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Final Copy of Case Study

Status:
Winner

Year:
2013

Organization Name:
Merit Network, Inc.

Organization URL:
http://www.merit.edu/

Project Name:
REACH-3MC (Rural, Education, Anchor, Community and Heathcare – Michigan Middle Mile Collaborative)

Please select the category in which you are submitting your entry:
Mobile Access

Please provide an overview of the nominated project. Describe the problem it was intended to solve, the technology or approach used, how it was innovative and any technical or other challenges that had to be overcome for successful implementation and adoption. (In 300 words or less.)

In rural and remote areas of Michigan, a lack of backhaul infrastructure limits Internet service performance, availability and affordability. Community anchor institutions (CAIs) are forced to operate with levels of Internet, telecommunication and networking service below their need. Businesses must compete in the global economy without an effective method to access it. End users at home face similar challenges accessing information. In 2010, Merit Network applied for and received ARRA funding in two grants through the Broadband Technology Opportunities Program (BTOP) that help fund REACH-3MC. REACH-3MC solves the backhaul problem in rural Michigan by constructing 2,287 miles of "middle mile" fiber-optic infrastructure. Led by Merit Network, Michigan's research and education provider to CAIs, REACH-3MC engages seven commercial ISPs as grant sub-recipients to create infrastructure that serves all sectors of society: homes, business, CAIs. Merit and sub-recipients each own fiber strands over various portions of the REACH-3MC network, ensuring competition at every interval. The network is governed

by "open access" principles enforced by the grant. ISPs cannot be denied access to the network where capacity permits. REACH-3MC provides 143 CAIs with 1 Gbps dedicated connections to Merit, enabling collaboration with over 230 other CAIs connected. By expanding Merit's footprint to over 4,000 miles, Michigan's public institutions have a mechanism to cut costs and provide more service to their constituents. Over 900 more CAIs will have the opportunity to connect over time. The REACH-3MC service area encompasses over 1 million homes and 55,000 businesses that will benefit either as direct customers of a REACH-3MC sub-recipient, or indirectly through an existing service provider that obtains backhaul from a REACH-3MC sub-recipient.

When was this project implemented or last updated? (Please specify month and year.) Has it incorporated new technologies and/or other innovations since its initial deployment? (In 300 words or less.)

In January 2010, Merit Network was awarded ARRA BTOP funding for the REACH-3MC Round I project which totals 1,017 miles of fiber-optic infrastructure with 55 lateral 1 Gigabit (Gbps) connections to community anchor institutions (CAIs). In August 2010, Merit Network was awarded ARRA BTOP funding for the REACH-3MC Round II project (REACH-3MC II), which totals 1,270 miles of fiber-optic infrastructure with 88 lateral 1 Gbps connections to community anchor institutions (CAIs). Round 2 includes fiber crossing the Mackinaw Bridge that connects Michigan's Upper and Lower Peninsulas. It also constructs fiber across Michigan's remote Upper Peninsula with backhaul to key interconnection points in Green Bay, WI and Duluth, MN. The Round I REACH-3MC project will be complete March 2013. The Round II REACH-3MC project will be complete July 2013.

Is implementation of the project complete? If no, please describe the project's phases and which phase the project is now in. (In 300 words or less.)

REACH-3MC is a fiber-optic network extension project that is funded by two ARRA BTOP grants (REACH-3MC and REACH-3MC II). Merit implemented each grant in a similar fashion; however, because they were awarded separately, each grant is on a separate schedule. In the preliminary phase of each grant, Merit Network put out an open call inviting other organizations to participate in the project, plan the fiber route and ultimately own fiber on the network. Organizations that elected to participate with Merit became sub-recipients on the grant. Merit led each grant application effort with support of the sub-recipients. Once the applications were awarded funding, the project service area underwent a comprehensive Environmental Assessment (EA) based on the preliminary engineered route. A lengthy engineering phase followed in which the fiber route was revised to meet the specifications of the EA. With the engineered route complete, the project was then required to obtain 1,769 permits in total from over 500 different permitting agencies in order to construct the planned infrastructure. No fiber could attach to a pole or be placed in the ground without proper clearance from the pole or property owner. The REACH-3MC network consists of a "mainline" network, while Merit and sub-recipients construct fiber-optic "laterals" from the "mainline" to connect individual community anchor institutions and businesses and to access cell towers and Central Office facilities. Both the mainline and laterals were constructed in parallel. With infrastructure and fiber installed, the network was spliced at various intervals so that it is operable. Splicing involves fusing fibers that connect consecutive lengths of fiber that

come together to make up the network and connect laterals to the mainline. Once splicing is complete, the network then undergoes testing to ensure all splices were performed properly.

Please provide at least one example of how the technology project has benefited a specific individual or organization. Feel free to include personal quotes from individuals who have directly benefited from the work. (In 300 words or less.)

