The Quilt
A Collaboration of U.S. Research and Education Networks

The Quilt

The Quilt is a non-profit collaboration of our country's advanced regional research and education networks. Created in 2000, The Quilt is a member-powered, vibrant forum where leaders from these networks come together to exchange knowledge, experience and ideas to collectively advance networking for research & education.

The Quilt aims to influence the national agenda on information technology infrastructure, with particular emphasis on networking for research and education. Through this coalition, Quilt members collaborate to promote the delivery of networking services at lower cost, higher performance and greater reliability and security.

Quilt members are our country's not-for-profit networking organizations serving research and education with similar missions to; support research and education, collaborate, manage advanced networks, provide advanced networking services and further knowledge and innovation.

Introductions

- The U.S. non-profit research and education networks are funded, governed and structured differently. These aspects of the organizations reflect the diverse and complex environments of the communities and states in which they operate.

- While diverse in some aspects, these organizations are similarly missioned with common goals which are to provide an advanced network infrastructure, services and applications which support of the research and education goals of the institutions each serve.

Introductions

This diversity is highlighted by the represented Quilt members organizations

Organization	State	Business Structure	Middle-Mile	Last Mile
MCNC	North Carolina	501(c)3	Owned Fiber	Fiber/ Leased Lines
Merit Network	Michigan	501(c)3	Owned Fiber	Fiber/ Leased Lines
OARnet	Ohio	Consortium under State of Ohio Board of Regents, The Ohio State University as fiscal agent	Long-Term IRUs/Leased Lines	Fiber/ Leased Lines
Utah Education Network	Utah	Managed by University of Utah which is fiscal agent and provides addt'l public oversight and admin	Leased Lines/Long-Term IRUs	Leased Lines/ Fiber

Quilt E-rate Comments - General

- Investment in Scalable Broadband Connections
- Flexible Infrastructure Needs the Appropriate Service Delivery Model for Schools and Libraries
- Network Quality Counts for Schools and Libraries
- Bandwidth Must Reach the Users
- Education Does Not End at 3 PM
- Consortia Applications Yield Pricing Improvements and Greater Efficiencies

Key Points from March 2014 E-rate NPRM

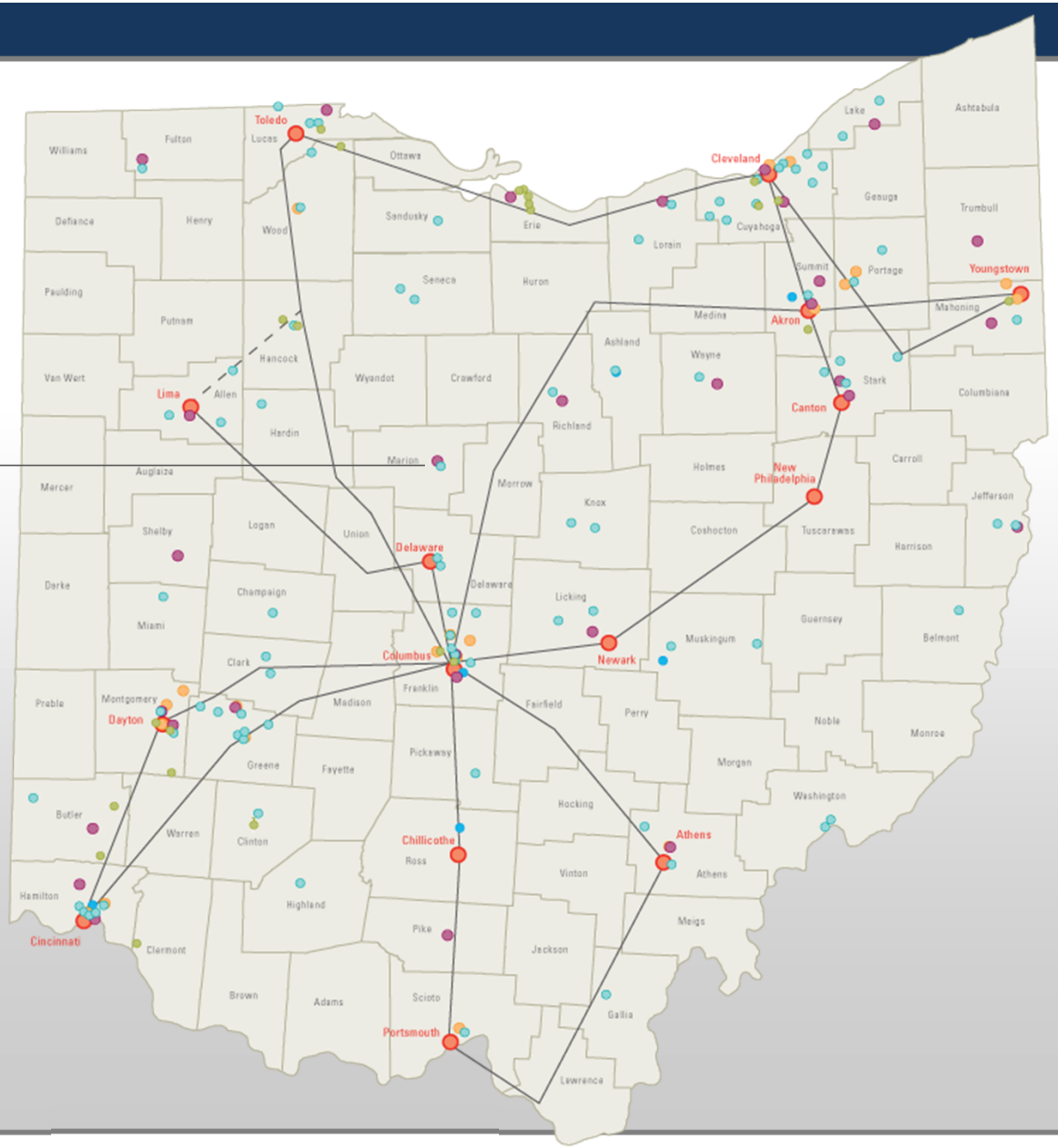
- E-rate program needs to fund internal connections for all schools and libraries. Leverage additional $2 billion in one-time funds for an initial down payment for internal connections
- Support the creation of a short-term investment program within the E-rate fund to spur additional build-out of last-mile connections to school and library buildings. Capital investment approach should be technology neutral but satisfy a specific set of criteria
- As consortium purchasers, RENs have formed lasting partnerships with industry partners. One of the best ways for E-rate to encourage consortia purchasing and bulk buying is to allow the use of existing contracts

OARnet
Accelerating Ohio's Future

OARnet Backbone Connections

LEGEND

- 88 Higher Education Campuses
- 76 Higher Education Regional Campuses
- 23 K-12 Education ITCs
- 15 Local Governments or State of Ohio Agencies
- 30 Industry Partners
- 6 Health Care Facilities
- 9 Public Broadcast Stations



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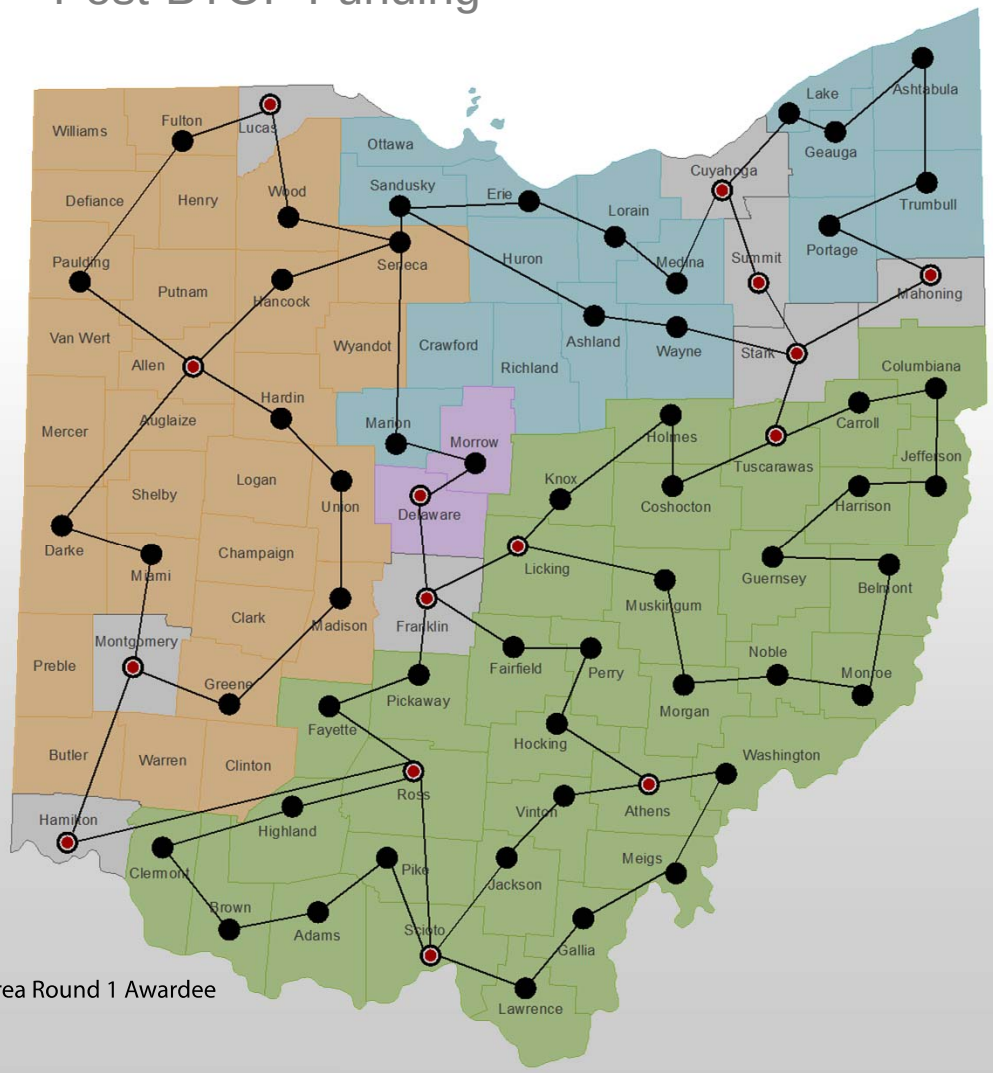
An OH·TECH Consortium Member

