

Fiber to the Home In a Planned Community

Issaquah Highlands was one of the first master-planned communities to have a fiber-to-the-home network. More than a decade later, the network is still going strong.

Community fiber networks are not commonplace – yet – but people increasingly see them as a viable option for getting the Internet services they want. A community fiber network can often deliver faster, better Internet service, mainly because the network serves a small number of people living in an enclosed community. Large cable and telephone companies often pack too many residences onto network connections that lack enough capacity to give great service to all of them. Even in this technologically advanced time, many people complain about not being able to access the speed and service levels they need.

Operating and managing a community network is costly, so it's usually necessary for all residents to sign up for Internet service. The initial cost of creating a community fiber network can run into the millions of dollars and take more than 30 years to pay off. The good news? Eventually, the community owns and controls a major asset.

THE ISSAQUAH HIGHLANDS STORY

Located about 17 miles east of Seattle, Wash., the planned community of Issaquah is well-known for its natural beauty. Issaquah Highlands is a village located within Issaquah, but it is a separate community. The first homes were built in 1998. Surrounded by parks and trails, this picturesque urban village has developed into a highly sought-after community.

Issaquah Highlands offers plenty of room (2,000 acres), and its 3,750 homes shelter more than 7,000 people. From the outset, builders concentrated on making sure that progressive thinking and awareness of current technology influenced the construction of every home.

The initial focus was on making the homes as energy efficient as possible. Even though the turn of the century was just a couple of years away, not every building planner or developer had experience with a project like Issaquah Highlands, and construction of the Issaquah Highland houses became a new standard to compare other homes to. For many years, people would use Issaquah Highlands as an example of sustainable development practices.

FIBER FOR HIGHLANDS HOMES

The idea of adding a fiber optic network to Issaquah Highlands arose when some early, tech-savvy residents requested it upon moving into their new homes. A dedicated fiber network seemed like a perfect addition to the community, and the Highlands Fiber Network is one of the oldest fiber-to-the-home networks in the United States. HFN chose fiber to “future proof” itself and avoid relying on cable companies or telcos.

Residents have enjoyed fiber-to-the-home services since 1998. The maximum speed initially was 1.5 Mbps – considered high speed at the time – and increased over the years to 55



Issaquah Highlands was an early model of sustainable development practices.

Mbps. On December 1, 2011, HFN increased the maximum network speed to a gigabit. The Issaquah Highlands community was very excited about this new upgrade, which gives homeowners the fastest Internet service in any residential community in the United States. Port Blakely Communities, the developer of Issaquah Highlands and current owner of HFN, instituted a covenant obligation to fund the network upgrades throughout the community and agreed to build out the system and operate it until the initial construction and operating costs are repaid. At that time the Highlands Council, a nonprofit that helps run the community, will have the option of acquiring full ownership.

Both the Highlands Fiber Network Advisory Council, which is made up of community residents, and the owner

of HFN, Port Blakely Communities, supported the network upgrades wholeheartedly. They understand that people need fast, powerful Internet service today.

A THIRD-PARTY PROVIDER

HFN was built by a private company under an agreement with the developer. The original business model did not work, and the company was closed in late 2000. Port Blakely Communities then took over the network and began looking for a regional Internet provider to deliver services. It needed a couple of tries to find the right one. ISOMEDIA, an independent service provider founded in 1991 in Redmond, Wash., was that company.

ISOMEDIA leveraged its experience servicing businesses and consumers with Internet and co-location services in the Seattle region and brought

operational and strategic know-how to the network. "Since we make it a goal to do everything in our power to stay competitive, we have accordingly increased our speed offerings so that everyone is able to choose the Internet service plan that fits their particular needs," says Stephen Milton, CEO and CTO of ISOMEDIA. In 2004, ISOMEDIA began to provide Internet service and support, and subscriber speed increased to 4 Mbps. The company agreed to become the operator and fiber plant manager of the network in 2007 and has consistently increased the value of services to residents and businesses in the community.

The fact that HFN is a community network makes staying current with technology easier. Almost every home in the Issaquah Highlands is already wired and ready to take advantage of the community network. Most homes contain a network panel that includes all the hardware needed to connect to the Internet and to access television and phone service.

