

Designing Fiber-Optic Networks for Reliability

Building a fiber-to-the-home network right the first time – even if that requires a more costly design – pays off in greater reliability and higher property values

By Caitlin Clinard ■ *Connexion Technologies*

Last month, we introduced the innovative fiber optic network builder Connexion Technologies and highlighted its business model of investing in networks by partnering with developers. Our in-depth look at Connexion Technologies' Engineering and Construction Department illustrated the company's strategy of exceeding developer and homebuilder expectations – a strategy that keeps it competitive in the cutting-edge industries of technology and real estate.

This month, we dive deeper into Connexion Technologies' design tactics and find out how decisions on the front end of the design process make all the difference to the final product.

"Do it right the first time," says Glen Lang, CEO of Connexion Technologies. The saying may be a familiar one but it's the driving force behind everything Connexion Technologies does. From the CEO at the company headquarters in Cary, North Carolina, to the installer laying fiber in the summer heat of Florida, everyone at Connexion Technologies has taken this value to heart. The clearest illustration of the "do it right" philosophy is in the design process that Connexion uses.

Connexion Technologies invests a large amount of capital up front to ensure the reliability of its networks. This investment benefits both developers and homeowners. More upfront investment leads to fewer problems and outages and more reliable networks result in greater customer satisfaction. It's this domino effect that keeps Connexion Technologies from experiencing an excessive amount of maintenance problems. But that's its focus.

"It's not really about maintenance.

It's about how our systems are designed to reduce it," Lang says. "We're not cheap. We invest a lot more capital to build some of the most expensive networks in the industry. And they provide the best level and quality of service to our customers."

Another reason for the reliability of Connexion Technologies' networks is the company's five years of experience delivering them. "It's both a science and an art," says Steve Jones, Connexion Technologies' Executive Officer and Vice President of Technology. "We practice all the time. We learn from our mistakes and get it right. We also go after the best practices in the industry."

Connexion Technologies follows these guidelines to design its infrastructure:

- **Reliability:** Build networks that don't go down.
- **Availability:** Guarantee room for new services.
- **Scalability:** Add capacity without complexity.

- **Manageability:** Build networks that require little maintenance or support.

Building Excellence Into the System

The only way to create a competitive edge is to go above and beyond the basic principles above. "When we started the company, we knew that just meeting expectations wasn't going to be enough," says Alan Williams, Executive VP of Engineering and Construction. "We had to provide something more than just a network. So we developed a system of excellence from design to delivery." It's this system of excellence that helps support the reliability of Connexion Technologies' networks. Here's how it works.

Industry standards. Connexion Technologies builds its networks to industry standards to ensure flexibility and reliability of services delivered to residents. Following these standards requires experience and more engineering discipline. But it allows Connexion Technologies to choose the best products available to build its infrastructure. This differentiating factor means that Connexion Technologies can easily integrate new services and upgrade its networks as

Join us next month for a look at how Connexion Technologies' aggressive approach to marketing helps developers sell their homes at a faster rate. Find out how the Marketing Department just won a national award to prove it.

opposed to being locked into finite options. In addition, by following industry standards, Connexion Technologies can build a network that is independent from the service provider. This allows it to select the best service provider available for each given development. If a service provider is not giving quality service to residents, Connexion Technologies can change the provider.

Some other companies limit the services and vendors they can use because they follow proprietary standards. Proprietary networks are built to specifically use preselected components, products and services. There is little to no flexibility in changing any of these elements. Companies may choose to build proprietary networks because it's easier and it protects their market share. However, it limits their future capabilities.

Best-of-breed components. The network is only as strong as the pieces that build it. Connexion Technologies partners with the best brands in the industry to ensure that its networks are built from the highest quality components. Leaders like Corning, ADC, Cisco, Alcatel-Lucent and Motorola help Connexion build reliable networks. These leaders spend extra capital on research and development to make sure their parts work with others, creating an interoperable environment.

Conduit system. Although the conduit system – the underground ductwork through which fiber is threaded – is one of the least glamorous components of the FTTH network, it shouldn't go unnoticed. Connexion Technologies uses this costly method to protect its fiber lines from accidental damage and to make it easier for field technicians to work around existing landscaping, sidewalks and driveways.

"If the fiber optic line has a problem, we have the ability to pull a new line through the conduit without digging up the yard or cracking the concrete," Lang explains. "The reason most cable companies don't use a conduit system is because it's much more expensive. They just dig a trench and bury cable. When they have a problem, they have to dig up the cable and repair it. There is no easy access to the line."

Flush mounting. Connexion Technologies uses a flush mounting system – placing all outside plant enclosures underground, flush with ground level – for reasons of both functionality and aesthetics. Building everything underground, including the distribution hubs, helps eliminate maintenance calls and accidental outages caused by residents backing over the hubs. The flush mounting system also makes it easier for installers to access network components and protects the system from the environment.

Aesthetically speaking, placing network components underground improves the appearance of each property. By making it more visually appealing, Connexion Technologies enhances the overall value of the development.

Point-to-point architecture. The most popular designs for FTTH networks are point-to-point and point-to-multipoint, or distributed. A point-to-point system usually costs about 15 percent more than a distributed system because it requires additional fiber and labor. Connexion Technologies elected to use a point-to-point architecture for several reasons. First, point-to-point brings an individual strand of fiber directly from the local point-of-presence or Central Office to the house. When a homeowner moves in, the activation experience is simplified. As the development matures, the point-to-point design also simplifies ongoing maintenance and support.

"Instead of having to make an inquiry to the development when a problem arises, we can troubleshoot all the way to the house," says Lang. "This reduces the amount of time it takes to figure out what the problem is."

In addition to the extra cost for a point-to-point network, Connexion Technologies selected the Corning MultiPort terminal and the Corning OptiTap system to build its FTTH networks, increasing the equipment cost of each home passed by almost \$150 over the least expensive alternatives. The MultiPort terminal, which routs several terminal stubs to a single splice location, increases workforce efficiency and reduces the installation time required to connect customers; the OptiTap system

is a connector housing that allows rapid installation of fiber-optic cables. These components offer more examples of how Connexion Technologies designs for greater reliability.

Playing the Customer Service Game

"Connexion Technologies' networks are reliable because they are designed to be that way," says Jack King, Vice President of Operations for one of Connexion Technologies' partners, Phillips Development Realty. "By using the best practices in the industry and by partnering with the best vendors, Connexion Technologies builds networks right without considering the cost of investment. The networks Connexion Technologies built for us have not only exceeded our expectations but also made a huge difference for our residents."

Because Connexion Technologies invests in real estate, it has incentives to build the network right. Connexion Technologies would rather *invest* in the beginning – thus creating a more reliable and higher-quality service for its customers. Because the company focuses on exceeding developer and homebuilder expectations and the overall customer experience from beginning to end, its standard of excellence continues to improve.

"Customer service is a game," says Jones. "And you'd better have a reliable network to play in that game. We've seen a lot of developers who have tried to play the game and then ask us to take over. They thought they were starting a project — and then they realize they've created another company." **BBP**

About the Author:

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