Impact: OARnet's Network

Middle Mile Connections Pre-BTOP Funding

Middle Mile Connections Post-BTOP Funding



- OARnet Middle Mile PoPs
- ARRA Middle Mile Expansion PoPs
- OARnet/OMMC Middle Mile PoPs

- Com Net, Inc.
- Horizon Telcom
- OneCommunity
- Interconnection Counties (Large Urban Areas)
- Consolidated Electric Area Round 1 Awardee

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Middle Mile Community Anchor Institutions

As Provided by OMMC Partners

HORIZON

K-12 Schools	622
Libraries	166
Medical/Healthcare	353
Community Colleges	25
Public Housing	476
Public Safety	407
Other Higher Ed Institutions	19
Other Community Support Orgs.	612
Other Gov. Facilities	722
Total CAI	3,424

CNI Com Net, Inc

K-12 Schools	705
Libraries	165
Medical/Healthcare	279
Community Colleges	12
Public Housing	377
Public Safety	322
Other Higher Ed Institutions	16
Other Community Support Orgs.	504
Other Gov. Facilities	488
Total CAI	2,868

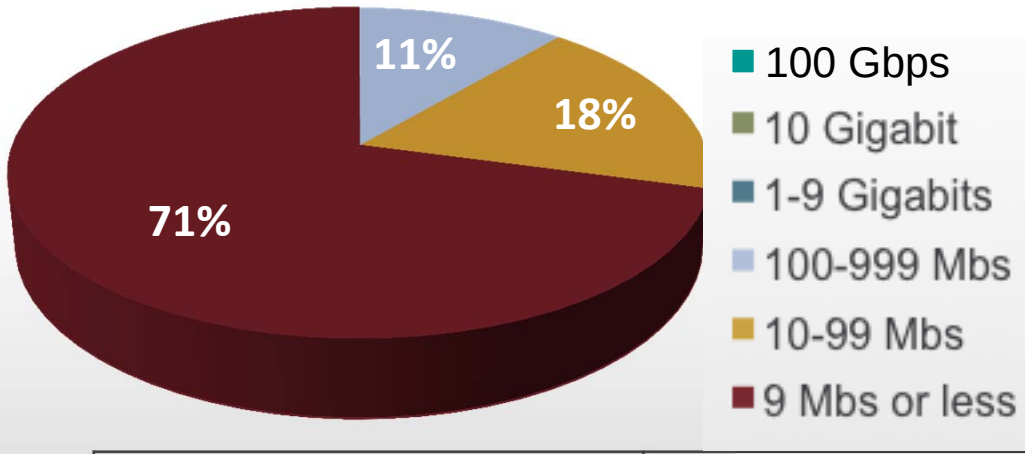
onecommunity

K-12 Schools	1,403
Libraries	94
Medical/Healthcare	189
Community Colleges	39
Public Housing	0
Public Safety	74
Other Higher Ed Institutions	14
Other Community Support Orgs.	29
Other Gov. Facilities	36
Total CAI	1,878

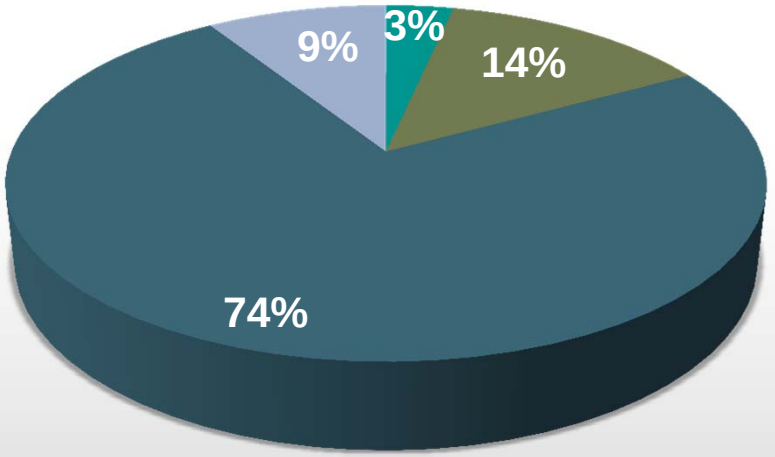
Last Mile Connections

Change in last-mile connections to higher education organizations

Prior to OARnet Implementation 2003



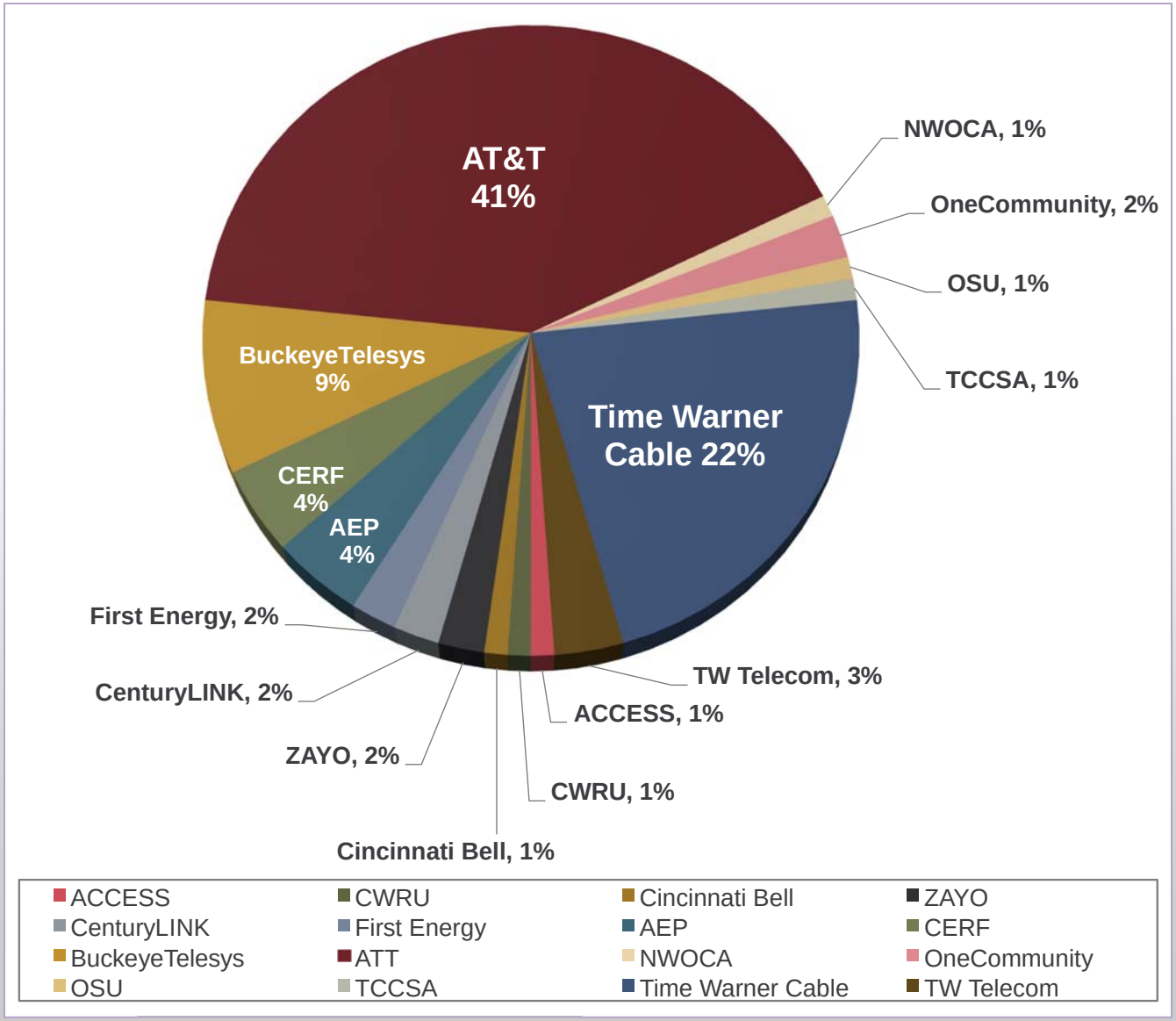
Current OARnet Connections 2012



Capacity	Prior to OARnet Implementation 2003	Current OARnet Connections 2012
100 Gigabits (pending)	**0**	**3**
10 – 99 Gigabits	0	12
1 Gigabit – 9 Gigabits	0	65
100 Mbs – 999 Mbs	10	8
10 Mbs – 99 Mbs	16	0
9 Mbs or less	63	0

