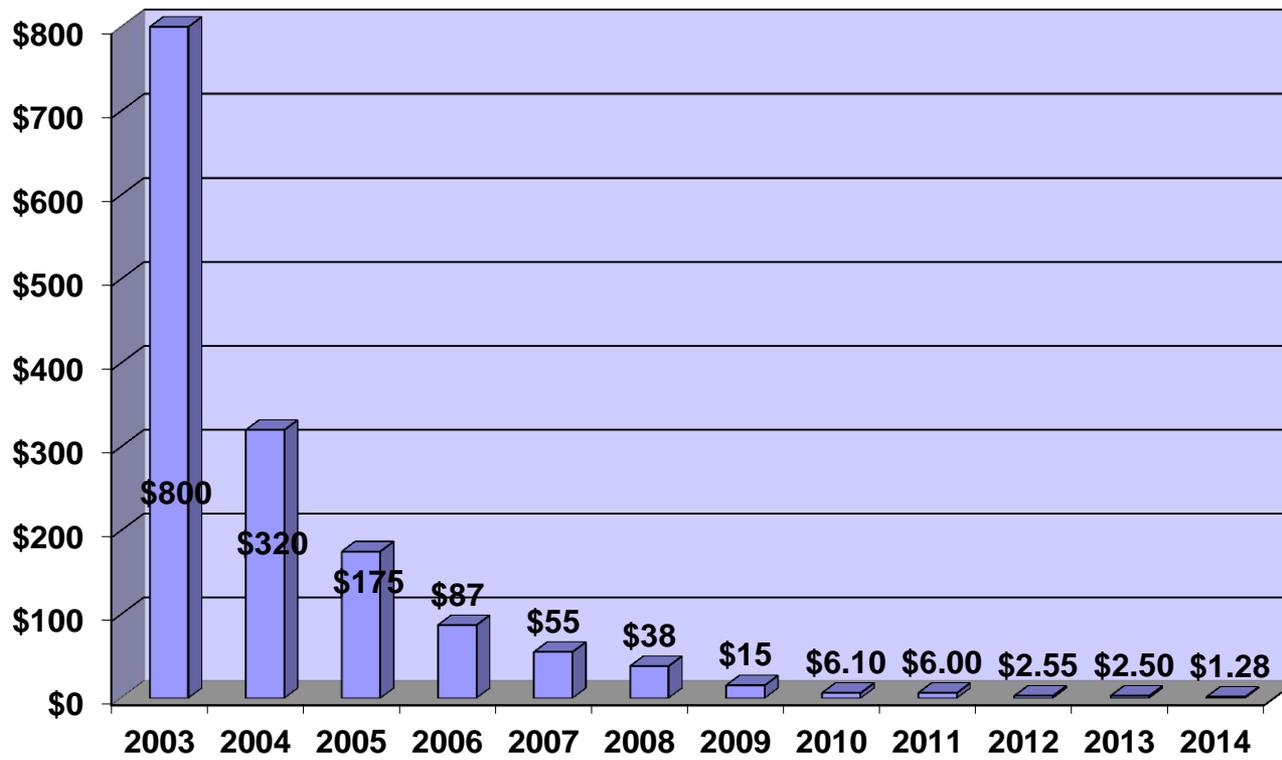
- **Network Nebraska-Education Fees (p3)**
 - **Participation Fee (2014-15)**
 - \$213.74/month/entity (regardless of size of entity)
 - **Interregional Transport Fee (2014-15)**
 - \$18.49/month/K-12 entity
 - \$57.79/month/higher ed entity
 - **Internet Rate (2014-15)**
 - \$.39/Mbps/month for K-12 (after E-rate)
 - \$ 1.28/Mbps/month for higher education
 - \$.04/Mbps/month for Internet2 Commercial Peering



- **Network Nebraska-Education “Achievements”**
 - Reduced Internet unit cost by 98% over 7 years through aggregation of demand and state master contract bidding
 - Annually transports over 600 semester distance education courses for high school and college credit
 - Serves over 375,000 (95%) K-20 students across Nebraska
 - Has one of the lowest indirect cost ratios in the country among statewide networks; totally self-funded by partners
 - Nebraska public school districts are 99% fiber-connected at or above 40Mbps or 100Mbps
 - Unprecedented collaboration between State and NU
 - Have had 100% partner retention through the first 8 years

