Background

Connected Nation is a nonprofit, 501(c)3, that develops and provides tools, resources, and methods to help local communities, states, and federal agencies create and implement solutions to broadband and digital technology gaps. Connected Nation is designed as a private-public partnership with communities and ISPs. Depending on the particular project or program, Connected Nation's funding sources include, but are not limited to, foundations, state and federal grants, local community contributions, depending on the scope of a particular project or program. Connected Nation works with both providers and politicians from all parties to connect as many families and businesses with broadband (high-speed internet) as possible.

Providers work with Connected Nation on a voluntary basis, often asking for assistance developing their FCC-required Form 477 filings (broadband mapping data) and because they protect proprietary information. Connected Nation also works with politicians to gather more accurate broadband data to help them make more informed policy and broadband infrastructure investment decisions. Their primary role between the two entities as well as with states and smaller communities is to act as a third-party agency to bring together the information each group can provide and find ways to improve the lives of consumers. Connected Nation engages in the following activities community planning solutions to address technology gaps, empowering state leaders through granular mapping, and creating jobs through digital skills training and education opportunities.

Establish Strategic Leadership

Connected Nation has partnered with over 600 communities to catalyze broadband development through partnerships with local and state officials, and ISPs. Connected Nation helps communities form strategic leadership groups around a broadband champion, an organization able to coordinate broadband development activities across domains and secure resources. A key challenge for any partnership is bridging communications gaps and helping each partner understand their individual and shared ability to contribute value.

Connected Nation first identifies a broadband champion, an organization with the perspective and positioning to form a strategic leadership group and coordinate broadband development across multiple domains. A community broadband "champion" could include an economic or education organization able to benefit from broadband through improved service delivery. These organizations are generally the most aware of the community's broadband gap and have the capacity and knowledge to address issues surrounding broadband development, including infrastructure and any impediments to adoption.

In Connected Nation's experience, the broadband champion is most often an economic development organization. EDOs are generally the most-flexible local organization, in terms of mission and ability to obtain public resources. EDOs understand local internet service gaps and their impact and have the resources to assign or hire a staff-member specifically targeted at broadband development at the local or regional scale. While school administrators are passionate about broadband development, they generally lack the resources to address broadband development in addition to their operational demands. School administrators are still a valuable partner – students and teachers are impacted by gaps in broadband access and school administrators can facilitate outreach to targeted vulnerable and low-income populations in underserved areas.

Partners that champions should target include any organization with a vested stake in improved internet service. Community stakeholders can include local ISPs, university educators, school administrators and education officials, community and economic development organizations, national associations, and state and local transportation, jobs and family services, and economic development officials. The strategic leadership group then champions the benefits of broadband development across each of their domains, organizing additional stakeholders to identify how broadband could improve service-delivery, and solutions to broadband development and access. This creates community buy-in across organizations, including local ISPs that have the capacity to expand broadband access across a region, but often lack the tools and resources to support any new development.

In addition to community partnerships, Connected Nation also works with state officials and ISPs to map broadband access at a more granular level than the data provided by the Federal Communications Commission Form 477. As part of this process, Connected Nation leverages existing partnerships with community ISPs to receive access to ISP-data, in exchange for helping these ISPs prepare their FCC-required filings. Connected Nation then works with a state government team to deploy a series of county and state-level maps that help policymakers challenge inaccurate broadband data and identify opportunities for broadband development. Connected Nation is able to receive access to ISP-data because of its long-standing relationships and trust built with regional ISPs as a partner. The organization has been partnering with regional ISPs since it helped create the National Broadband Map in 2009 with the National Telecommunications and Information Administration.

Regional planning organizations and ISPs have to bridge a language barrier to successfully collaborate. Broadband development efforts can help ISPs feel comfortable partnering with community stakeholders by engaging ISPs during the kickoff and organizational stages of any effort. Inviting ISPs to the table early helps the private sector feel comfortable that the community wants to develop broadband infrastructure as partners, rather than replace the ISP with a public sector service-option. Early engagement leaves room to create a dialogue about how the public sector can help private ISPs overcome barriers to development such as financing, regulations, or talent shortages. Successful broadband development efforts bring ISPs into the fold, rather than being confrontational.

Early engagement with ISPs creates time for the dialogue to grow from confrontation to collaboration. Initial meetings with ISPs often have community-members complain about the current service-quality provided by ISPs. The following meeting provides ISPs an opportunity to explain their development plans and share any barriers to expanding service. Small and local ISPs often appreciate the opportunity to be transparent and share barriers to expanding service, including access to capital, regulations, return-on-investment, or talent shortages. By the third meeting, both parties can have a constructive, solutions-based dialogue to identify profitable opportunities for ISPs to expand service to underserved areas. Strong partnerships create opportunities for public-private collaboration around broadband development that maximizes the value provided by the public and private sectors.

