In 2010, Horizon Telcom was successful in its application to the NTIA BTOP program, winning $66 million to build fiber across much of Appalachian Ohio as a member of the Ohio Middle Mile Consortium (OMMC). Two other companies, ComNet and Everstream (One Community at the time), also successfully applied for funding under the OMMC banner. The resulting networks, illustrated in Figure 1, have had a tremendous impact on their respective regions.

In approaching the current NTIA Middle Mile Grant (MMG) opportunity, Horizon focused on how best to build upon the previous NTIA investments. We worked closely with Appalachian Regional Commission-designated Local Development Districts[1] to identify key gaps in the region's open middle mile. The top priority gaps we identified are illustrated in Figure 1.

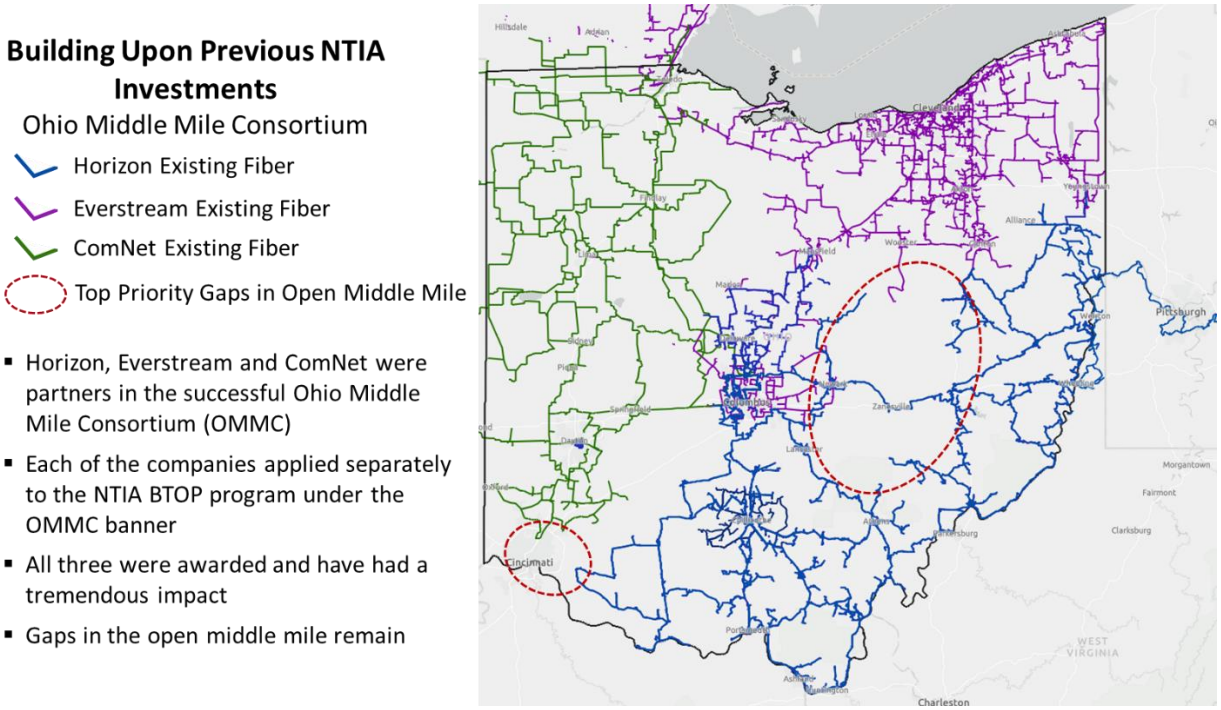

Figure 1: Top Priority Open Middle Mile Gaps

Horizon saw an opportunity to increase the density and diversity of the existing network, deliver open middle mile to two high-need counties that currently have none, and create new meet points among the original OMMC participants as illustrated in Figure 2. The proposed 239 miles on new fiber will close multiple rings, greatly improving reliability. We already offer connections to hosting facilities and Internet Exchanges (IXCs) in Columbus and Pittsburgh. Our

[1] The Appalachian Regional Commission designated "Local Development Districts" (LDDs). In the targeted service area, the LDDs are Buckeye Hills Regional Council, Ohio Mid-Eastern Government Association and the Ohio Valley Regional Development Commission.

proposed build into Cincinnati will provide additional IXC connectivity of importance to the K-12 and healthcare communities.

