

## Bridging the Digital Divide

Harbor Networks orchestrated an innovative community WiFi solution for ONE|NB.



### Problem: Bridging the Digital Divide

The digital divide encompasses the technical and financial ability to utilize available technology, along with access (or a lack of access) to the internet. The consequences include isolation, which can affect mental health, educational barriers, and discrimination.<sup>1</sup>

At the onset of the pandemic in early 2020, Jennifer Hawkins, President & CEO of ONE Neighborhood Builders (ONE|NB), saw firsthand how the digital divide was impacting the Olneyville neighborhood of Providence, R.I.

ONE|NB, a nonprofit community development organization located in Olneyville since 1988, saw communities struggling to remain connected to each other, students lacking access to now-online school, and older adults unable to connect virtually with their doctors. Like many low-income communities in cities across the region, Olneyville was negatively impacted by the digital divide.

Jennifer and her team at ONE|NB began searching for opportunities to meet this glaring need. They were disappointed to learn that free community WiFi was not offered anywhere in Rhode Island at the time.

Further, most community-based WiFi systems did not provide internet access inside people's homes, only from communal and outdoor spaces. Facing overwhelming odds, ONE|NB set in motion a multi-faceted project to facilitate free WiFi in Olneyville.

“Free WiFi access is essential to bridging the digital divide.”

Jennifer Hawkins  
President & CEO  
ONE|NB



### Solution: Multiple Providers Working in Concert

To lead the project, ONE|NB enlisted OSHEAN, Inc. (Ocean State Higher Education Economic Development and Administrative Network), a provider of advanced infrastructure solutions. OSHEAN quickly built out a network of solution partners.

Harbor Networks, a leader in managed wireless infrastructure as a service, was entrusted to design and install the multi-vendor WiFi infrastructure solution. Ruckus CommScope provided the WiFi hardware, American Tele-Connect Services installed the hardware, and Brave River Solutions implemented the software and designed the web interface. AV Systems' LinkyFi provided the public WiFi analytics.

The parameters of the project were challenging. Rapid turnaround was required to provide WiFi access to families in need and to get grade school students online. As the project relied entirely on philanthropic support, funds were limited. Despite these hurdles, Harbor Networks quickly proposed a powerful solution at reasonable cost with negligible environmental impact and minimal regulatory review.

### Strategy: Mesh Network via Systems Integration

The team was tasked to build the network in a highly residential area of Olneyville. Led by Wireless Practice Lead Joshua Lee, Harbor Networks researched solution options, and decided upon a cooperative opensource mesh.

In a mesh, a group of devices acts as a single WiFi network so there are multiple sources of connectivity. In a traditional WiFi network, phones and computers are connected to a single router, and all communication passes through that router. The farther the device is from the router, the weaker the signal. With a mesh network, the multiple points mean that users are never far from a point. Additionally, someone can connect to the internet and move throughout the coverage area without having to disconnect and reconnect to the network.



**One of the Olneyville neighborhoods featured in the project.**

Joshua’s engineering team at Harbor Networks helped guide the overall network design so the radios could communicate with each other. The two lateral hub installations were located inside two separate Olneyville buildings, next to the electrical boxes. These hubs act as “routers.”

The wires leading from the hubs serve two purposes:

1. They connect to the underground fiber optic cables, so the system has access to those cables. Essentially, they allow the underground fiber to transmit broadband signal into the buildings.
2. They connect to access points (which are radios) mounted atop those two buildings. Before the system sends signals to the access points, that broadband signal is filtered through a firewall for cybersecurity reasons.

The transmission of the network signal from one access point to the next is what actually creates the mesh network. The 24+ transmitters were Ruckus Commscope radios that were mounted on buildings that we own and/or manage throughout the neighborhood. They provide the WiFi signal to the devices and, more broadly, to the greater coverage area in the neighborhood. Those radios “repeat” the network connection, essentially refreshing it by pinging the next radio in line to continue the circuit.

The 12 access points were also Ruckus CommScope radios that were mounted on buildings that One NB owns and manages. They provide the WiFi signal to the devices and, more broadly, to the greater coverage area in the neighborhood. Those radios “repeat” the network connection, essentially refreshing it by pinging the next radio in line to continue the circuit. The mesh network

doubles as the “last-mile provider” for the users. The benefits of this approach include:

1. Flexible coverage: Additional points can be added for better coverage in hard-to-cover areas;
2. The ability to “self-repair”: If one access point goes down, communication is rerouted through another point; and
3. A direct path: Since all access points are connected to each other, data can take several paths toward its destination. It will always choose the best route from Point A to Point B.