Evaluating the Current State of Broadband Development

Connected Nation works with communities to map broadband development, access, and adoption using a combination of FCC data, private-ISP data, and information obtained from community surveys. This results in resources that are used to help policymakers and regional ISPs invest in or develop programs to support broadband development. In their experience, regional organizations have the capacity to work with partners across the community to identify relevant datapoints and map regional assets.

Connected Nation creates more accurate state-level maps of broadband access that tap into private datasets through partnerships with state officials responsible for broadband development and planning. A Connected Nation team first segments FCC Form 477 data by Internet Service Provider to determine the ISPs that are responsible for broadband-service delivery in a selected area. Connected Nation will work with these ISPs to prepare broadband coverage data for ISPs FCC Form 477 filings, in exchange for the rights to use the data for mapping purposes. Connected Nation then joins ISP-provided spatial data on broadband service with addresses to map coverage at the address or neighborhood level. FCC data is only mapped at the Census block-level. This allows state and local policymakers to identify opportunities for broadband development.

When working in a region or county, Connected Nation first aggregates community demand for broadband services to understand gaps in coverage and demand for broadband services. A community survey examines all aspects of broadband demand: current internet speeds, the cost of connection, usage of broadband enabled devices, and how community-members use the internet. In addition to residents, the survey is distributed to community assets and businesses, including agriculture producers, healthcare facilities, libraries, public safety, and schools to understand their digital skills, quality of their connection, and how they use the Internet. The survey asks residents to self-assess their own digital literacy, and ability and usage of tools including telehealth, tele-education, and telework. A similar survey is distributed to local ISPs to understand their current service-offerings and coverage-areas.

Connected Nation then aggregates its findings and combines them with information on local assets that might facilitate planning for broadband development to create an interactive map for the community. Mapped assets include the location of community anchor institutions, middle-mile networks, vertical assets, and places that are currently/have already received funding for broadband development. In the case that the state does not have a mapping-partnership with Connected Nation, the organization uses FCC Form 477 data, rather than more granular coverage information. Communities might also request an "outside- audit," where Connected Nation staff drive every road in a community map where service is and is not available. While this process provides the best ground-view snapshot of broadband service, its extremely costly and requires staff to check service along every road and address in the community.

Local ISPs are typically willing to help regions map broadband service if they are included in the formation and organization of community broadband development efforts. Its important for communities to help ISPs understand the community is there to help ISPs improve their service-delivery, rather than deploy a public solution. Publishing data on local demand, access, and assets helps incumbent regional ISPs understand opportunities to expand service, and helps new ISPs identify market-opportunities. Regional organizations provide value to any partnership with ISPs by coordinating mapping efforts that meet the needs of underserved communities and help ISPs understand profitable business models. Community-level market research can impact the development plans of regional ISPs but is not typically relevant to national ISPs that make development decisions based around corporate strategy and financial analysis. Regional organizations can play an important role in any partnership by gathering broadband-related data and partnering with ISPs to create solutions around these datapoints.

LDDs can provide a valuable leadership role in coordinating broadband mapping that addresses inaccuracies in public, national data on broadband access. Regional organizations provide value as coordinator for any market-research and mapping efforts, and a leader in leveraging any insights to address underserved communities. Local Development Districts typically already utilize GIS to map

assets and can apply this capacity to help communities map broadband assets and access. As a regional partner, LDDs can work with communities to survey broadband access on the ground, such as performing validation of service in targeted areas. LDDs might also have relationships with local ISPs. No matter the willingness of ISPs to share data on broadband access, LDDs are well positioned to coordinate any mapping efforts involving various methods.

Datapoints that show the importance of digital literacy often strongly resonate with communities. Surveys deployed by Connected Nation include self-assessments of respondents' ability to use hardware, software, and online applications. Across communities, respondents often rate their cyber-safety skills as low and their online banking skills as high, with the two skills being interdependent. Digital literacy training, including cyber literacy, is often a major need for communities. Connected Nation helps communities frame their issues by benchmarking survey data across communities and leveraging frameworks from similar communities to develop initial broadband development solutions. The national repository of data and experience helps Connected Nation match data to solutions and help communities identify funding opportunities they might be able to compete for. Solutions can be creative - one region developed a series of cyber safety seminars for businesses around wine tastings.