Carol Souchock, Adrian Public Library Director: "This project allows the library to expand upon our services to small business and entrepreneurs, provide library customers and students with long distance education opportunities and programming, improve access to government resources, and address the ever-increasing technology needs of our community." "REACH-3MC provided an impetus for further development of our downtown, resulting in investment by competitive service providers, expanded networking opportunities with local educational institutions Adrian College, Jackson Community College, Siena Heights University and our economic development partner South Central Michigan Works as well as directly connecting us to educational and governmental resources throughout the State of Michigan." Randall Melton, Executive Director Information Technology Lake Michigan College: "Merit's new fiber REACH initiative lowers our telecommunication cost by 18% and will position us to take advantage of on-net cloud service with much lower latency. This could greatly expiate our transition to cloud-based services." Paul Robinson, Systems Administrator, Monroe County Library System: "Utilizing Merit fiber for the primary Internet connection at the Monroe County Library System will allow us to provide better and faster network connectivity at lower cost at our operations center and our branch locations. Public libraries have become a primary location for those that are unable to access broadband Internet services at home, and it's great to have the opportunity to provide better service to our patrons." James Jones, Information Technology Director, Jackson Community College: "It's been a long haul but worth it financially and a benefit to the communities it serves. There was simply no way for [Jackson Community College] to do this on our own. Effective partnering and collaborative projects are the only reasonable way. Thanks for your team's time and expertise."

Would this project be considered an innovation, a best practice or other notable advancement that could be adopted by or tailored for other organizations and uses? If yes, please describe that here. (In 300 words or less.)

REACH-3MC leverages public-private sector collaboration. Merit Network, non-profit service provider to Michigan's research and education community, and seven sub-recipient commercial providers work together, supported in part by federal investment to address Michigan's broadband shortfalls. The majority of fiber-optic construction cost is labor. Increasing strand count or cable size is only a marginal cost increase. Therefore bringing other providers to participate in the build makes the construction more cost-effective for all. Merit and sub-recipients will each own fiber strands over various portions of the REACH-3MC network. This is what is commonly referred to as a "condo build" in the telecommunications industry. Merit owns the fiber sheath, while the ownership and operation of the fiber strands within the sheath are divided between Merit and sub-recipients. On each network segment, there are multiple service providers (Merit and sub-recipients) competing to provide a given community the best value, whether it be

wholesale transport to a local ISP, a fiber connection to a school or library, or residential and commercial service. Each brings a different value proposition, employing different technologies, content and service packaging. The number and diversity of sub-recipients participating in REACH-3MC ensure the network is a sustained investment that delivers results. Merit's portion of the fiber enables community anchor institutions (CAIs) to connect to Merit's private, high-performance network, enabling them to lower costs, consolidate services and provide more service to Michigan's citizens. As a "middle mile" project, the aim of REACH-3MC is not to directly connect every home and business in the network service area, but rather, REACH-3MC will build backhaul into a region. ISPs will then have the opportunity to use this infrastructure to provide faster, cheaper, and more reliable service.

If there are any other details that the judges should know about this project, please note them here. (In 300 words or less.)

The BTOP grants stipulated three years for project completion. Merit faced unique challenges and complexities implementing both grants. In addition to REACH-3MC's large scope, Merit contended with a decentralized permitting process and two Michigan winters that slowed construction. Merit also worked with a complex series of environmental protections and coordinated with seven commercial organizations that were sub-recipients on the grant. Through REACH-3MC, Merit Network succeeded in bringing over $100 million in federal funding to Michigan. The project is a textbook example of successful federal investment, with government funding catalyzing millions of dollars in additional private and local investment. Collectively, Merit and REACH-3MC provided nearly $30 million in matching funds as part of the project. In February 2012, Merit's President and CEO, Donald Welch, was honored as Innovator in Infrastructure and "Champion of Change" by the White House. The distinction recognized REACH-3MC for creating jobs in Michigan communities through an innovative project to improve America's infrastructure. The City of Hillsdale, MI has worked with Merit and the Michigan Economic Development Corporation for years on plans for a technology park that would make Hillsdale the site of a new, advanced datacenter. REACH-3MC has positioned Hillsdale to realize these plans, making the City a major point of presence with a four-way connection to the world. REACH-3MC sub-recipient TC3Net has begun a Fiber to the Home (FTTH) project in the city of Adrian, MI. Collaboration between Merit and TC3 on REACH-3MC infrastructure in Adrian provides the foundation for TC3's project. Merit launched the Michigan Cyber Range in November 2012 with Governor Rick Snyder. REACH-3MC provided Merit 10G capability for members where it wasn't possible before, expanding accessibility to the Michigan Cyber Range and increasing opportunities for Merit Members.