Updated May 21, 2013

Partnerships with Industry - Last Mile Connection by Service Providers



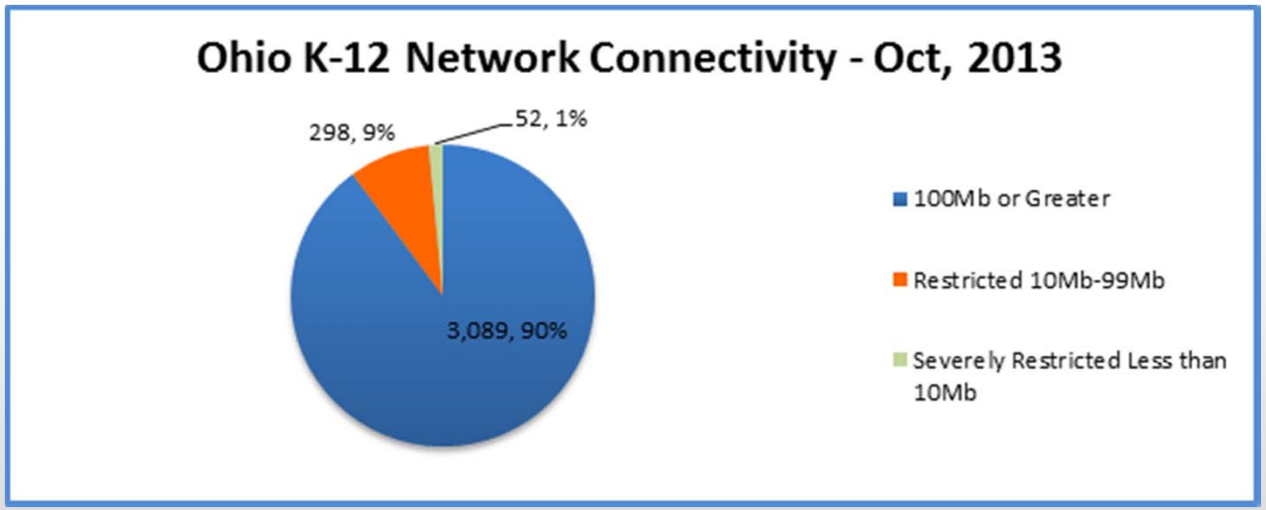
Ohio E-Rate Support

- Federal E-Rate program available to:
  - Eligible K-12 schools
  - Public libraries
- Provides discounts on:
  - Telecommunication services
  - Internet access
  - Internal connections hardware
  - Maintenance costs
- Ohio Department of Education provides planning, support and information to program applicants and recipients

FY2012/July 1, 2012–June 30, 2013
Total funding received to date - $74M

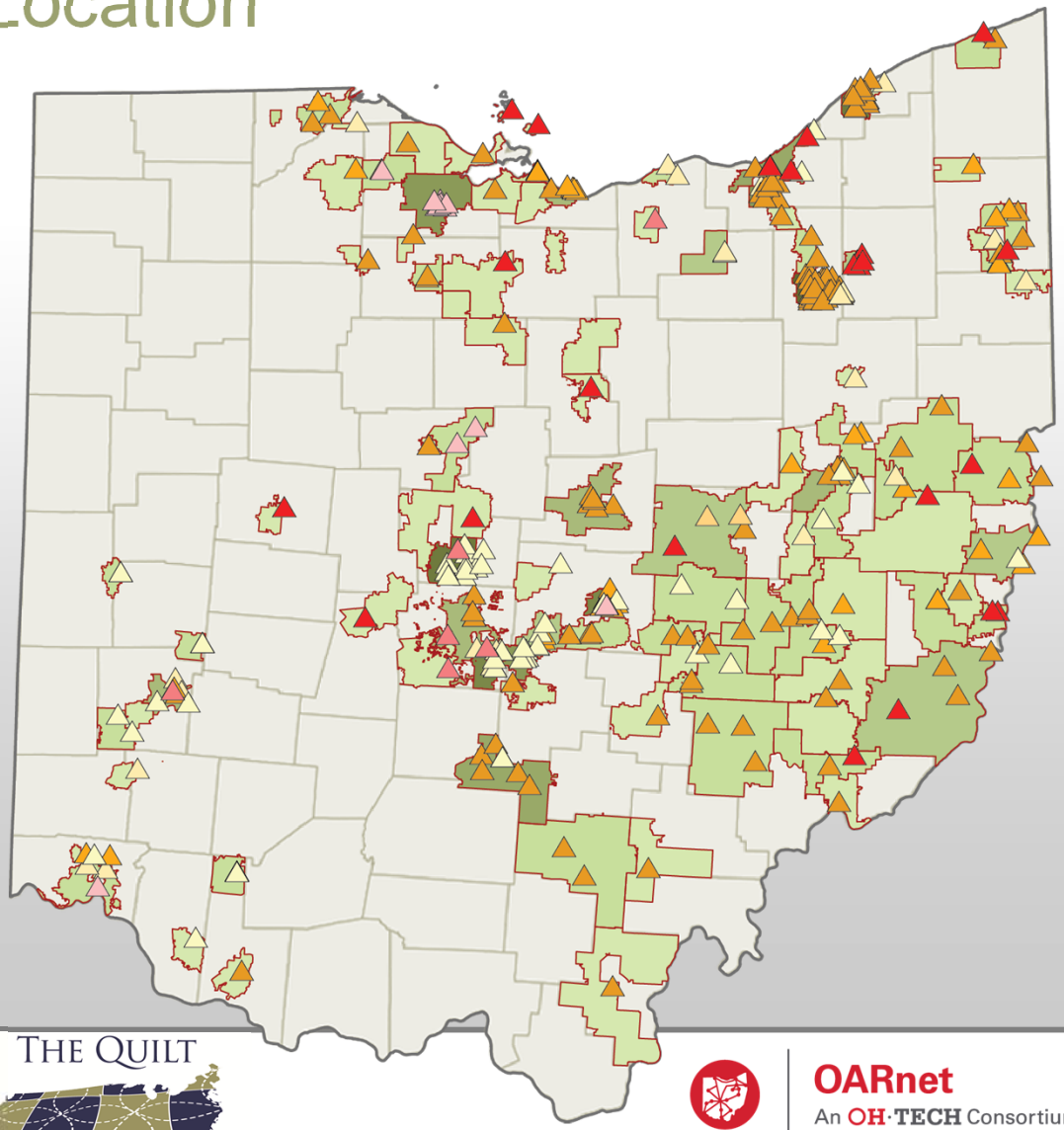
FY2013/ July 1, 2013–June 30, 2014
Total funding requested - $123M
Priority 1 Requests - $85.8 mil
Priority 2 Requests - $37.3 mil

Low Capacity Broadband OH K-12 School Buildings



- Approximately 350 buildings below the new 100Mb standard
- Approximately 3,089 buildings (90%) meet the new 100Mb standard

Low Capacity Broadband OH K-12 School Buildings by Location



Deploying fiber to remaining restricted K-12 schools in the state is estimated to cost $60M-$80M

Department of Administrative Services
Office of Information Technology
Enterprise Shared Services

Ohio Geographically Referenced Information Program

Severely Restricted Network Speed Mbps

- 1 with 0 Mbps
- 30 with 2 Mbps
- 7 with 4 Mbps
- 15 with 5 MBPS

Restricted Network Speed Mbps

- 164 with 10 Mbps
- 35 with 20 Mbps
- 2 with 25 Mbps
- 30 with 30 Mbps
- 62 with 50 Mbps

# of Buildings per District *

- 1
- 2 - 3
- 4 - 5
- 6
- 7
- 8 - 9
- 10 - 11
- 12 - 13
- 14 - 51

* Includes Community Schools

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OARnet
An OH·TECH Consortium Member

Ohio K-12 Internal Wireless Costs

- School districts can contract with their ITC for managed WiFi service. The state government is actively pursuing bulk purchasing arrangements for local area network equipment.
- ITCs provide a managed local area network (LAN)/WiFi service that includes wireless access points (WAPs) and controllers owned by the ITC.
- Managed service includes site surveys, conducted by 3rd party in partnership with the ITC
- Pricing for this service is based on a number of factors, including number of devices

Ohio K-12 Internal Wireless Costs

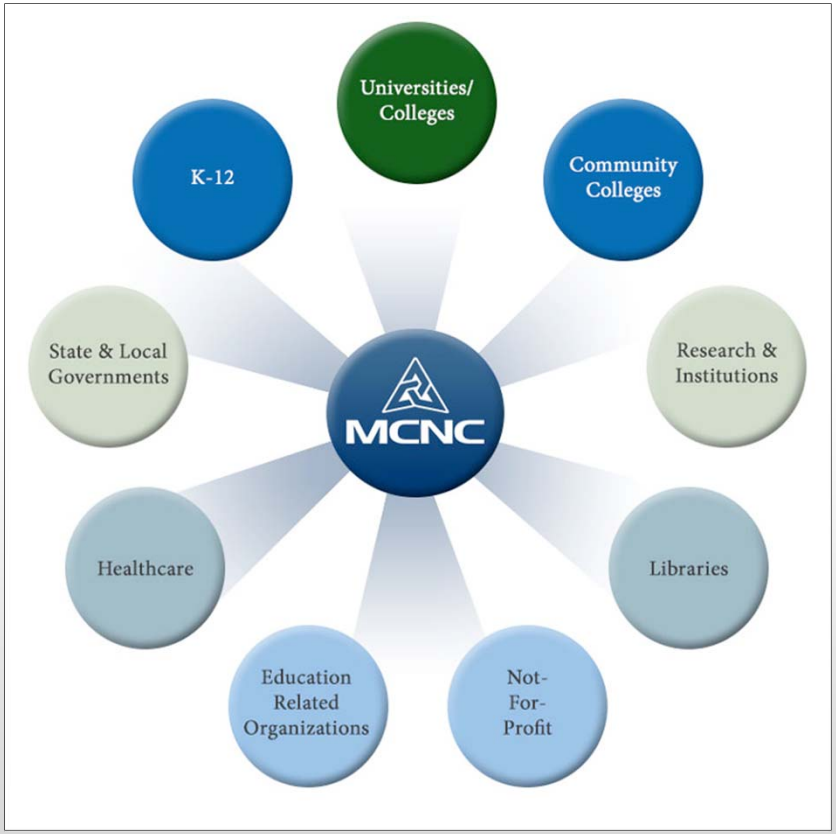
For all K-12 buildings in the state (3500): $105 million