Promote Digital Inclusion and Skills Training

The ultimate goal of broadband infrastructure development and expanded access is to encourage connections to and the creation of digital tools that result in improved community, economic, and social outcomes. A successful broadband development program focuses on the issues that impact a community's ability to tap into opportunities enabled by broadband, including infrastructure-expansion. A comprehensive broadband development strategy attaches efforts to expand access to unserved areas with programs that facilitate the access, adoption, and utilization of broadband technologies and services to the benefit of a community.

Communities can create demand for broadband services by offering programs that help citizens access improved services and opportunities via high-speed Internet. Increasing the demand for broadband services by consumers will support the sustainability of any development by increasing the take-rate of the network. Programs to facilitate the adoption of broadband service by consumers focus on using and navigating the Internet and demonstrating how broadband service results in improved quality-of-life. Examples of programs that Connected Nation has supported include digital literacy and awareness classes or subsidies for low-income residents purchasing broadband-enabled devices. Programs can focus on helping community-members use the Internet to access resources including for business, healthcare, and educational purposes. Other programs help community anchor institutions and public services leverage broadband technologies to improve the delivery of public services. Helping consumers understand the uses and benefits of broadband helps broadband developers maintain a profitable business case by increasing the demand for broadband by consumers, increasing the take-rate.

As a key part of its community development strategy and market research, Connected Nation surveys the technology skills of businesses' employees through a self-assessed digital skills diagnostic. The business survey asks employers to rate how well the skills of their current workers match the needs of the business, and if the business supports technology training. The survey targeted at higher education institutions asks about the quality of their relationship with businesses and the Chambers of Commerce, and their ability to meet the workforce needs of employers. This information helps Connected Nation understand how local businesses have adopted broadband technologies and identify broadband

technology training assets that can help support local businesses, community organizations, and public officials. The survey has been used to find opportunities for teleworking that helped local companies facing talent-shortages recruit from outside the region, and business and workforce training programs that help employers leverage broadband technologies to become more competitive.

Navigate Legislative and Regulatory Barriers

Connected Nation sees the role of local, state, and federal legislatures as providing ISPs and communities with the tools to develop broadband infrastructure, including removing restrictions to local development of infrastructure. Connected Nation is currently working with the Michigan legislature to allow municipalities to use special assessment districts to construct broadband infrastructure. Ammon, Idaho also used local improvement districts, a kind of special assessment district, where neighborhoods opted into extending municipal broadband to the home in exchange for a special property assessment.

Legislative and regulatory barriers modify the business case for broadband development as either more or less feasible. A major barrier for ISPs is access to capital for development when the investment will result in an uncertain or unfeasible rate of return, especially in rural areas. The public sector can access capital, such as bonds or government loans, that can be refinanced over the life of infrastructure that private firms can only access through competitive grant and loan programs. A profitable business case for broadband development in a low population-density area, might require a municipality the development of broadband infrastructure that is then leased that to an ISP through a public-private partnership. Laws that restrict the use of creative financing solutions to develop broadband limit the ability for broadband development in rural, poor, or low population-density areas where ISPs can only offer Internet profitably with the support of public funds.

Fundamentally, laws and regulations can either increase or decrease the cost of constructing broadband infrastructure. Local restrictions on right-of-way access and permitting increase the cost for each square mile of fiber laid. Broadband development is driven by private sector economics. Lowering the cost to build capital - through partnerships, loans, grants, or regulations – can catalyze development in areas previously deemed unfeasible with private-sector support alone.

Models to Deploy Broadband Infrastructure

Connected Nation typically works with organizations that address broadband development issues at the sub-county level as a result of regional organizing efforts. Development organizations should leverage the best abilities of each partner, including ISPs able to understand and deploy technical solutions that meet the goals of the effort at a reasonable cost. Partnerships between ISPS can result in the leveraging of low-cost public capital to fund infrastructure expansion projects. Public funds can support capital expenditures, but they cannot necessarily increase the affordability of broadband, a key issue for access.

Efforts to develop broadband can be either led at the regional or county-levels, but action is often taken at the county-level. Typically, Connected Nation supports county-level broadband development efforts as a result of regional efforts identifying a specific county with a broadband gap. Regional organizations set goals for broadband development and function as a financial-supporter and facilitator for any development efforts. As facilitators, regional organizations help Connected Nation partner with counties to identify infrastructure-gaps, community anchor institutions, and vulnerable areas. Counties can enact regulations and have access to the granular planning data, including street layouts, vertical assets, and

water/telecommunications infrastructure that facilitate development. Implementation challenges and solutions typically occur at the county-level – what library system and school district to partner with, which business park lacks infrastructure, etc.