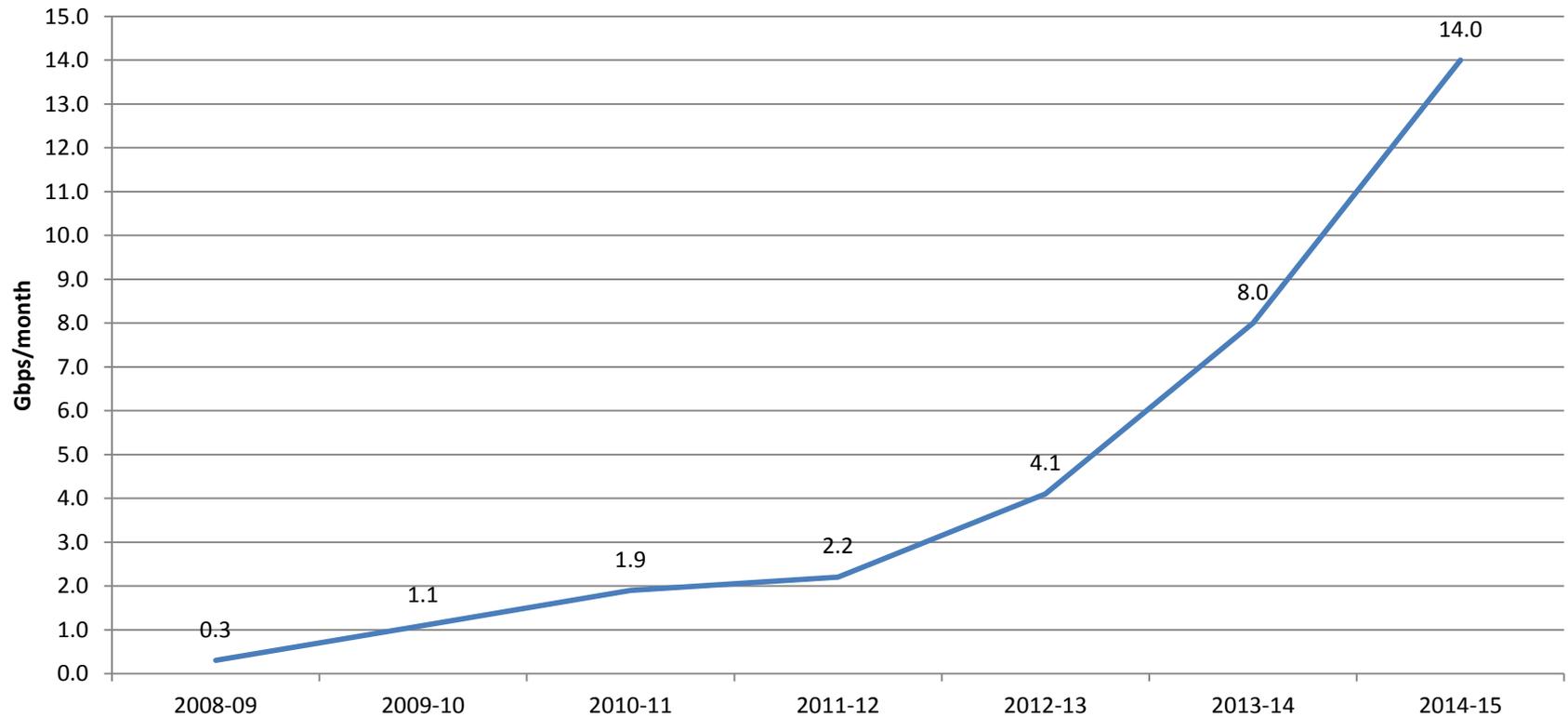


**Network Nebraska Internet Access Cost
(Average \$\$ per Megabit/month)**





Amount of Internet Bandwidth Purchased by Network Nebraska- Education **K-12** Participants (in Gbps/month)





- **Critical Success Factors**

- Network Nebraska Codified by the Nebraska Legislature
- Management was tasked to the State and University with a proven track record of managing large networks
- Participation by public K-12 was incentivized by state lottery funds (e.g. \$20,000 equipment reimbursement and \$1,000 distance education incentives)
- Cooperative, collaborative project was the product of State, NU, school districts, ESUs, and colleges all working together
- All backbone costs, administrative costs and annual rate setting is a very transparent process with partner input
- Motto since the beginning of the project has been: “Brokering the fastest, most reliable services at the lowest prices”

How Nebraska Lottery incentivized K-12 Schools

Network Nebraska Annual Costs

- Participation \$2580/yr.
- Backbone \$204/yr.
= \$2,784/yr.

