NATIONAL LEAGUE OF CITIES
CITIES STRONG TOGETHER

DIGITAL EQUITY PLAYBOOK

Investing in Digital Equity Solutions: Infrastructure

Investing in digital equity solutions

After city officials have communicated and built support for what their communities need to create digital equity, they can start to consider the many options for realizing this equity. This section explores investments that city leaders may consider establishing or expanding in their communities. It describes each solution and highlights local government efforts to use the solution to bridge the digital divide in their communities.

Infrastructure

A wide spectrum of infrastructure solutions exists for local leaders to consider, from building public conduit that cities lease to internet service providers, to providing retail internet services directly to homes and businesses. By providing public infrastructure to their communities, cities can reduce barriers to entry for private service providers and allow better coverage and more competitive rates.

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Conduit network

A conduit network is a system of underground pipes through which fiber optic cable can run. In this solution, cities can construct, repair and maintain the network and provide access points for the internet service provider. The internet service provider is responsible for pulling the fiber through the conduit, lighting the fiber and providing the internet service.[1]

Dark fiber

In dark fiber solutions, cities construct a network of physical fiber optic cable strands that private companies may lease to provide service to customers. These networks can be run through conduit or attached aerially to poles.[2] Fiber optic cables transmit data via light passed through special glass or plastic strands in the cables, and dark fiber is fiber optic cable infrastructure that is not in use. Private companies bear responsibility for "lighting" the fiber—that is, using light to pass data through the network—and providing internet access services to end users.

Lit fiber

Lit fiber solutions include burying a physical fiber network and lighting it up by using network electronics so that the fiber actively transmits data and delivers internet service. The city maintains the network and provides support through a network operations center. Private internet service providers then lease the network and provide internet services through a virtual circuit.[3]

Community broadband

Community broadband, also known as municipal retail broadband, is publicly provided, whereby municipalities, public-private partnerships, nonprofit organizations or cooperatives build the infrastructure and provide service directly to customers, in contrast to internet service that a for-profit company provides directly.

Fixed wireless

Fixed wireless access is a last-mile alternative to direct fiber-to-the-home connections and offers connectivity when an expensive infrastructure project is not feasible. Fixed wireless networks connect homes to a wireless transmitter with an antenna. This approach generally requires a direct line of sight between the home and the transmitter, so physical barriers such as trees and terrain can block the connection.

Wireless mesh network

Mesh networks allow cities to wirelessly connect residents to the information they need. Public Wi-Fi networks are frequently wireless mesh networks. Instead of relying on access points or wireless hotspots to connect users to the internet, mesh networks use a distributed system of wireless nodes to share the network across a defined area. Only one node needs to be physically wired into a network to share that connection with the nearest nodes. Those nodes then share the connection with nodes around them to create a cloud of connectivity.[4]

Endnotes

1 Hovis, J., Baller, J., Talbot, D., & Blake, C. (2020, October). *Public Infrastructure/ Private Service: A Shared-Risk Partnership Model for 21st Century Broadband Infrastructure.* Benton Institute for Broadband & Society. www.benton.org/sites/default/files/PPP3_final.pdf

2 Hovis, J., Baller, J., Talbot, D., & Blake, C. (2020, October). *Public Infrastructure/ Private Service: A Shared-Risk Partnership Model for 21st Century Broadband Infrastructure.* Benton Institute for Broadband & Society. www.benton.org/sites/default/files/PPP3_final.pdf

3 Hovis, J., Baller, J., Talbot, D., & Blake, C. (2020, October). *Public Infrastructure/ Private Service: A Shared-Risk Partnership Model for 21st Century Broadband Infrastructure.* Benton Institute for Broadband & Society. www.benton.org/sites/default/files/PPP3_final.pdf

4 Roos, D. (2021, April 27). *How Wireless Mesh Networks Work*. How Stuff Works. www.computer.howstuffworks.com/how-wireless-mesh-networks-work.htm

Visit nlc.org/resource/digital-equity-playbook-how-city-leaders-can-bridge-the-digital-divide to view the complete Digital Equity Playbook.