For all K-12 buildings with < 100Mb/s bandwidth: $13.5 million

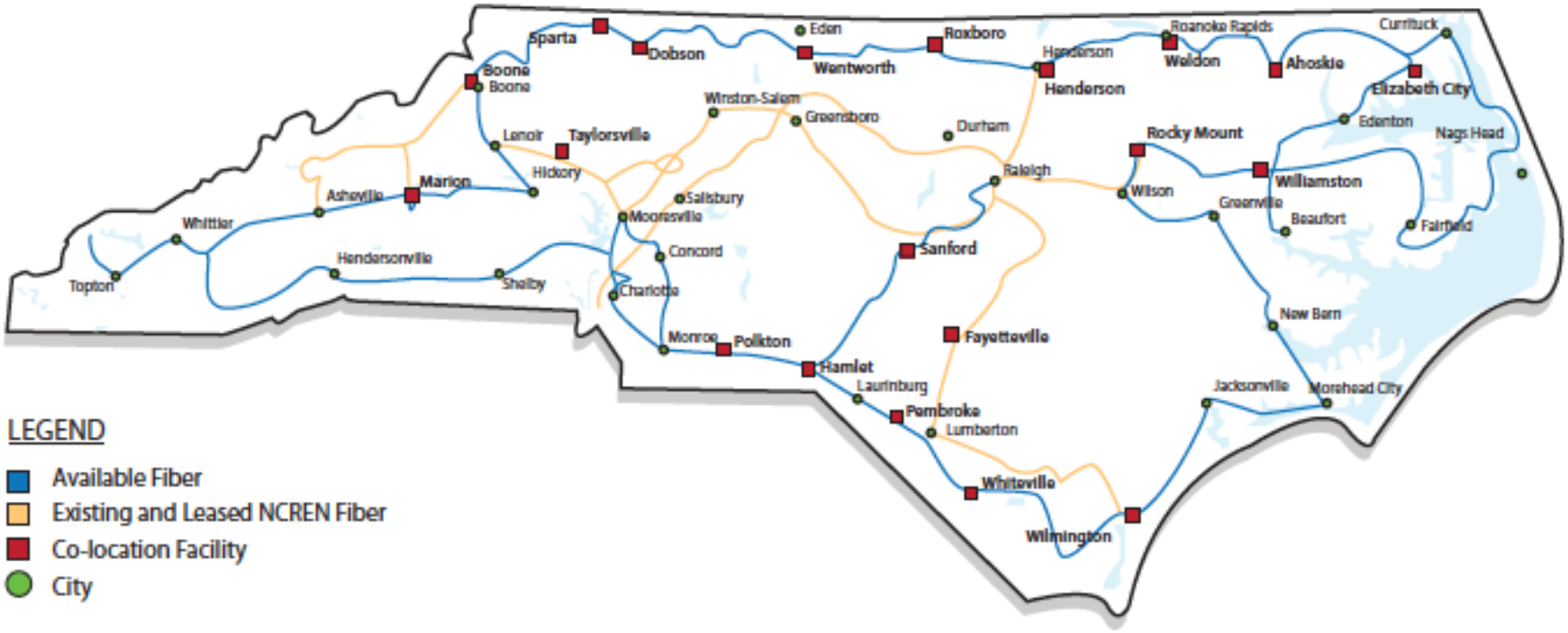
North Carolina
Research and Education Network

Who We Serve…

- 17 UNC System Institutions
- 26 of 37 independent colleges and universities
- 58 Community Colleges
- 115 Local Education Agencies
- (All School Districts)
- 45 Charter Schools
- Healthcare
  - 30 Hospitals (Non Profit)
  - 70 County Health Agencies and Free clinics
- RTI, NISS, NHC, Burroughs Welcome Fund, Bio Tech Center, other research institutions



Map of North Carolina BTOP Build



*Handholes/interconnection points are available approximately every 5,000 feet or less as needed.

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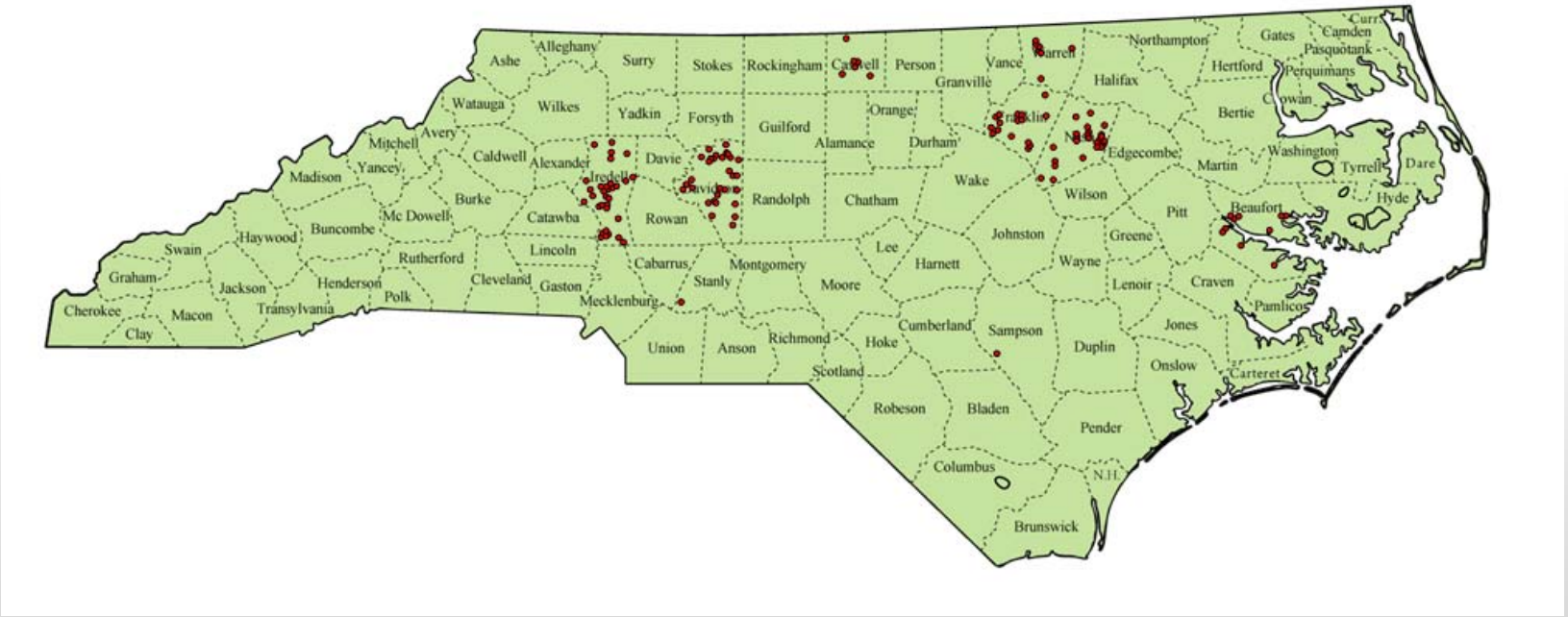
MCNC
Connecting North Carolina's Future Today

Low Capacity NC K-12 School Buildings by Location



- 139 out of 2331 K-12 schools (6%) do not have access to fiber. Deploying fiber to remaining restricted K-12 schools in the state is estimated to cost $25M-$30M
- Additional priority for the state is the deployment of wireless access points for the classroom which is estimated to cost $50M

K-12 Connections “To The Building”

Category	Number
Districts	115 (all connected to NCREN)
District Connectivity	All fiber based All Scalable to 1G
District Connectivity	54 with direct fiber
Schools	2400
Schools with fiber	2270
School WAN	Premise routing gear in place 10 M/100 M routing to each fiber based school
School WAN	MCNC consulting engineering practice has engaged each district
Public Charters	45 of 120 connected
Public Charters	Premise routing gear in place for 10M/100M

K-12 Connections “To The Classroom”

Category	Quantity
Total schools	2331
Schools with 1 WAP per classroom (high)	515
Schools with 1 WAP per 2 classrooms (int.)	928
Schools with 1 WAP per 3 classrooms (low)	818
Schools with 1 to 1 student/device ratio	371 (all in high density)

Cost of Wi-Fi for North Carolina Schools

DPI survey findings on classroom WiFi estimate that it will cost approximately $50 million to upgrade the WiFi in all NC K-12 schools to coverage that can support 1:1.