On the day before Thanksgiving of 2020, ONE Neighborhood Builders launched the first free community wireless network in

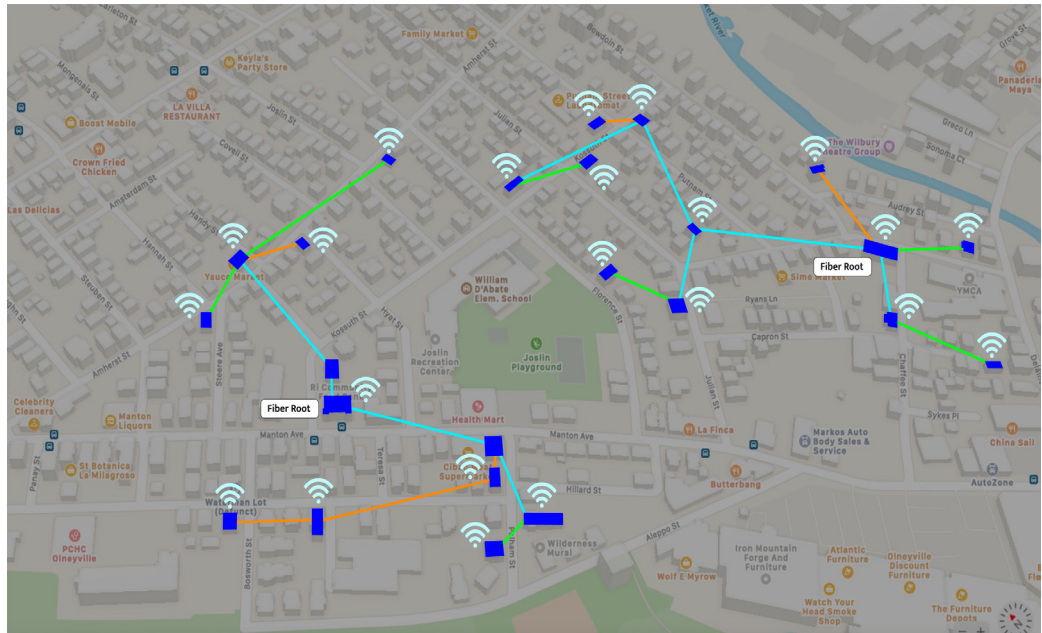
The lowest proportion of in-home internet in Providence.

Among the highest rates of poverty in Providence.

The highest number of COVID-19 cases in the State and second-highest number per capita in the State, based on ZIP code data.

**Olneyville residents and neighbors shared their challenges in accessing internet at an affordable cost with ONE|NB during the early stages of the pandemic, when it became undeniable how critical access to the internet was.**

**This overlay of the neighborhood map shows Harbor Networks' initial design for transmitters in the neighborhood. The WiFi download/upload speed is now 100 mbps. Coverage was recently expanded from 5 million to 7 million sq. ft., including houses and backyards.**



Rhode Island. Notably, the launch took place eight months after ONE|NB asked the compelling question that began this entire initiative: Couldn't we just build a system so that everyone in the neighborhood could access free WiFi? They named the network "ONE|NB Connects."

### Outcomes and Future Plans

ONE|NB is constantly working to ensure that the network meets high standards and offers high quality internet access. After the initial rollout, they established a five-year service agreement with Harbor Networks and OSHEAN to lead maintenance and support for the ongoing evolution of the network. Once ONE|NB raised additional funds in 2022, the team was ready for expansion.

The team decided to upgrade to new transmitters from backhaul provider Cambium Networks. Cambium's radios increased the network speed 2x to 3x and reduced dead zones, laying the foundation for future expansions. Rather than a point-to-point system that pings one radio after the next, this more reactive network has redundancies built in so other radios in the system can be pinged more effectively and efficiently. Communication is now rerouted more seamlessly from point to point.

To expand the network, seven of the original 12 nodes were relocated and 11 new devices were installed at various locations. The expanded network now covers about 7 million sq. ft., and the download/upload speed has increased to 100 mbps.

### About One Neighborhood Builders

ONE Neighborhood Builders (ONE|NB) is a nonprofit community development leader that improves lives across Rhode Island by building homes and connecting communities. They use their 35 years of practical experience in the housing and community development fields to test new ideas and challenge entrenched systems. ONE|NB is the convening entity of Central Providence Opportunities: A Health Equity Zone (CPO-HEZ), a place-based collective impact initiative of more than 60 stakeholders across the nine neighborhoods of Central Providence. CPO-HEZ advances the shared vision for greater health and economic equity in the 02908 and 02909 zip codes.

### About Harbor Networks

Founded in 1995, Harbor Networks is a northeast-based leader in managed network, voice, and security services solutions. We aspire to be a modern managed service provider who:

- Proactively adapts new technology to our customers' needs by delivering "best in class" solutions, programs, and services.
- Enables secure, cloud-based collab and communication services over networks that are managed, monitored, and continuously maintained.
- Drives security awareness, policy, and compliance

<sup>1</sup> Investopedia: "The Digital Divide: What It Is, and What's Being Done to Close It."

