

Ensuring Broadband for All

Effective strategies for expanding the middle mile

Broadband's so-called "middle mile" — the high-speed connections that link local networks with high-capacity regional and national networks — is critical to providing communities with resilient and affordable internet access. Now, with the availability of unprecedented federal funding for broadband improvements, strategies are coalescing around strengthening and expanding this important component of broadband infrastructure.

"You don't get high-speed, reliable and affordable internet to all Americans without the middle mile," said Sarah Bleau, broadband specialist at the U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA), during a recent *Government Technology* webcast.

The webcast focused on funding and deploying middle-mile networks to increase broadband internet access. It also featured Link Oregon, a nonprofit consortium that's spearheading middle-mile network efforts in the state, and experts from Cisco and Lumen. This brief is based on their conversation.

THE BROADBAND LANDSCAPE

In the wake of the Great Recession, the 2009 American Recovery and Reinvestment Act provided \$4 billion for broadband projects, public computing and last-mile sustainability. The latest round of federal funding — part of the \$1.2 trillion Infrastructure Investment and Jobs

Act (IIJA) passed in 2021 — far eclipses previous investments, with \$65 billion for broadband initiatives.

But the magnitude of funding isn't the only thing that's changed. The focus of federal, state and community efforts has galvanized around several critical areas: emphasizing affordability as well as access, reaching populations that historically have lacked internet access, and ensuring resiliency in the face of climate change and other natural and man-made risks.

Middle-mile infrastructure is an essential component of these objectives, Bleau said. "We're looking to build to areas where there are unserved and under-served populations. We want to reduce the cost of delivering internet to the household. You do that by building middle mile and building resilient systems."

MIDDLE-MILE STRATEGIES

Creating effective middle-mile networks requires collaboration, careful planning and an understanding of rapidly evolving technology. Among the strategies for success:

Develop partnerships and coalitions.

The sheer scale of middle-mile projects requires a wide range of stakeholders coming together to develop solutions. Local internet service providers, schools, healthcare organizations and government entities can serve as anchor institutions for middle-mile networks. These coalitions also may include nonprofits, economic

development councils, private sector partners and state governments.

Partnerships are also critical for winning competitive federal grant funding. "We're not looking for one single hero," Bleau said.

Start planning early. For grants with hard deadlines or timetables embedded in their criteria, it's critical to start assembling partnerships and developing plans well in advance to ensure you have adequate resources and time, said Scott Pohlman, director of business development for Lumen's higher education practice.

Leverage partners' expertise and existing infrastructure. For example, Link Oregon has relied on partners from higher education, state government and private industry with extensive network operating experience to create a state-wide middle-mile network backbone. "Leveraging partners with demonstrated experience and aligned objectives is a model for success," said Steve Corbató, Link Oregon's executive director.

Emphasize resiliency. It's important to ensure networks aren't vulnerable to disasters through a single point of failure. That proved a critical focus in Oregon, where communities may face a variety of natural hazards, including earthquakes, tsunamis and wildfires. Link Oregon identified communities with vulnerable infrastructure and is prioritizing resilience in its next phase of network expansion.

Understand the potential of new technologies. Developing middle-mile networks has never been as simple as “putting fiber in the ground and being done with it,” said Albert Garcia, Cisco business development manager for broadband. Organizations must also manage connections to multiple last-mile networks.

“As communities grow, you’re going to need more points of intersection where you can provide last-mile services to new homes and businesses,” Garcia explained. “You need to think very closely about how you operate these networks efficiently so they’re successful and provide affordable internet access to constituents and customers.”

New technologies can address the limitations of legacy architecture, which relies on separate equipment to handle routing, transport and multiplexing. For example, routed optical networking and open standards can create “a simpler, intent-based approach to managing networks,” Garcia said, increasing flexibility and resiliency while reducing cost.

Research suggests that routed optical networking technologies can yield up to 35% in capital expenditure savings, 57% in operational expenditure savings and 46% in overall total cost of ownership (TCO) savings.²

“Ultimately, that leads to more affordable internet for customers,” Garcia said.

Emphasize equity and digital literacy. Strengthening middle-mile networks to provide broadband connections to underserved or unserved populations is

LINK OREGON

Since its inception in 2019, Link Oregon has evolved from a consortium of research universities and state government agencies to a statewide middle-mile network that includes more than 2,000 miles of fiber.

Link Oregon provides services to more than 50 partners — including K-12 schools, higher education institutions, libraries, tribal and state governments, and nonprofit organizations.

The organization “stitched together” dark fiber from multiple providers and acquired the key network components to develop two additional network rings in rural parts of the state, said Steve Corbató, Link Oregon’s executive director.

“It took this type of broad consortium to make this type of network pencil out financially,” Corbató said. “The important thing has been the partnerships and the support from multiple sectors.”

critical. But expanded internet access must be accompanied by efforts to increase digital literacy.

“As infrastructure providers, we tend to focus on the availability side of the broadband equation,” Corbató said.

“Human and economic factors come into play in efforts to maximize adoption, and this increasingly is a societal question.”

Educational initiatives must reach out to underserved populations, including older individuals, formerly incarcerated persons and others who have had limited exposure to the internet as a practical tool. The National Digital Inclusion Alliance (www.digitalinclusion.org) offers guidance and resources that may help partnerships develop programs that address these challenges and ensure all members of

the community can take advantage of expanded broadband availability.

MEETING THE CHALLENGE

Through the IJJA, the federal government is making a massive investment in expanding broadband availability and access. To use these dollars effectively, communities must assemble partnerships and leverage evolving technologies to deliver affordable and resilient connectivity. They’ll also need to launch digital literacy efforts to educate and engage underserved populations.

These multifaceted efforts will help the nation meet the goal of ensuring equitable high-speed internet access for everyone.

“It’s going to take all of us,” Bleau said.

This piece was written and produced by the Center for Digital Government Content Studio, with information and input from Lumen and Cisco.

1 <https://webinars.govtech.com/How-State%2C-Local-and-Education-Organizations-Can-Tap-into-Billions-of-Dollars-for-Broadband-141034.html>

2 <https://www.cisco.com/c/dam/en/us/solutions/collateral/service-provider/routed-optical-networking/white-paper-sp-acg-400g-ip-transport.pdf>

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