(roughly equal to the cost of 1 high school football helmet OR 75 reams of paper per month)

Lottery Benefits for participating in Network Nebraska

- \$20,000 equipment reimbursement (1-time)
- \$1,000 for each semester distance education class SENT or RECEIVED



- **Challenges/Obstacles**

- Still perceived as a “distance education network”
- Has very little budget or staff to do marketing or communications; mainly a volunteer committee effort
- Development of applications and services is slow because they must be requested and agreed to be funded on a pay-as-you-go basis
- The potential of the IP Network is not fully realized (e.g. statewide directory services, learning management, content management, e-mail system consolidation, etc...)
- Entry costs (WAN & annual NN fees) for most rural libraries and nonpublic schools are beyond their ability to pay



- **A look to the future...**

- Traffic shaping, Intrusion Prevention, and Commercial Peering Services were implemented in 2013-14
- Participation by public K-12 and public higher education entities expected to reach 100% by 7/1/2015
- Educational Service Units are in a national pilot project to implement statewide federated identity management
- Statewide learning management and content management systems, and data analytics services to follow
- Some backbone segments transitioning from 2Gbps leased circuits to dark fiber (10Gbps-400Gbps capacity)
- School/library mini-consortium demonstration projects

INTERNET²

U.S. UCAN (Unified Community Anchor Network)



INTERNET²

U.S. UCAN's Goals

- Provide broadband connectivity to satisfy growing anchor needs
- Change the way content, applications, and services are delivered
- Foster regional, national, and international anchor collaboration
- Ultimately, transform communities