While some applicants will suggest that underground fiber is required to achieve high uptimes, Horizon asserts that densifying the existing networks by closing rings will do more than building underground fiber in areas already well-served with open middle mile. Horizon's approach will also save money, coming in at a fraction of some other proposals.

Further, by deploying fiber primarily on existing utility poles, the Horizon proposal will help harden the electrical grid. The "make-ready" process will result in the replacement of many marginal power poles, thus increasing the grid's resistance to climate-driven weather events.

Building Upon Previous NTIA Investments

Ohio Middle Mile Consortium

- Horizon Existing Fiber
- Everstream Existing Fiber
- ComNet Existing Fiber
- Top Priority Gaps in Open Middle Mile
- **Proposed Fiber**

a. Closes multiple rings, increasing reliability
b. Establishes additional interconnection points among original OMMC partners
c. Reaches counties lacking current open middle mile
d. Provides diverse connectivity into Cincinnati

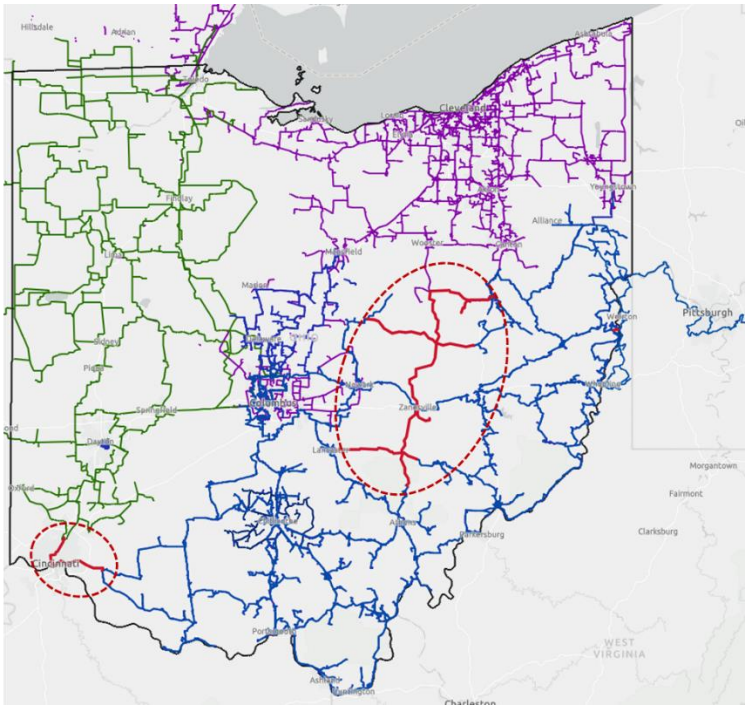

Figure 2: Proposed Fiber to Build on Previous NTIA Investments

Continuing with the theme of building on existing NTIA investments, Horizon also proposes to establish three new POPs in Holmes, Coshocton and Perry counties that currently have NO open middle mile providers as illustrated in Figure 3. In addition, Horizon proposes to upgrade its existing POPs in the service area to 400 Gbps DWDM from the original 10 Gbps DWDM installed as part of the BTOP program. While the 10 Gbps DWDM has served the region well, bandwidth demand has outstripped available capacity, and the equipment is aging out. The new Ciena 6500s will support integrated AES-256 encryption at wire-speed to safeguard data in-flight. Ciena's approach is FIPS certified and includes hitless key rotation every second.

Building Upon Previous NTIA Investments

Ohio Middle Mile Consortium

- **Proposed Fiber**
- Horizon Existing Fiber
- Horizon Point-of-Presence
- Everstream Existing Fiber
- ComNet Existing Fiber

a. Establish new POPs in Holmes, Coshocton and Perry counties with 400 Gbps DWDM
b. Upgrade existing POPs to 400 Gbps DWDM
c. Establish presence in global IXC location in Cincinnati
d. Link Cincinnati back to ComNet in physically diverse path

