

Tech Director Meeting

May 17, 2018

Fiber 10 Update
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Region 10 ESC



Region 10 Fiber Network Consortium



Mission: Provide a **Regional Fiber Infrastructure** for Broadband Enhancement to All Region 10 School Districts and Charters with Competitively Priced Internet Access



Objectives of the Regional Network Consortium

- Establish a reliable and resilient, carrier class fiber infrastructure for **all districts** in Region 10
- Create a cost **effective, future-proof**, and **scalable** network capable of long-term growth - **bandwidth is no longer an issue**
- Provides opportunity for districts to partner with the ESC or other districts to **share additional services** directly over the consortium's private circuits
- Consortium buying power to layer optional services such as DDOS, firewall, web filtering, VoIP, etc - **What else can we do?**
- Provide high-speed buildout to **rural areas** - all districts have **equitable** access



Why Build a Regional Network?

Why now?

- Building a dedicated fiber network is expensive, however...
- Texas State Matching funds from Classroom Connectivity Initiative
 - \$25 million state match - 10% of fiber construction costs (only available for FY 18)
 - E-rate Program chips in another 10% to equal the state match (only available for FY 18)
 - Consortium E-rate discount is 71%
 - **Consortium only pays 9%** of fiber buildout costs
- Allows most cost effective creation of the network for R10 LEA

Why the consortium model?

- Cost effective - leverage size of consortium to drive down costs
 - Buying from Costco instead of a convenience store
- Additional capabilities not generally available to individual LEA
 - Active DDOS Mitigation
 - Direct connections to Amazon, Microsoft, Google, State testing providers and other statewide education networks



RFP Evaluation Results

- Fiber Network Buildout, Equipment, and Support
 - Bid out both dark fiber and leased lit solutions
 - Received four bids from 27 to 65 million over 10 years
 - Zayo Group was chosen as fiber vendor
 - Leased Lit was chosen as the most cost-effective option
 - Saves Consortium minimum of \$1.5 Million initial equipment purchase and maintenance cost
- Internet services
 - Four vendors submitted bids
 - Chosen Vendor (Zayo Group) not the lowest priced
 - But does provide best value, features, and flexibility for consortium
 - Vendor providing active DDOS mitigation, capable of firewall service



Why Zayo Group?

- Zayo's **expertise** lies in delivering lit and dark fiber infrastructure
- Tier 1 provider - operate a global IP backbone
- Owns 1000's of miles of fiber in DFW - major cell carriers, Fortune 500
- Fiber-optic cable 100% **dedicated** to Region 10 and 100% owned and operated by Zayo
- Already undergone the legal process of establishing franchise requirements and permitting with all of the counties served by Fiber 10 - saves time and money
- Same vendor as used by Region 11 and Region 20
- Provider for 12+ districts already in Region 10



Why Leased Lit?

- One vendor provides all services
- Provides strong **synergies** between the deployment of physical fiber assets, optical/ethernet equipment procurement and installation, Tier 1 internet access, maintenance, monitoring, and support
- Equipment cost, ownership, and maintenance issues are removed from the equation
- The wholly owned and operated network Zayo will minimize the support and operations requirements for Fiber 10
- Combined services increase performance, reduce support requirements, provide a more **comprehensive solution** and reduce the total cost of ownership
- Offloads the requirement to staff engineers capable of operating multiple 100G connections supporting DDoS, firewall management, and BGP
- Eliminates multiple vendor coordination meetings and associated finger pointing