Estimated cost is $2,500 per classroom which includes additional $300 for 802.11ac APs

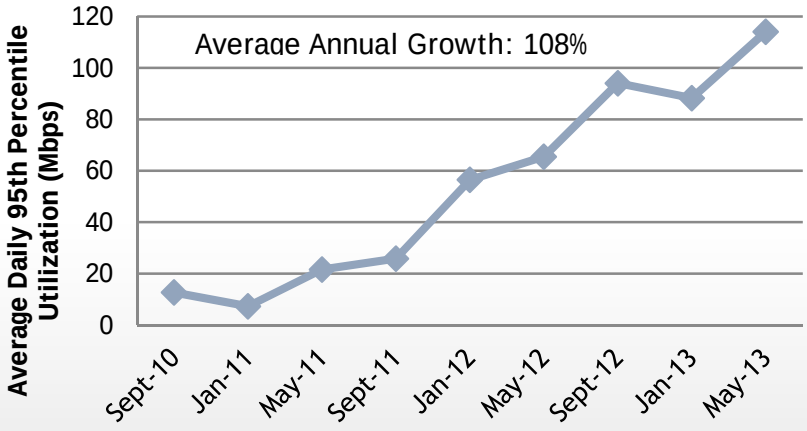
Cost of Wi-Fi for North Carolina Schools

Estimated cost is $2,500 per classroom:

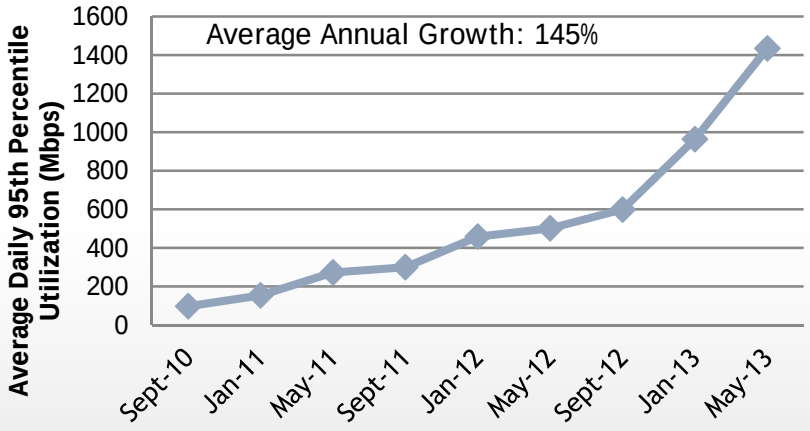
- $250: Install Charges (Cable Pulls, mounting)
- $50: Configuration Charges (Configuring switch ports, APs, etc)
- $100: Wireless Site Survey
- $650: Access Point
- $550: Wireless Controller (Redundant)
- $250: POE+ Switch Port (Assumes some inefficiencies due to existing construction, closet locations etc…)
- $200: Other Network/Security Upgrades (Cost associated with new firewalls, filtering backplane, etcetera)
- $300: 802.11ac APs
- $150: Miscellaneous Cost (Covers some site layout anomalies when school has an outlier designs, etc)
- Includes 3-year maintenance and support and cost of wireless to common areas

Sample Districts – Bandwidth Utilization

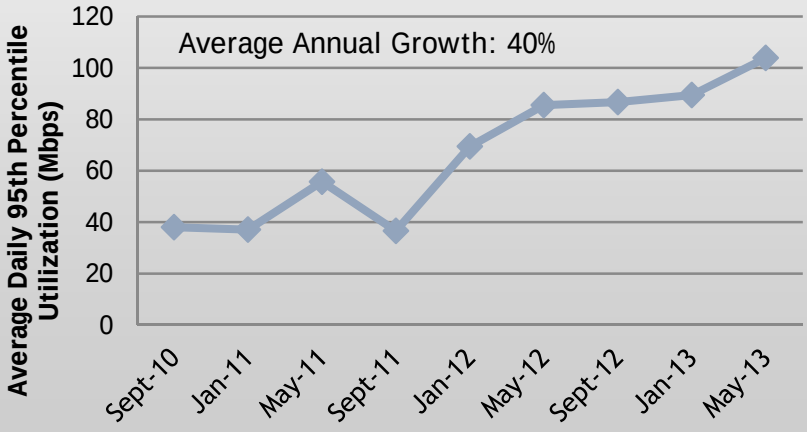
Avery County Schools



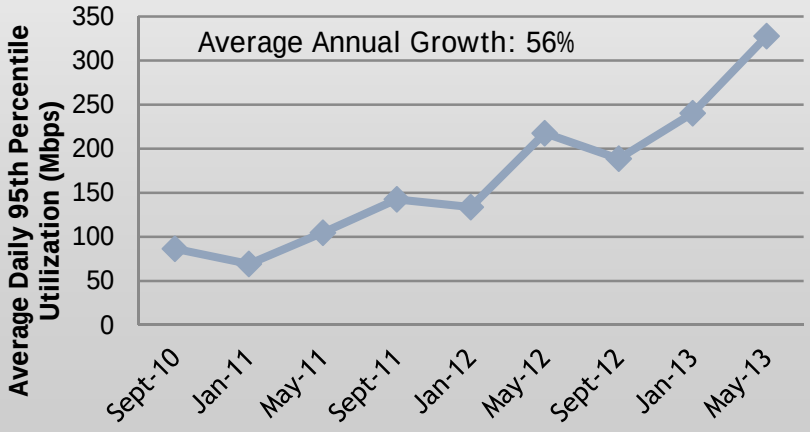
Cumberland County Schools



Halifax County Schools



Mooresville Graded



Financial Comparison – SCI vs. Before

Category	2006-2007	May 2013	
Total Bandwidth Consumption K-12	7G	45.45G	650% increase
Enrollment	1,390,168	1,474,434	
Consumption per Institution (40 charters and 115 LEAs)	28 M/month	253 M/Month 36K per student daily	
Total WAN and Internet Cost	$13,000,000	$14,000,000	7% decrease
Cost per MG	$155	$16.50 for LEA $54 for Charter	
Added Services Firewall and Filtering	Not addressed in an aggregated fashion in 2006	$1.37 per student	Couldn't track how much NC LEAs were spending in 2006-07

Numbers are kept by E-rate Division of DPI

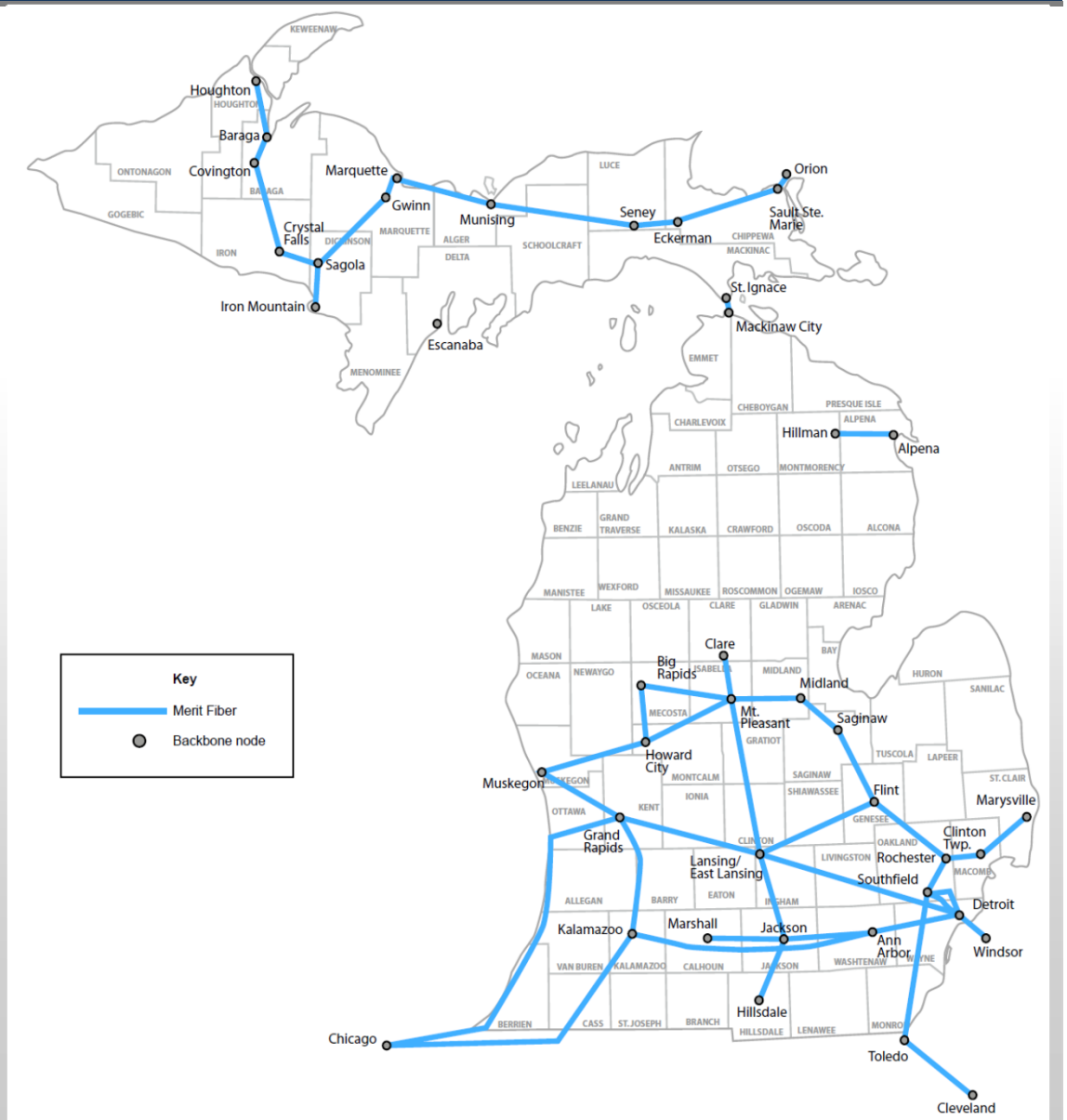
Merit Network
Michigan Research and Education Network