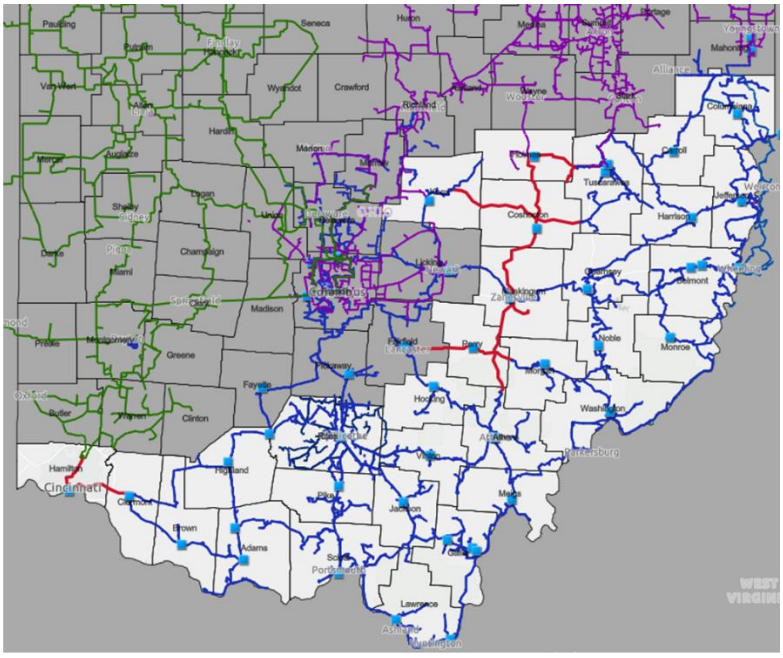

Figure 3: Establishing New POPs and Upgrading Existing POPs

As part of this proposal, Horizon also commits to establishing "Community Benefit" indefeasible rights to use (IRUs) for key community anchors. With a total of 12-strands, Horizon proposes to provide four-strands to K-12, four-strands to healthcare and four-strands to OARnet (Ohio's REN). This commitment will traverse not only much of the new fiber but also 711 miles of existing Horizon fiber as illustrated in Figure 4.

Community Benefit IRU Rings

- IRU Rings

4 IRU Strands Each For

OARnet (Ohio's REN)
K-12 ITC's (OME-RESA and META)
Southern Ohio Health Care Network

817 miles in total

106 miles on proposed fiber
711 miles on existing fiber as in-kind match
711 miles x 12 strands = 8,532 strand miles

Figure 4: Community Benefit IRU Rings

Focusing on the K-12 community, Figure 5 illustrates the reach compared to the school children's homes and the school buildings themselves. Schools not directly on the rings will be reached from other existing fiber assets of Horizon.