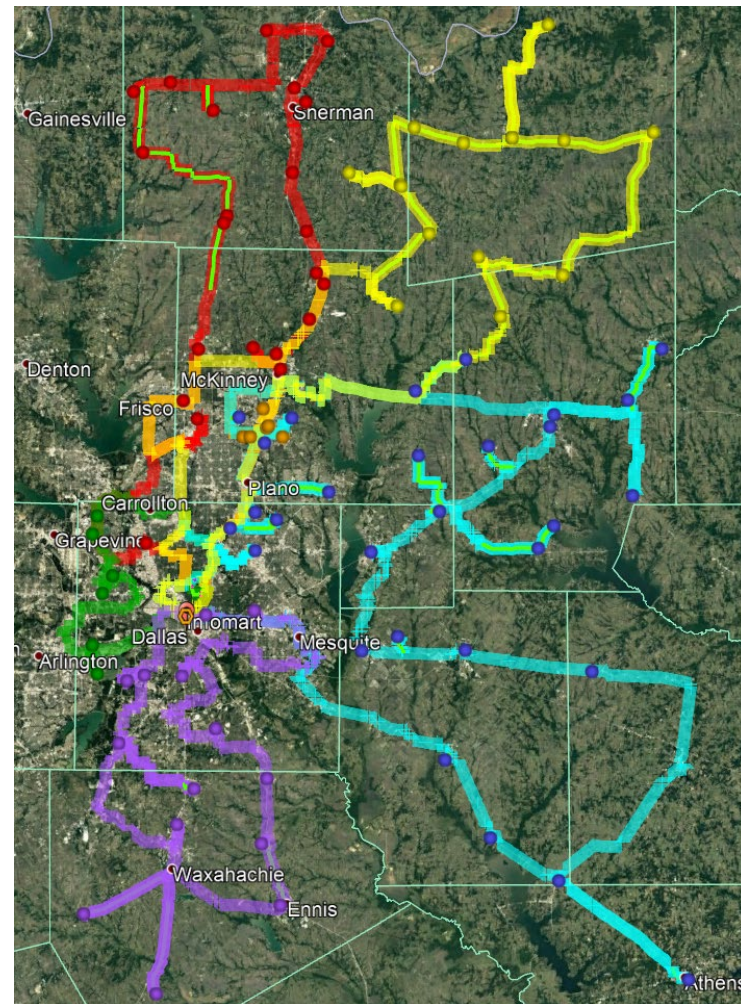
Zayo Customized Support

- Zayo delivers 7x24x365 customer support and **proactive** monitoring
- Zayo NOC specialists (not third-party) own outage resolution from trouble-ticket submission to complete service restoration
- **Zayo employees** provide local support in the DFW area
- No bureaucratic escalation desk -- Escalations available immediately
- Fiber 10 has access to the cell phone of Zayo's Senior Vice President of Fiber Solutions
- Spare parts inventory and rapid-response
- Districts have **transparency and accessibility** in escalations



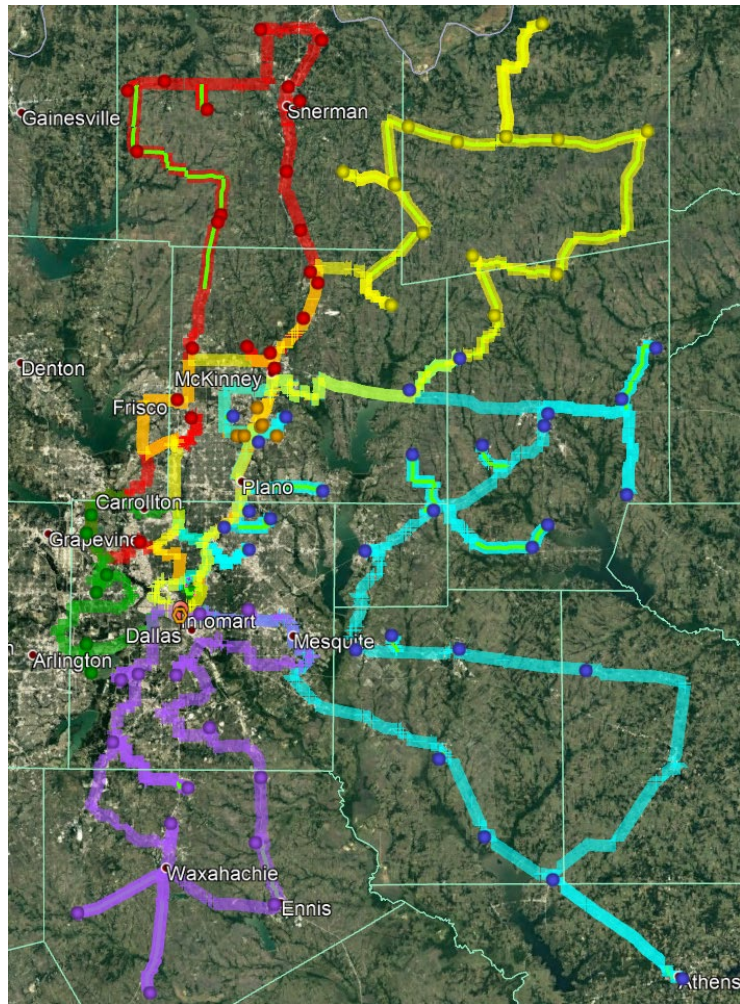
Tech Details

- Completely optical private network
- All locations are WDM nodes on the network - equipment is the same at each site
- Five diversely routed WDM core rings
- All rings terminate at Infomart in Dallas - One of largest interconnection hubs in the US
- Fiber, equipment, and network operational support all delivered by Tier 1 fiber optic provider
- 2nd-most-peered network in North America



Tech Details cont.

- Design spans over 2000 fiber route miles
- Architecture provides redundancy in case of failures in the network (e.g., fiber cut) and allows traffic to be protected around the rings in under 50ms switching times
- 200 Gigs of Internet Access - Scalable to 500 Gigs
- Potential direct connections to Amazon, Microsoft, Google, State testing environment
- High-speed connections to other ESC and statewide networks
- Scalable to long range goals of 1 Meg per second
- DDOS scrubbing capability included



Designed for Scalability

- Each location will have **10 G ports**, non-throttled bandwidth
- Districts can add bandwidth beyond 10G with ease
- DWDM rings operate at 100 Gbps - capable of over 1Tbps
- Rings upgraded simply by adding another wavelength
- Since Fiber 10 will be a single-subscriber, private network, the consortium will bypass the “Carrier Cloud”, **it will not be affected** by aggregated network traffic of other customers
- Free from outside interference, interception or interruption - the most **reliable** and **secure** network possible
- Bandwidth availability far exceeds Region 10’s 1Mbps per student target and any foreseeable FCC requirements



