Deploying High Speed Broadband in Municipalities

Municipalities are providing their communities with employment opportunity, access to health & wellness resources, educational advantage and seamless roaming connectivity with WiFi.

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The 4th Utility

High speed broadband internet service has been dubbed the "4ᵗʰ Utility", both in and outside of the home.   Simply, access to high speed broadband is essential to remain competitive in the workforce, stay in communication, have access to health and wellness resources and receive a decent education.   Municipalities need to have a broadband strategy that gives their residents, businesses and community members a socioeconomic advantage.   With an adequate strategy for providing access to high speed broadband, a community will flourish.

Spot On Networks ("SON") has implemented multiple multitenant and municipal high speed wireless broadband networks throughout the U.S.   SON's experience has shown that the best way to provide necessary high-speed broadband services in an outdoor municipal space, a multitenant community, mixed-use space or affordable housing community is the through the deployment of a wireless network.   WiFi has proven to be the ideal technology for providing high speed internet service in community scenarios due to the flexibility of the network architecture, the low-cost relative to other deployments and the roaming capabilities that WiFi provides.

The Case for WiFi

Among its various implementations, SON has developed an approach which has been implemented in New York City, Jersey City, NJ and New Haven, CT that takes bandwidth at a fiber node, and distributes high speed broadband to various locations within a certain radius of the node, wirelessly. Once an area or building demarcation point receives high speed broadband access, SON delivers high speed broadband internet access to end users via its WiFi services within the areas requiring coverage.

In two such venues, SON in conjunction with a municipality, established a public-private partnership in which SON acts as the service provider under contract with the municipality to serve residents and visitors of the municipality.   This type of partnership is advantageous.   Residents and visitors get the benefit of wireless high speed broadband access which includes upgraded homework capability for school students, access to municipal services through a device, either at home or in a municipal area, coordination of municipal events for visitors and residents, access to employment opportunities,

educational opportunities, access to health and wellness resources and more.

The municipality benefits because the technology encourages upgraded employment opportunities, increases exposure to municipal events and education sessions, fosters innovation, drives job creation, encourages local businesses to advertise and make themselves known and generally upgrades the knowledge base of the municipality's residents.

By providing services in this manner, Rights of Ways are not necessarily required, trenching is not required, pole costs are avoided; however, rooftop rights and tower access are required.   By providing a wireless backbone from a fiber node to a user populated facility, the expense of delivering high speed broadband access to swaths of communities is greatly reduced compared to other methods.
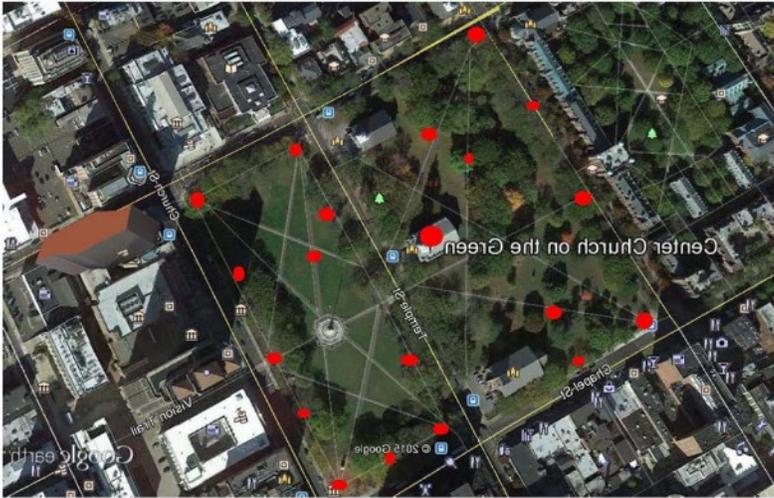
The New Haven Green

New Haven Green's Summer Concert Series is enhanced with Spot On Network's Municipal WiFi, allowing concert goers to post, stay connected and learn about the City.

A particular use case was implemented in New Haven, CT.   The New Haven Green is one of the largest, and most well-known greens in the United States, dating back to 1638.   The Green is host to many public events including a jazz festival each year, classic and modern music concerts as well as the International Festival of Arts and Ideas.

In 2017, Mayor Toni Harp helped establish a public – private partnership with SON to implement a Wi Fi managed service on the Green.   The purpose was to encourage visitors to the Green to share their experiences on the Green, to indicate to these visitors the many facets of New Haven by having them see and listen to a 15 second trailer on New Haven, and to offer connectivity for social media purposes helping to establish New Haven as a technology innovator.

SON's offices are just 1,500 feet from the Green.   Since SON had fiber connectivity in its offices, SON established a wireless link to the Green and then from that demarcation point, delivered service to 22 locations along the periphery and in the middle of the Green using point to point and mesh technology (See picture below).   Any device on the Green was able to achieve 10 Mbps service

Ariel view of New Haven Green

once the user signed on and played the 15 second piece on New Haven.   The opening night of the

WiFi service was during a two-hour concert by "En Vogue", a popular American Rhythm and Blues musical group.   During the period leading up to the concert, and while the music played, more than 4,000 unique users displayed pictures and video on social media.