Merit Connects Michigan CAIs

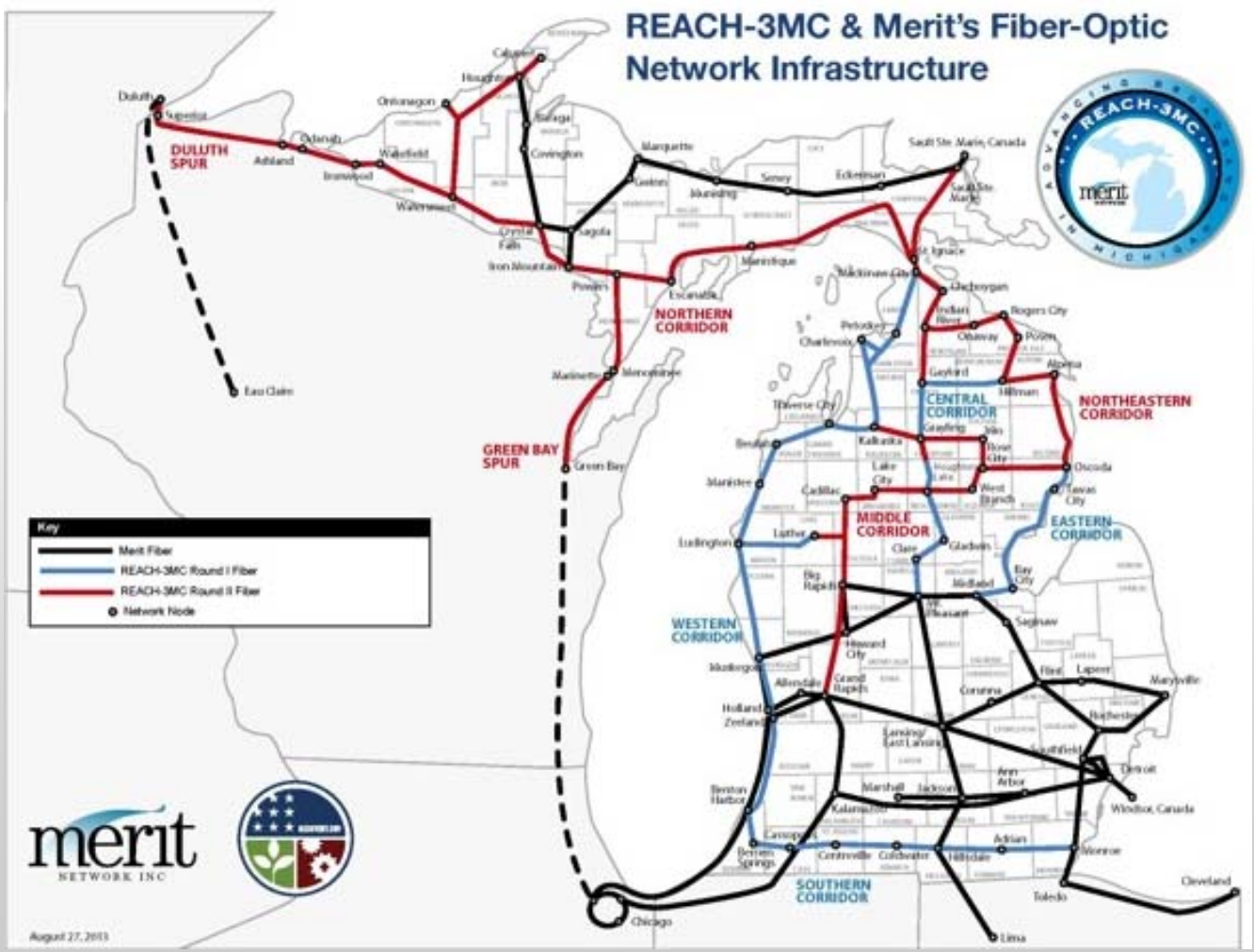
Merit Connects:

- 100% of Public Higher-Ed Institutions
- 78% of Community Colleges
- 31% Private Colleges
- 60% K-12 Intermediate School Districts
- 42% Library Cooperatives
- 10% Healthcare Sites
- 3% State and Local Government
- 9% Other Non-Profits

Merit Fiber Backbone - Then



Merit Fiber Backbone - Now



Investing in Fiber Optics

Merit has realized operational cost savings as a result of the fiber-optic infrastructure constructed with BTOP funds. Merit has been able to pass those savings on to our Members in the form of lower bandwidth rates.

Bandwidth Rates Before and After BTOP Funding

Bandwidth Level	Bandwidth Rate Prior to BTOP (2009)	Bandwidth Rate Today (2013)	Percentage of Decrease	Savings
6 Mbps	$7,089	$2,160	69.5%	$4,929
24 Mbps	$27,401	$8,640	68.5%	$18,761
100 Mbps	$78,104	$36,000	53.9%	$42,104
250 Mbps	$142,997	$90,000	37.0%	$52,997
500 Mbps	$208,472	$180,000	13.6%	$28,472
700 Mbps	$313,950	$252,000	19.7%	$61,950
1 Gbps	$393,300	$360,000	8.47%	$33,300

merit NETWORK INC

Fiber Optics to Schools and Libraries

Case Study #1

Rural School District– Prior to REACH-3MC, school district had a fixed capacity connection to their local Intermediate School District, which was not able to be upgraded at a price that was sustainable for the schools. School district was able to take advantage of the REACH-3MC backbone infrastructure and fiber-optic technologies to establish a fiber connection to the network at 1 Gbps, providing them the ability to subscribe at 150 Mbps. School district is planning to move more services to the cloud and has introduced a laptop & tablet program for students. Both of these initiatives would not have been possible without the BTOP project and by their previous connectivity options.

BTOP Success: This school is in a rural area and without the fiber-optic infrastructure their school system would not have access to high-speed connectivity at an affordable price. Furthermore, the infrastructure and connectivity has opened up opportunities for them to provide improved learning and content to their students.

E-Rate Success: Increased capacity to school building to 1 Gbps and leverage e-rate funding to support the increased service level based on a fixed cost of $93,897 annually for 3yrs. In the 4th year, the fixed annual cost drops to $3,750 saving the e-rate program $90,147 annually. Additionally, because of Merit's BTOP infrastructure available in the area the school system was able to put on the ballot a millage that was approved by the citizens to help bring 21st century network to their school system.

Fiber Optics to Schools and Libraries

Case Study #2

Library Cooperative– Prior to REACH-3MC, Co-op had 2 libraries connected via fiber, and 20 libraries connected via 1 or 2 leased T1 circuits. Merit was able to connect 14 libraries via 1 Gbps fiber. This capacity upgrade has begun to bring more interactive content opportunities to these libraries located in rural parts of Michigan's Upper Peninsula.

BTOP Success: The libraries are located in rural areas of the Upper Peninsula, with no cost-effective and scalable connectivity options beyond leased T1 circuits. The BTOP-funded fiber-optic infrastructure enables them to share more services over the network and bring more interactive/video content into the libraries. The libraries also have the ability to source interactive content to other locations.

E-Rate Success: Increased capacity to each library from 1.5 Mbps or 3.0M bps to 1 Gbps at an ongoing fixed cost for each location. The cost per location for a 1 Gbps connection is: $3,150 annually, plus a share of the aggregated Internet bandwidth.

The ***key success*** here is the ability to provide high-speed connectivity to these rural libraries as part of Merit Network's On-Net service.

Making the Case:
Fiber Optics for Schools and Libraries

Description	Current Capacity Level	Current OpEx Annual Recurring E-Rate Circuit Costs	CapEx Cost to Build Fiber	New Capacity Level	New OpEx Annual On-going Cost to E-Rate Program	On-going Savings to E-Rate Program	Notes/Comments	Network Usage with Fiber
Northern Michigan Rural K-12 School	3.0 Mbps	$11,700	$25,084	1 Gbps	$3,000	($8,700)	When the school needs more capacity the current cost would increase by $5,700/T1	Pent-up demand went from 3.0 Mbps to 60 Mbps
Northern Michigan Rural Library	3.0 Mbps	$12,000	$5,538	1 Gbps	$2,250	($9,750)	Same as above, this site T1 cost is also $5,700.	Pent-up demand went from 3.0 Mbps to 20 Mbps
Upper Peninsula Michigan Library	3.0 Mbps	$4,800	$12,481	1 Gbps	$1,950	($2,850)	Same as first example above, however, the cost of a T1 $2,400.	Pent-up demand went from 3.0 Mbps to 10 Mbps and growing
Upper Peninsula Michigan K-12 School	1.5 Mbps	$5,970	$15,077	1 Gbps	$1,950	($4,020)	Same as first example above, however, the cost of a T1 $3,600	Pent-up demand went from 1.5 Mbps to 10 Mbps to 20 Mbps and school hasn't started yet.
Totals		$34,470	$58,180			($25,320)	Total Annual Savings to E-Rate Program	

Utah Education Network: Networking for Education

UEN Value Proposition

- UEN has implemented high speed “future-proof” WAN connections for nearly every school and library community anchor location in the state.
- The statewide WAN makes use of leased private carrier infrastructure and services for all services/connections except in the most difficult and costly to serve areas.
- UEN is responsible for the first (backbone) and middle (aggregation) mile portion of the network as well as the vast majority of last-mile network connections, funding, and management.