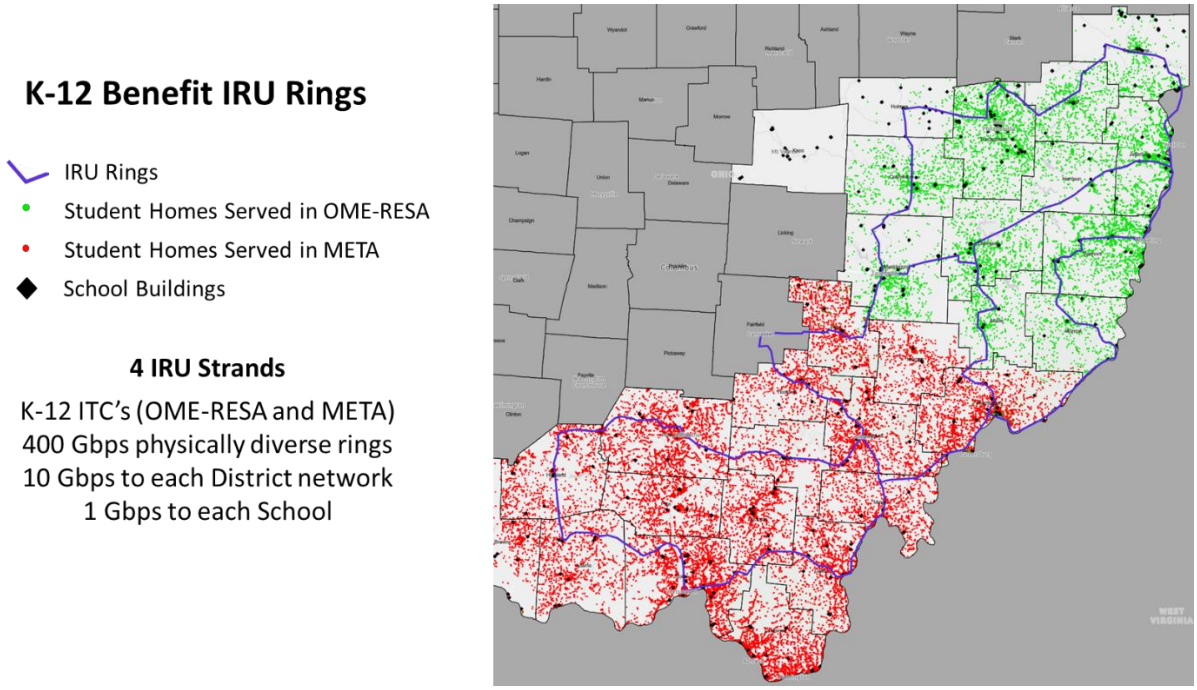

Figure 5: K-12 Community Benefit IRU Context

For the K-12 community, we are working through the Information Technology Centers (ITCs) serving the project area.[2] Each will benefit from 400 Gbps rings on physically diverse fiber with 10 Gbps symmetrical connections delivered to each district network center as illustrated in Figure 6. Where feasible, district network centers will also be served using physically diverse fiber feeds. Each building will be upgraded to 1 Gbps symmetrical connections. Providing dual 100 Gbps connections to OARnet, Ohio's Regional Education Network (REN) will deliver Internet capacity and links to hosting services beyond what the ITCs provide in their own data centers.

[2] The K-12 ITCs in this project are the Ohio Mid-Eastern Regional Education Service Agency (OME-RESA) and META Solutions.

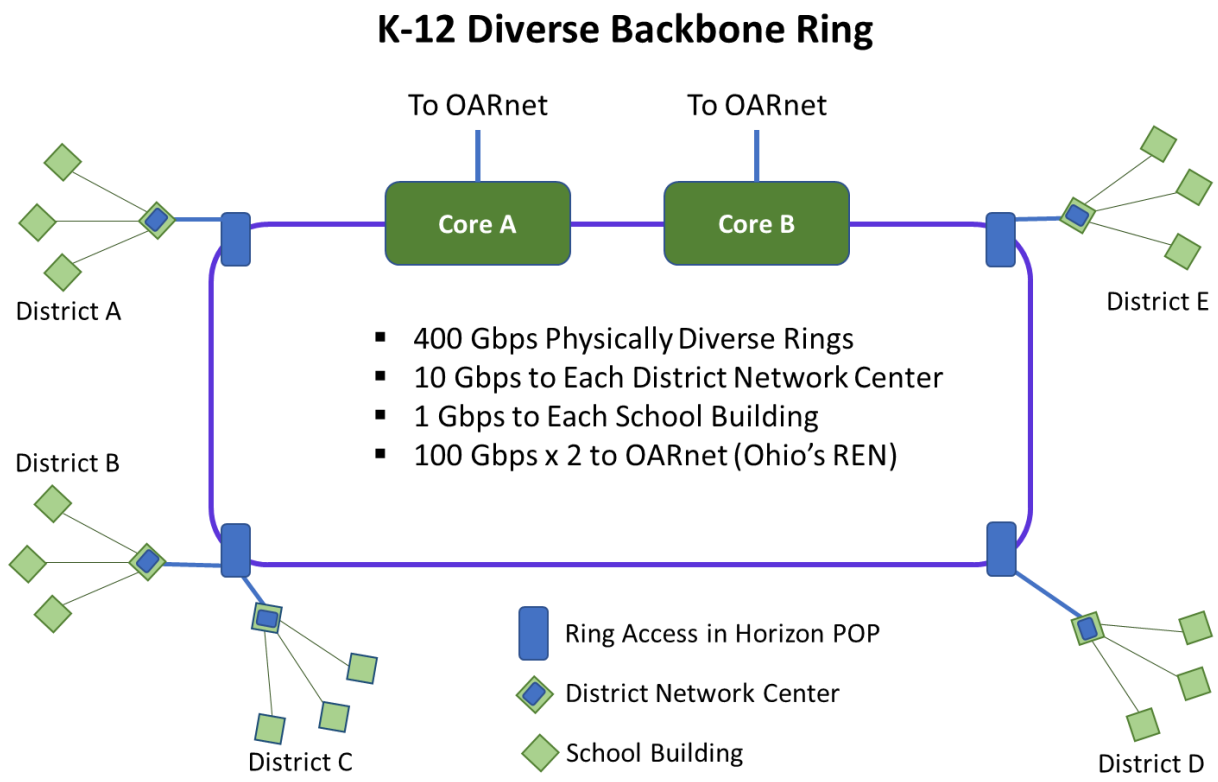

Figure 6: Extending IRU Rings to Districts