Although some homes built in the early days of Issaquah Highlands are excluded, most are part of the planned community and have agreed to pay a monthly subscription fee for the Internet service HFN provides. Not

In December 2011, Issaquah Highlands became a gigabit community. Residents can now choose Internet access speeds that range from 10 Mbps to 1 Gbps.

FTTH CASE STUDY

everyone was on board at first – some people already had Internet service – but residents soon found that all the benefits the network had to offer made switching from one service provider to another worthwhile. And switching was easy.

The HFN uses only state-of-the-art technology, so residents can easily expect a high level of Internet service with greater than 99 percent uptime. Customer service is available for any

questions or issues residents may have and is available 24/7 for easy access.

Every house built within Issaquah Highlands will have at least one connection to the network. At closing, new residents are responsible for a connection fee, which is paid directly to Port Blakely for infrastructure costs. After that, a small monthly fee is required to pay for ongoing fiber optic network services.

HFN encountered a few hurdles during its great leap forward, but the resiliency of the network and its evolution as a pioneer in the market is quite impressive. The network understands what its customers want and then gives it to them. ❖

ISSAQUAH HIGHLANDS FIBER NETWORK

HISTORY

2000–2001

- Port Blakely Communities rescues network
- Maximum subscriber speeds are 1.5 Mbps

2001–2003

- Covenant obligation instituted for funding of network
- Developer drives to build network throughout the community

2004

- ISOMEDIA brought in as ISP and support
- Subscriber speeds increase to 4 Mbps

2005–2006

- Fiber backbone to Internet established
- Active Ethernet architecture established
- All major network elements replaced
- Maximum subscriber speeds increase to 8 Mbps

2006–2007

- HFNVoice phone service launches
- ISOMEDIA wins 15-year contract as operator and fiber plant manager
- Maximum subscriber speeds increased to 20 Mbps symmetrical

2008–2009

- HFNVoice phone service platform 2.0 becomes available
- Maximum subscriber speeds increase to 55 Mbps
- Business services evolve
- Hospital and medical office park added to network

2011

- Subscriber plans revised – HFN Quantum 10/100/1000
- Maximum subscriber speeds increase to 1 Gbps

2013

- Router and traffic shaper throughput upgraded to 3 Gbps
- Interconnect with Netflix for “Super HD” streaming tier

TECHNOLOGY

Premises Technology

- Mixed multimode, single-mode, and single-mode simplex
- Enforced standards for Ethernet and media cabinets in homes
- Fiber and residential gateway in each home prior to move-in
- On-site support staff and 24/7 customer support

Infrastructure

- Active Ethernet architecture – dedicated fiber to each premises
- Three on-site switch centers
- Extensive underground conduit infrastructure
- Redundant dark fiber ring back to Seattle
- Five separate Internet transit connections
- More than 100 free peering relationships through regional exchange

CUSTOMERS

Residential

- 2,650 on network
- 3,500 dwellings passed
- 4,400 residential units when construction complete ~2016

Business

- >40 businesses on network
- >40 more commercial business being built with a ~2017 completion date

CHALLENGES OF BEING AN FTTH PIONEER

Challenge: Hardware Architecture

- Multiple network hardware changes
- Management software incompatible and incomplete
- Hardware supplier mergers and acquisitions

Result:

- Adaptation to architecture and hardware change
- Implementation of custom provisioning solutions instead of using vendor proprietary licensed software
- Developed new supplier relationships and purchased end-of-life hardware at steep discounts

Challenge: Network and Plant Management

- Data center design problems
- Changes in fiber optic technologies and costs
- Conduit design and installation

Result:

- Increased costs for retrofit of HVAC and generator upgrades
- Mixed fiber plant – MM, SM, SM-simplex

- Increased costs to correct conduit installation and documentation and enforce tighter standards

Challenge: Network and Plant Buildout Funding

- No long-term plan for paying for infrastructure buildout or operating costs

Result:

- Creation of covenant obligation to pay for a minimum level of HFN Internet services – initially \$20, increased to \$42

Challenge: Effects of Multiple Recessions

- Home builder and homeowner bankruptcies
- Massive slowdown in buildout pace

Result:

- Some subdivisions had to be released from covenant obligations to sell property
- Increased education efforts with individual home builders about benefits of FTTH for homeowners

*GigabitNow formally known as ISOMEDIA