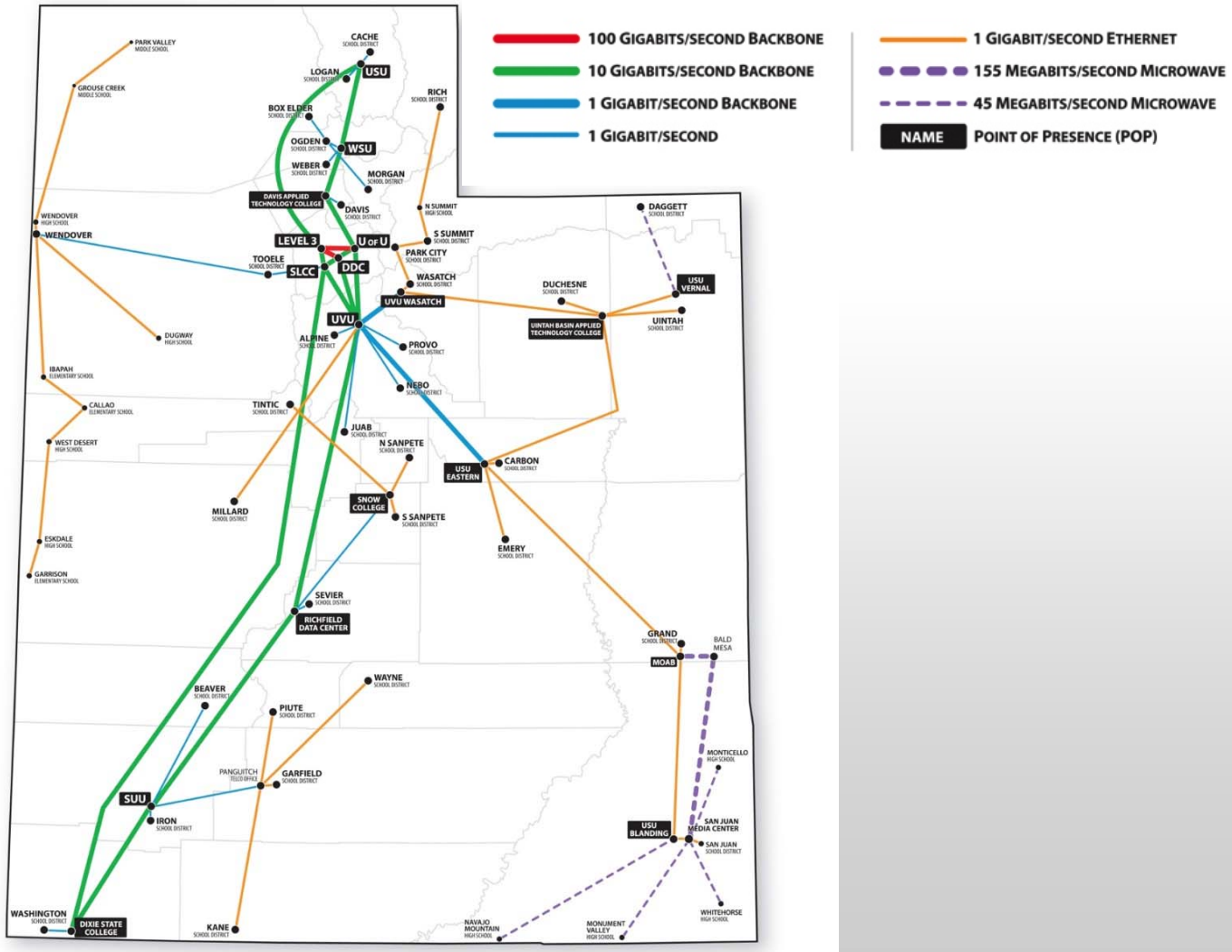
UEN Connects Utah's Community Anchors

Of the total CAIs in Utah, UEN connects:

- 100% of independent colleges and universities
- 100% Community Colleges
- 97% of K-12 School Districts
- 65% out of Public Libraries
- 60 sites with Utah Telehealth Network (recently merged into Utah Education Network)

UEN has largely accomplished the goal of providing 1 Gbps/1,000 students by deploying fiber-based WAN services to the urban K-12 schools. 80% of the public libraries that connect to UEN connect at speeds of at least 100Mbps.

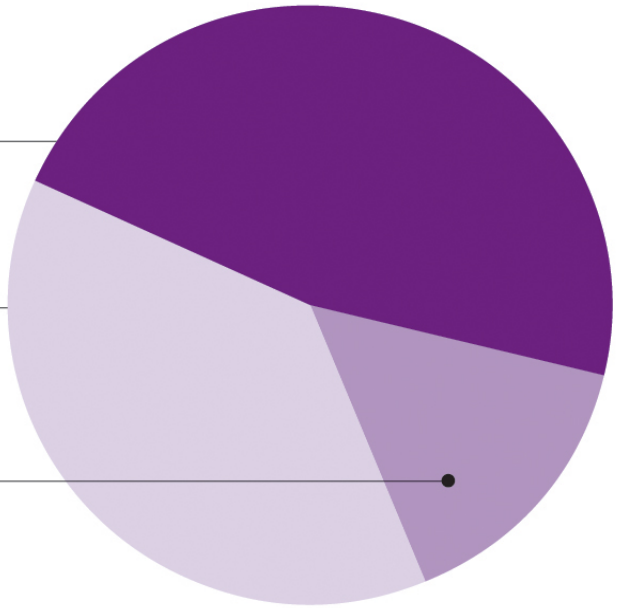
UEN MAP



Connecting 1396 sites throughout Utah

UEN Bandwidth

Overall Bandwidth Utilization



Higher Education
6.7 Gbps 47%

Public Education
5.4 Gbps 38%

Other Traffic
2.2 Gbps 15%

Total Utilization

14.3 Gbps

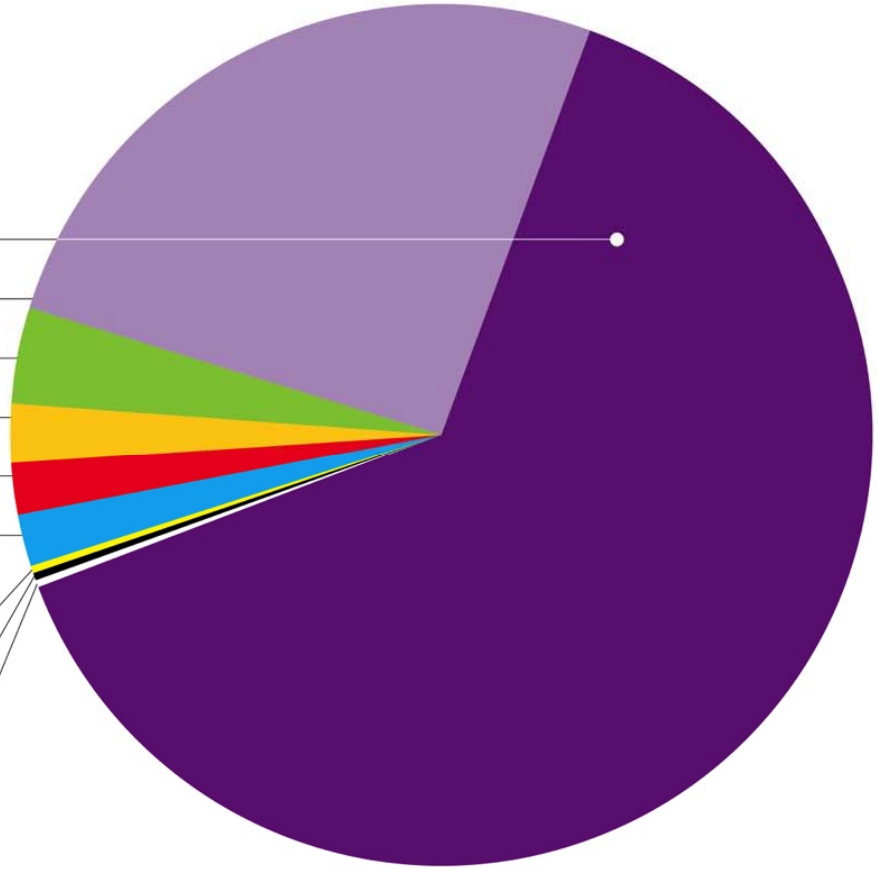
Gbps = Gigabits/second

Bandwidth measured by Peak 95th percentile. Margin of error +/– 5%
UEN NOC data Nov. 18-22, 2013

UEN also caches another 5.2Gbps of content from non-Utah sources which makes UEN faster and reduces the need for additional external Internet bandwidth.

UEN Resources by Segment

Public Education	$27,667,441	63.64%
Higher Education	$11,251,125	25.88%
Libraries	$1,621,735	3.73%
General Public	$891,302	2.05%
UCAT	$891,302	2.05%
State Government	$808,694	1.86%
Community Learning Centers	$165,217	0.38%
Private Schools	$113,043	0.26%
Other	$68,292	0.16%
TOTAL	**$43,478,151**	**100%**



As of June 30 2013 - FY2013

UEN and E-rate

- UEN is a consortium filer and functions as the state consortium E-rate coordinator
- UEN is the largest single applicant for E-rate funding and the largest customer (anchor tenant) of most telecom carriers and providers of E-rate eligible services in the state
- Funding Year 2012 E-rate disbursements for UEN totaled $13.6M
- UEN leverages state appropriated funds to pay the non-discounted share of E-rate eligible services.
- UEN's participation in E-rate and partnerships with state telecom carriers aids in the development of private capital infrastructure, allowing UEN to increase access to the higher speed broadband network and connections

Utah Governor's State of Excellence Commission

Vision 2020: By 2020 and thereafter, at least 66% of Utahns ages 20 to 64 will have a postsecondary degree or certificate, ensuring a well-educated citizenry and workforce that qualitatively and quantitatively meet the needs of Utah employers, which will lead to greater economic prosperity and a better quality of life for all Utahns.