State and Federal governments have created a regulatory environment that fosters a monopoly or duopoly framework for telecommunications service providers.   One way out of such a quandary is to enable a diverse competitive environment by providing incentives that would encourage new competitors and innovative new services by offering public - private partnerships such as was accomplished on the New Haven Green.

Economics of Wireless Broadband Deployments

The economics of providing services is dependent upon a number of factors.   The amount of bandwidth available in a given municipality, coupled with the number of fiber nodes, will be some of the most important factors in the economic analysis of service provision in a municipality.   The greater the population, the greater the revenue potential.   The greater the land mass, the more expensive to provide such services.   SON's view is that the establishment of a public-private partnership in larger cities, would be beneficial to the service provider, the end user and the municipality.   Where no such large city exists, a region could be made up of a number of municipalities to give some density for the service provider, thus reducing the costs to the end user.

The technology deployed as part of this implementation must offer the following features and functions in order to ensure availability and reliability:

1. A service platform must exist that would monitor the entire network for the municipality and its locations to ensure high availability.   Each device providing services to end users must therefore adhere to certain standards that enable full monitoring and maintenance capability from a central Network Operations Center.

2. Where possible, overlapping service areas should be implemented so that in the event of a node failure, another node could provide temporary service to the failed area.

3. All parts of the network, including all devices providing services (switches, access points, modems, etc.) will need to be provisioned with Quality of Service ("QOS") attributes to ensure that all services can be delivered with high quality.

One regulatory issue that may arise is the provision of broadband services by public-private partnerships.   In some states, incumbent service providers have lobbied state legislatures to prohibit the implementation of broadband networks by municipal entities to limit competition or "unfair" competition.   One way to avoid that issue is to ensure that the Public Utility Regulatory Authority has the necessary authority to issue permits to the public-private partnerships (such as a Certificate for Public Convenience and Necessity).

Moreover, with the rise of the Internet of Everything and machine to machine communications ("M2M"), municipal wireless networks are becoming as much about a connected trash can as they are about the end user streaming YouTube on their smartphone. Beyond offering free Wi-Fi to citizens and tourists, the wireless networks of our cities will have to be robust enough to handle huge amounts of data on the one hand or many small bursts of bits-and-bytes of data on the other. Furthermore, some of the services and applications — like traffic control and power grid communications — will be considered "mission critical," while others, like smart meter readings, are less time-sensitive. It's critical, therefore, that the city's wireless network be both flexible and scaled enough with respect to the different services and their respective needs.

Cities across the world are struggling to come up with a solution to providing reliable public Wi-Fi to meet these new consumer and urban demands, and many — like Taiwan, Paris, Tel Aviv and Perth to name just a few — have developed and implemented free Wi-Fi networks shrouding downtown areas, designed to make the urban experience more enjoyable for both tourists and residents. But these networks often aren't geographically comprehensive, and they are barely equipped to deal with the kind of traffic they are getting now, let alone the traffic we can expect to see in the coming years. Some of these have used existing subscriber infrastructure to deliver municipal services.

ISP vs. WISP

Some ISPs such as Comcast, Spectrum and Cox, have used dual-SSIDs on customer home routers in an attempt to broadcast a "public" WiFi network. These attempts fail for a municipal WiFi deployment for a few reasons.   Users often find themselves connecting with no service, interrupting an adequate cellular service to connect to a weak ISP signal or having issues with login.   In addition, the ethical

practice of using customer's home routers to broadcast a public signal has been hotly debated and angered customers as they are essentially paying for the electricity and capacity of their home internet service.   The most important technical issue, however, is that that ISP approach provides no seamless roaming, meaning that the user has to reconnect every time they switch to a new access point.   This virtually eliminates the use of WiFi Calling and streaming while roaming.   The real benefits of using a true managed Wireless Internet Service Provider (WISP) are lost in this scenario.

A better approach is the one taken by the New Haven – SON public private partnership in which the managed network serves the needs of the municipality as a primary goal rather than an add-on.

Municipal Wi-Fi holds substantial potential for enabling a functional connected future in which both humans and machines can be constantly and reliably be connected. The key to ensuring that the connected municipality works, is to make sure that just as the traffic on our streets is managed, so too is the data traffic in our air.

About Spot On Networks

Spot On Networks, LLC ("SON"), headquartered in New Haven, CT, has implemented wireless broadband networks at a variety of both public and private venues, and in nearly 1,000 multitenant buildings throughout the United States.   Founded in 2005, SON established its own platforms for the

management and control of wireless broadband networks and, in addition, has several patents that provide security and interference remediation for IEEE802.11 (including WiFi6).

For more information about Spot On Networks, please visit www.spotonnetworks.com, email marketing@spotonnetworks.com or call 877-768-6687.