Ciena Equipment



- Ciena is the gear that powers the largest IP networks (ATT, Verizon, Zayo, CenturyLink, etc.) What the largest carriers use in their backbone
- Fast becoming the standard in the delivery of carrier-grade private networks
- Ciena is more cost effective than competitors
- Ciena's optics shoot a longer range, so Region 10 can consolidate the network and reduce points of failure and total equipment costs



IP Address Options

- Each district will have their own IP address space to terminate layer 3 services
- Districts who own their IP addresses may continue to use them
- Districts who do not own IP addresses may be assigned up to a full Class C of Region 10 owned addresses
 - Will not have to change if the consortium changes Internet providers in the future
- BGP fully supported



Colocation Possibilities

- Additional VLANs can be created between a district site and another location on the rings
- Each district may create a private LAN consisting of multiple locations on the ring
- Supports district equipment being housed at R 10, Infomart, or another district
- Firewalls, web filters, and other services may be placed at Infomart (usage could be optional per site)



Buildout Timeline - Blue Ring

Quinlan

Kaufman

Greenville

Campbell

Richardson

Farmersville

Garland

Forney

Caddo Mills

Forney

Greenville

Lone Oak

Allen

Athens

Royce City

Terrell

Rockwall

Lovejoy

Wills Point

Kemp

Bland

Community

Commerce

Wylie

Boles

Green Districts online by July 1, 2019

Yellow Districts online by March 1, 2020



Buildout Timeline - Red Ring

Pottsborrow

Frisco

Whiteboro

Dennison

Prosper

Sherman

Carrollton

Sherman

Van Alstyne

McKinney

S&S Consolidated

Anna

Howe

Gunter

Collinsville

Green Districts online by July 1, 2019

Yellow Districts online by March 1, 2020



Buildout Timeline - Yellow Ring

Blue Ridge

Honey Grove

Leonard

Bonham

Ector

Whiteright

Celeste

Savoy

Tom Bean

Whiteright

Wolfe City

Trenton

Sam Rayburn

Dodge City

Green Districts online by July 1, 2019

Yellow Districts online by March 1, 2020



Buildout Timeline - Purple Ring

Cedar Hill
Red Oak
Life School
Lancaster
Dallas
Faith Family

Ferris
Palmer
UME Prep
La Acadmenia
Ennis

Italy
Maypearl

Green Districts online by July 1, 2019

Yellow Districts online by March 1, 2020



Buildout Timeline - Green Ring

Coppell
Irving

Grand Prairie

Green Districts online by July 1, 2019

Yellow Districts online by March 1, 2020



District Onboarding Options

Current Internet Contract Ends	Begin Fiber 10 Internet Service
June 2019	July 2019
June 2020	July 2020
June 2021	July 2021

- Districts have up to three years to begin using the network
- Districts **will not** be invoiced until they begin using the network



Consortium Pricing

Cost for a 10 Gig Circuit and Internet Access

Number of Students	Year 1-4 Monthly District Cost per Circuit	Year 5-10 Monthly District Cost per Circuit	Ten Year Cost	Average Per Month Ten Years
1-999	\$700	\$400	\$62,400	\$520
1,000-1,999	\$1,000	\$600	\$91,200	\$760
2,000-3,999	\$1,300	\$800	\$120,000	\$1000
4,000-9,999	\$1,500	\$1,000	\$144,000	\$1,200
10,000 Plus	\$2,100	\$1,200	\$187,200	\$1,560

- Cost savings per MB to ISD's
- Surpasses Commissioners 1 Mbps per student target goal (1.39 Mbps)
- Rate not dependent on E-rate fluctuations
- Scalable for all members



Fiber Network Consortium Timeline

- ~70 LEAs joined the consortium with over 100 circuits requested
- April 18 - 8 responses received - RFP evaluation complete
- April 18 - Vendor contracts signed
- Spring 18 - LEAs presented final pricing
- Spring 18 - Meetings this spring with your Tech Directors
- Summer 18 - LEAs sign commitment letters with Region 10 (4 years from circuit go live date)
- Districts answer discovery questions, potential site surveys conducted
- FCC Form 471 review process, Three levels of FCC / USAC approval
- Jan 19 - Funding Commitment Letter - Network buildout begins
- July 19 - Majority of the network online and operational
- April 20 - Complete implementation
- Districts may delay going live until current ISP contracts expire



Fiber 10 - Next Steps...

- Region 10 to provide to all consortium members
 - Copy of this slide deck and video link
 - Signed MOU to commit to service
 - Discovery questionnaire
- Return the signed MOU to Region 10 is August 1, 2018
- Region 10 requires the signed agreement even if your entity does not intend on utilizing the service until July 1, 2020 or July 1, 2021 as noted on the Contingency Agreement
- Wait on funding... And additional bandwidth!

