

# One Size Does Not Fit All

## Three approaches to community broadband networks

By Trevor Jones / OTELCO

One of the first decisions a community needs to make in bringing broadband to residents is what sort of network to operate. Should the network be closed, with one ISP providing service to residents; open and lit, providing the basic infrastructure for potentially competing ISPs; or open with dark fiber leased to competing ISPs?

All three models have their proponents and detractors. In my experience and opinion, no one model is ideal for every community. Each option impacts how a community will build and operate a network, and each has advantages and disadvantages. Which is best for a community depends upon factors such as population density, the time and energy the community can afford to invest in managing the solution, and its risk tolerance.

### CLOSED NETWORK

In this model, communities either provide ISP services themselves or contract with a single internet service provider to serve residents. Generally, towns select a contracted ISP through a municipal procurement process that includes a request for proposals (RFP). The ISP then has the exclusive right to provide service via the community broadband network for a contract period of three to five years.

- PRO:** The community maintains competitiveness in its internet services through the bid process.
- PRO:** The ISP can be held accountable for service quality through a strong service level agreement.
- PRO:** The ISP can be held accountable for the market penetration levels needed to recover the network cost.
- PRO:** From the ISP's perspective, this model provides less risk to market penetration rates.
- CON:** A closed network offers less choice to end users than an open-access network.
- CON:** A closed network limits pricing competition until the next contract renewal.

The closed network option works best in small communities that lack the population density necessary

to attract and support multiple providers. It has been used successfully in many areas, including Leverett, Massachusetts, where OTELCO is currently the contracted ISP.

### OPEN ACCESS – LIT SERVICES

In an open-access network, the network operator provides connectivity at competitive, nondiscriminatory rates to any carrier that wants to provide services. One way this can be done is for the town to “light” the network and sell Ethernet connections to ISPs that they can in turn use to serve customers.

In addition to fiber cables installed on poles or buried in rights-of-way, fiber optic broadband networks need electronics to carry data over the fiber. This includes optical line terminations (OLTs) in network hubs as well as optical network terminations (ONTs) at customer premises on the network. These devices account for approximately 15–20 percent of the total cost of a fiber network. Over time, there will also be costs to power, maintain and replace this equipment. On the other hand, lighting the network should allow communities to manage their fiber utilization better, resulting in cost savings on the physical infrastructure.

An ISP that wishes to serve a community establishes a network-to-network interface, or NNI, to connect its internet, phone and other services to the OLT at the network hub. Typically, it installs routers and sometimes other devices in rack space and brings in one or more internet connections over the middle-mile network.

- PRO:** This model has a lower cost of entry than its dark fiber cousin for ISPs to bring service to town because they don't need to build and operate Ethernet networks over the fiber.
- PRO:** Lit services networks offer capital cost savings opportunities compared with dark fiber. For example, a lit network can efficiently serve multiple homes on a single fiber using PON, whereas a dark fiber network

requires a dedicated physical path to each premises, necessitating higher fiber counts, more splitters and greater operational complexity.

**CON:** Lit services networks are more complex than either closed or dark fiber networks because the community will need to add staff to operate the network or issue an RFP to hire a network operator. The community also needs to market the fiber network to potential ISPs. “Build it and they will come” won’t work here.

**CON:** Although the community can require ISPs to serve everyone in town, it is very difficult to make them accountable to reach a target penetration level short of a “take or pay” requirement that mandates that ISPs buy a certain amount of connections, which further increases the barriers to entry.

The model is best suited to communities that already have experience running municipal utilities and that have enough population density to be appealing to multiple ISPs. Of the open-access options, this model is most likely to create a vibrant competitive market because of lower cost of entry for providers. Ammon, Idaho, is a good example of an open-access lit service network that uses software-defined networking to make switching providers easy for consumers.

### OPEN ACCESS – DARK FIBER

In this model, the town constructs a fiber network without any electronics and leases the fiber to service providers. Providers install their own electronics to light the fiber both in the town’s network hub and at the customer premises and supply the routers and internet connections. This model shifts more operational requirements and investment to the ISPs but keeps ownership of the basic infrastructure within the community.

**PRO:** This model offers the greatest operational simplicity to the town, which only has to build and maintain the cables and keep an inventory of which provider is using each fiber. That said, I can tell you from experience that inventorying the fiber is much harder than you think unless you have the right software.

**PRO:** This model gives more flexibility to ISPs in the services and speeds they offer, so there is greater differentiation among competing offers.

**CON:** ISPs need a larger investment in electronics to service the community, which may result in fewer ISPs willing to compete.

**CON:** The need for a higher fiber count during construction may be costlier to the community.

**CON:** As in open-access lit networks, holding ISPs to achieving a desired take rate is challenging in this model.

This model is well suited to the middle mile and can be effective in communities that have enough population density and commercial development to make lighting the network worthwhile for ISPs. It’s also common in limited deployments

All three models – closed network, open-access lit network and open-access dark fiber – have pros and cons. The right choice depends on a city’s density, resources and risk tolerance.

targeted to serve commercial zones and in communities that lease existing fiber constructed mainly to serve municipal facilities – a good example is the Columbia Water and Light Department in Missouri, which currently leases dark fiber to nearly 30 entities. ❖

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