Organizations should be willing to deploy a combination of broadband infrastructure solutions in rural areas. While the long-term goal of broadband development is fiber to the premises, rural areas with less than six households per square mile need to utilize a combination of fiber and fixed wireless solutions. Deploying fiber increases in cost exponentially as the population density decreases, limiting the feasibility of expanding fiber to the premises in the short term. Its up to regional partnerships and ISPs to determine where it is cost effective to deploy fiber. Fixed wireless represents the current favored technology to provide broadband service over a large geography – some fixed wireless developments supported by the RDOF offer 100 Mbps download, and the capacity of these networks is growing. Satellite-constellation networks, such as Starlink, represent another potential option to offer broadband in rural areas. Ultimately, fiber is the only solution that can be easily renovated to provide Internet service that meets future needs. While communities want fiber to the premises everywhere in the short term, in reality, fiber is a long-term goal that should be bridged with wireless and satellite technologies.

Demonstrating that your community has a high projected subscribership rate incentivizes investment by private ISPs, who need to be able to make a business case for expansion. Public-private partnerships can smooth entry of private providers into rural markets by leveraging public sector access to low-cost capital. An example of this from Connected Nation's work is a Michigan township that passed a millage to finance a broadband infrastructure expansion. The township in turn leased the fixed wireless infrastructure to an ISP that offers last mile service to residents and businesses.

Any community planning an investment in broadband development needs to consider affordability of service, in addition to access. While broadband development is straightforward, once financing is obtained, affordability is an ongoing and complex issue for communities. The primary consideration in determining the affordability and feasibility of a broadband infrastructure project is the subscribership rate for an area. Areas with projected high rates of subscribership can make deeper infrastructure investments, because of the increased certainty that a profitable number of households will purchase the service. In turn, projected high rates of subscribership enable ISPs to offer service at a lower cost, increasing the affordability for consumers.

The United Nations defines affordability as 2% of an area's median monthly income, which could be as high as $60 - $80 in high-income areas. However, that price is still only affordable for 50% of the population – government programs, community foundations or other philanthropic efforts need to fill in the cost for these lower-income individuals. One such program, the FCC's Emergency Broadband Benefit program[1] provides low-income households with a $50 monthly subsidy for broadband services during the COVID-19 Pandemic. With a high subscribership cost, its important to help customers tap into programs that realize the potential benefit of broadband and increase their earnings potential.

Claire County, Michigan is one Connected Nation community that tapped into regional assets to develop broadband towards meeting community needs. Claire County is rural, lower income and knew it had an access issue outside a fiber ring through community anchor institutions, especially in rural development

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[1] https://www.fcc.gov/broadbandbenefit#:~:text=The%20Emergency%20Broadband%20Benefit%20is,classrooms%2C%20and%20so%20much%20more

on the county periphery. Several of the townships combined funds to finance the construction of towers with fixed wireless equipment at $60,000 a tower to connect with the fiber ring, allowing an ISP to extend last mile service from the towers. Community leaders bounded together to solve the capital financing problem faced by small ISPs in expanding service, which in turn increased the livability of developments designed to house a growing population.

Best Practices

Engage ISPs early in any community broadband development effort. ISPs can provide data on broadband access that supplements market research and can be a critical partner in expanding service to underserved areas. Partnerships that bring the private sector to the table early provide opportunities to create a shared dialogue and set of solutions that benefit the community and help ISPs make sustainable investments that result in further development. Early engagement allows communities and ISPs to hear each other out, and results in a solution that has the buy-in of the community and private ISPs with the resources, tools, and experience to deliver broadband service.

Leverage Local Development Districts' strengths as a regional coordinator and facilitator. LDDs have the relationships with local government, community stakeholders, and businesses to engage regional ISPs, and the tools to lead planning efforts around broadband. LDDs can coordinate the collection of community data on broadband access and demand, including drive-by validation, and most LDDs have the GIS tools to map broadband access, demand, and regional assets to facilitate broadband planning. As a coordinator, LDDs can activate regional assets to address gaps in broadband infrastructure and access, affordability, and digital literacy.

Organize a group of broadband champions that can address gaps in infrastructure, affordability, and digital literacy. Broadband development stakeholders include any organization that can utilize broadband-enabled solutions to improve service delivery. Activating these assets to leverage broadband enabled technologies towards improved service delivery helps create demand for broadband that demonstrates to ISPs the sustainability of any investment. Champion organizations work within their sector to mobilize demand for broadband and realize sector-wide opportunities to leverage broadband towards improved social, economic, health, education and other community-related outcomes.