- Based upon seminal research indicating that 66% of jobs in Utah will require a postsecondary certificate or degree by 2020
- Governor's call to action for all Utahns to raise their education levels to meet Utah's current and future workforce demands and to take advantage of the economic opportunities available.

The Route to 66% by 2020 Relies on UEN

UEN services match the priorities and objectives of the institutions we serve.

UEN SERVES:	AND ITS:	IN SUPPORT OF THEIR MISSION TO:
Utah Public K-12 Education	612,551 students 31,612 educators 1,072 schools *(USOE Fingertip Facts 2012-2013)*	• Assure literacy and numeracy for all Utah children • Provide high quality instruction for all Utah children • Establish curriculum with high standards and relevance for all Utah children • Require effective assessment to inform high quality instruction and accountability *(Promises to Keep 2009)*
Utah System of Higher Education	171,291 students 33,831 faculty and staff 8 institutions *(USHE Data Book 2013)*	• Grow the college ready pipeline • Increase college completion • Expand system capacity • Advance effective technology • Build economic prosperity *(Higher Ed Utah Action Plan 2010)*
Utah College of Applied Technology	40,320 postsecondary students 14,995 adult trainees *(UCAT Annual Report 2012)*	• Provide technical training, vocational certificates and associate degrees • Retrain employees and provide workforce alignment *(UCAT Mission Statement 2009)*

The Route to 66% by 2020 Relies on UEN

Utah Public Libraries	121 public libraries and branches* serving 2.8 million Utah residents *(Utah State Library 2012)*	• Provide users with online resources • Deliver exceptional library services *(USL Strategic Plan 2013-15)*
Utah Leaders	**66% by 2020 Goal:** By 2020 and thereafter, at least 66% of Utah adults will have a postsecondary degree or certificate, ensuring a well-educated citizenry and workforce, leading to greater economic prosperity and a better quality of life for all Utahns. *(Governor's Education Excellence Commission Vision 2020)*	• **P**repare young learners • **A**ssure access for all students • **C**omplete certificates and degrees • **E**nable economic success *(On PACE to 66% by 2020 Plan)*

**connected directly to the UEN backbone or via DTS*

The route to *66% by 2020* relies on UEN's network, applications, and support infrastructure.

Cost Factors for Fiber Construction

R&E Experience Constructing Fiber Networks

- Quilt members Merit Network, Inc., which operates the Research and Education Network in Michigan and MCNC, which operates the North Carolina Research and Education Network, have gained great experience constructing fiber to anchor institutions the last 4 years.

- Subsequent slides outline the various factors impacting the cost of fiber construction and provide estimates of costs for various construction environments.

Cost Factors for Fiber Construction

Factor	Description
Aerial vs. Buried	In most situations, it is much cheaper to attach fiber to poles than it is to trench and bury fiber. However these cost advantages often disappear if new poles need to be set and annual pole attachment fees are assessed.
Location: Urban vs. Rural	Urban locations due to several factors: Available customers, easements, rights of way fees, traffic control costs, etc. are more expensive per mile to build
Terrain	The type of terrain can make a huge difference particularly in buried construction. Rocky substrate can increase costs by up to a factor of up to 10x per mile. This can be somewhat ameliorated by attempting to aggregate several types of bids and requesting "all-in" bids that mix some rocky terrain construction with friendly soil bids.
Water crossings	Trenching under rivers or attaching metal piping to fixed bridges can increase costs by a factor of 10x per mile.
Private property	Negotiating rights of way with private property owners can be an expensive undertaking. Costs per mile can be greatly impacted by the demands of a private property owner where no public easement exists.
State, County and Local Regulation	States, Counties and Municipalities have regulations and fees that impact the cost of construction. Particularly in rural areas governments should be engaged to gain flexibility on these fees.
Co-location Facility Charges	Building into existing interconnection points can be expensive. Particularly if these interconnection points are controlled by a telecommunications company that has pricing control.

Estimated Construction Costs Based on Factors

Installation	Terrain	Water Crossing	Location	Cost/Mile + lighting	Recurring Poll Attach
Aerial	Sandy Soil	None	Urban	$21,912	$12/pole/year
Aerial	Sandy Soil	None	Rural	$21,912	$12/pole/year
Aerial	Rocky	None	Urban	$18,480	$30/pole/year
Aerial	Rocky	None	Rural		$15/pole/year
Buried	Sandy Soil	None	Urban	$36,168 - $55,440	N/A
Buried	Sandy Soil	None	Rural	$31,680- $58,080	N/A
Buried	Rocky	None	Urban	$79,200 – $528,000	N/A
Buried	Rocky	None	Rural	$79,200 - $528,000	N/A

Estimated Construction Costs Based on Factors

Installation	Terrain	Water Crossing	Location	Cost per mile including lighting
Bridge Attachment	Water	Yes	Urban	$249,638 - $316,800
Bridge Attachment	Water	Yes	Rural	$169,594 - $316,800
Bore	Water	Yes	Urban	$79,200 - $298,478 - $528,000
Bore	Water	Yes	Rural	$79,200 - $396,000 - $528,000

Other Factors and Costs

Other Factors	Description	Location	Upfront Cost	MRC
Interconnection	Owned by provider	Urban	N/A	N/A
Interconnection	Owned by provider	Rural	N/A	N/A
Private property	Rights of Way	Urban	$1500-3000	N/A
Private property	Rights of Way	Rural	$2/ft.	
Government fees		Urban	N/A	N/A
Government fees		Rural	N/A	N/A

Other Considerations Should E-rate Program Fund Dark Fiber

- Request an expedited easement process
- Contribute to capital projects, such as road construction or improvement that include conduit being installed to serve K-12 schools and libraries. Tie this to TIP funds supplied by US DOT and reimburse only the incremental cost of conduit
- Require that permit fee waivers and rights of way fees for government owned easements be waived
- Agree to a price structure that reflects telecommunications provider rates for colocation such as rack space, utilities, splicing, cross-connects

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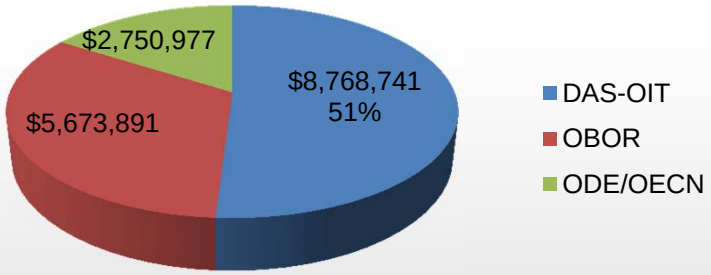
Other Examples of REN Bulk Purchasing

Quilt Commodity Internet Service Bulk Purchasing Agreements

- Program began in 2002
- Publicly bid – multiple awards
- Authorized Quilt Buyers list includes 30+ Quilt members and over 260 member institutions
- Current purchases for Authorized Quilt Buyers for committed bandwidth is over 370Gbps – (does not include burst traffic which is significant for R&E networks)
- Cumulative savings for Authorized Quilt Buyers since program inception is $78 million

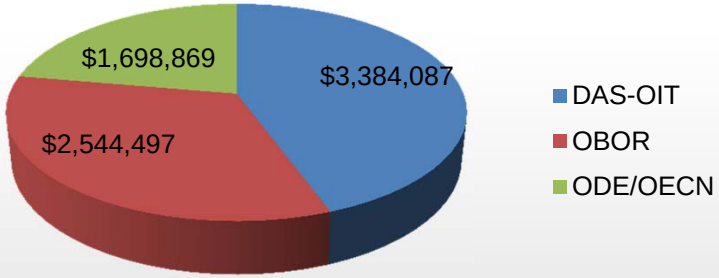
Impact of Service Aggregation in Ohio

VMware Sales 2008-2011
Total Sales $17,193,609



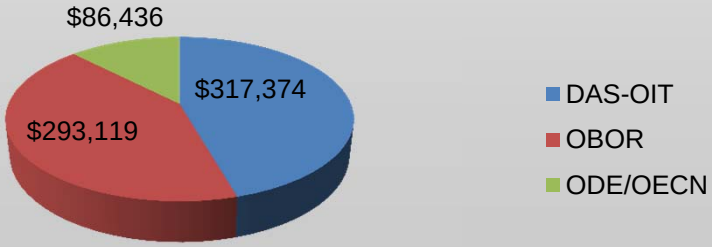
Estimated Hard Dollar Savings: $22,000,000

VMware Sales 2011-2013
Total Sales $7,627,453



Estimated Hard Dollar Savings: $9,000,000

VMware Sales 2013-2017
1st Quarter New Contract
$696,929



Estimated Hard Dollar Savings: $900,000

THE QUILT

Impact of Service Aggregation in Michigan

Average savings to members for Merit Services

- 35% on professional development classes, training and certifications
- 25% on VoIP, hosted infrastructure and hosted applications depending on options selected
- Up to 60% on MeritMail depending on features selected from other mail services