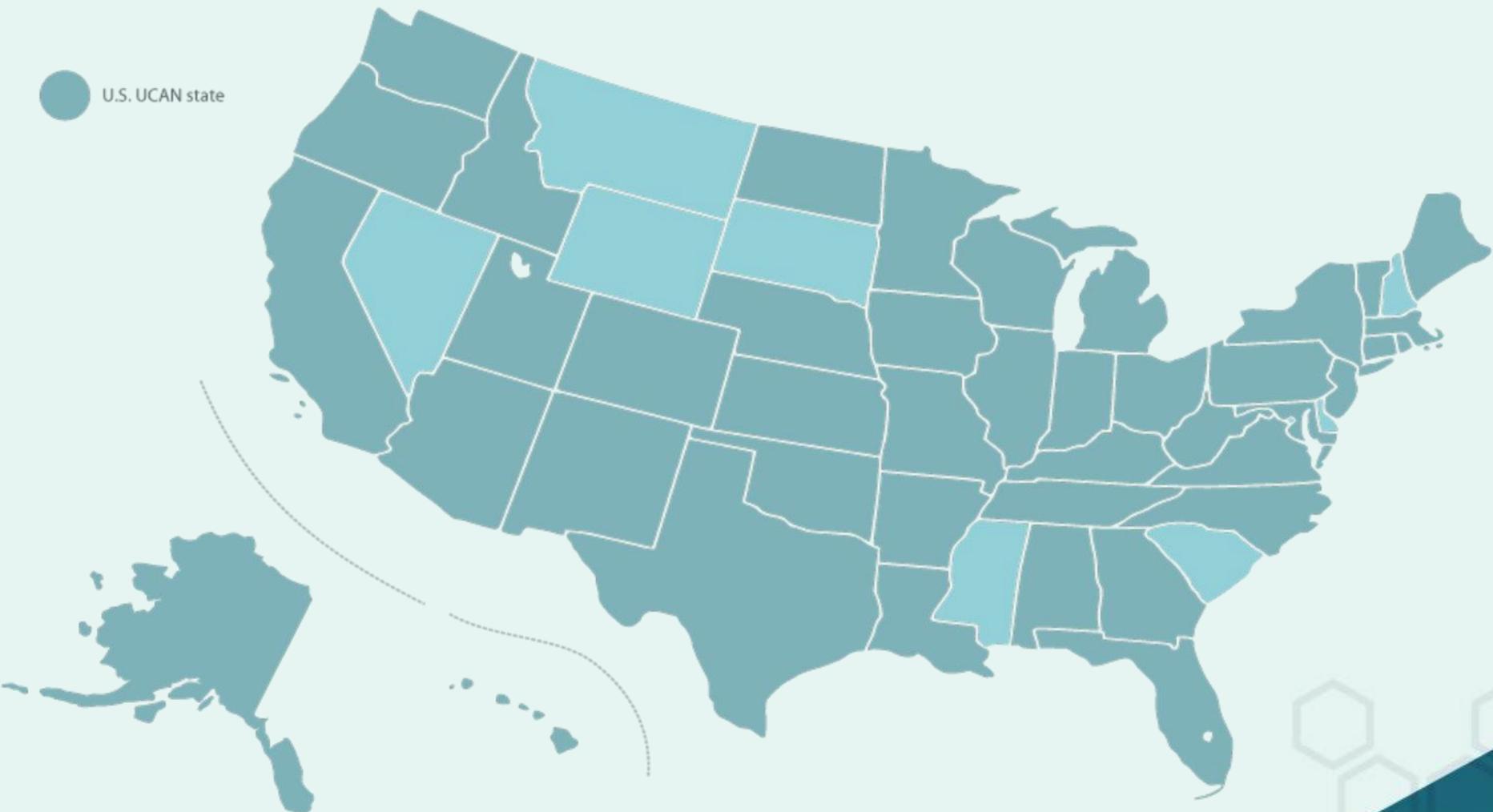


U.S. UCAN *by the Numbers*

- 4,203** Libraries
- 84,146** K-12 Schools
- 2,237** Health Institutions
 - 33** Telehealth Networks
- 200+** Museums, Science Centers, Zoos, Aquariums, Parks & Reserves, and Performing Arts Organizations
- 799** Community & Vocational Colleges
- 31** Public Radio, TV, Streaming Media Organizations
- 1,491** Colleges & Universities

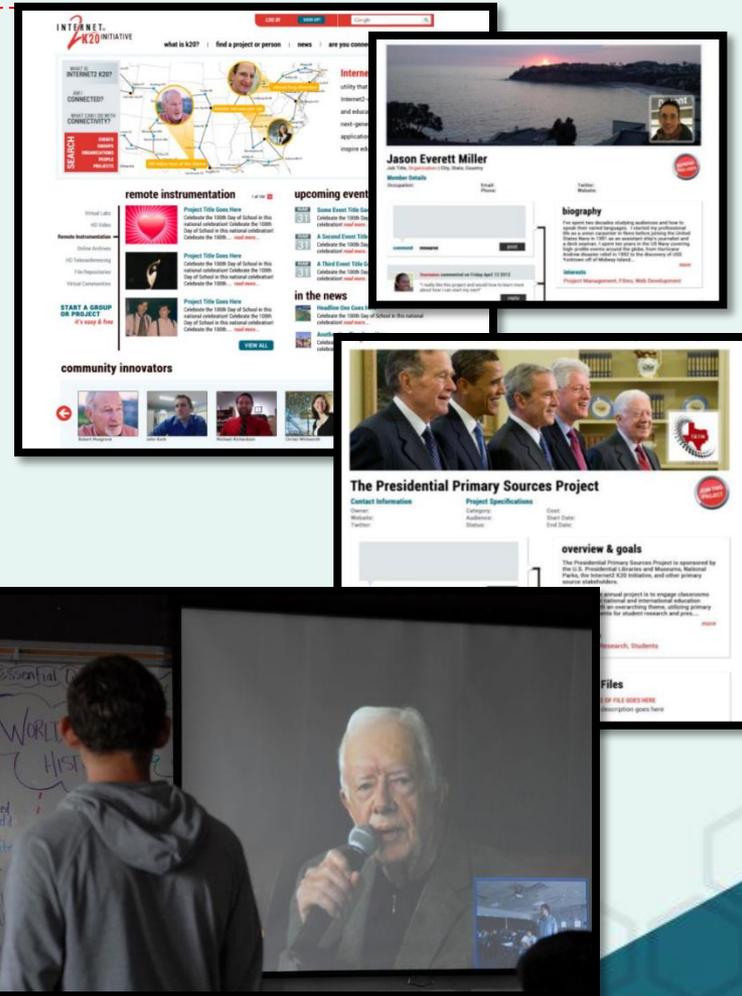
Where is U.S. UCAN Today?

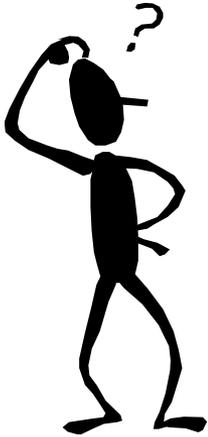
U.S. UCAN state



K20 Initiative

- **K20 Advisory Group:** Subset of U.S. UCAN Community focused on K-12, libraries, and community colleges
- **Presidential Primary Sources Project** (e.g., NPS)
- **Internet2 K20 Librarians Interest Group:** Group of 60+ academic, school, and public librarians
- **Muse:** Online social networking and collaboration platform for U.S. UCAN community
- **Federated Identity and Access Management for K-12**
- **Smithsonian (Digital Content)**





Questions?

[NASCIO Award Video](#)

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SHLB PRESENTATION: <http://tinyurl.com/ndl6dny>