

Application Note - SONAbeam™ and Wi-Fi Network Integration



fSONA Communications is helping to make the ultimate dream of the information age come true – high-speed internet access available to everyone, always, everywhere.

Getting Connected

As the demand for the internet steadily grows, so does the need for broadband access. So rapid is this growth, in fact, that fiber and copper network infrastructures simply can't keep up, especially in densely populated urban environments. Routing a dedicated leased line to each and every internet user is neither practical nor economically feasible, resulting in a bandwidth bottleneck at access points. The need for relieving this bottleneck and getting broadband data to end users is the inspiration and driving force behind fSONA's SONAbeam™ technology. Now, a recent development in the wireless telecommunications industry is providing fSONA with the perfect complement to its product line, allowing flexible high-capacity network expansion into potentially every corner of the globe. This development is 802.11 wireless networks, more popularly known as Wireless Fidelity, or "Wi-Fi."

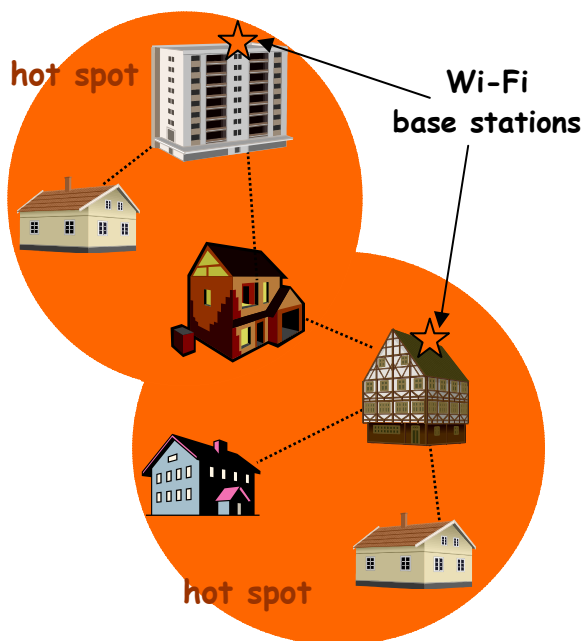


Figure 1. *Wi-Fi progressive network*

The Wi-Fi Solution

Wi-Fi technology now allows for a new type of network architecture that can be deployed and expanded dynamically, as customer demand increases, for relatively little cost. Rather than attempting to extend a leased-line network into densely populated or growing areas, users can be interconnected in a "progressive" network, as shown in figure 1. A single low-cost Wi-Fi base station (chip and transceiver), connected to a high-speed internet line, can provide high-speed connectivity to multiple users within the surrounding vicinity. This coverage area is often called a "hot spot." Anyone inside this hot spot with an inexpensive Wi-Fi device on his/her PC or PDA is then always connected to the internet via the Wi-Fi base station without requiring a separate dedicated line. Moreover, Wi-Fi operates in a license-free part of the spectrum, eliminating the recurring fees associated with most other transmission types. As demand grows, additional base stations can be added to extend network coverage and capacity. In this way, service providers can increase their customer base without large upfront investments in infrastructure.

The SONAbeam™ Connection

As impressive as the expansion capabilities of Wi-Fi progressive networks are, they are not end networks in themselves. There must be some backbone connection from the Wi-Fi base stations to a Point of Presence (POP) providing the high-speed capacity in the first place. To use the analogy given by Nicholas Negroponte in the October 2002 issue of *Wired* magazine, the complete network resembles a pond with lily pads, with the stems of each pad reaching into the internet. The Wi-Fi coverage areas are the lily pads, and the stems are high-capacity links to the internet. It is for this crucial function that the SONAbeam™ is ideally suited.

This backbone connection must be capable of supporting the aggregate capacity of all the users within a certain coverage area, plus some overhead for future growth. It should also do this without increasing the potential for interference. These two requirements alone effectively limit the carrier to two basic choices; optical fiber and free space optics. But this is only the beginning. In order to retain the benefits of a dynamic and flexible Wi-Fi network, the backbone should also be easily deployable. With free space optics, all of the costs, delays, and physical disruption of laying fiber are eliminated. Even if it were feasible to extend a fiber line into each hot spot, the associated license fees defeat the purpose of an economical Wi-Fi network. Because the SONAbeam™ operates in the unlicensed 1550nm band, the financial benefits of the license-free Wi-Fi are retained throughout the network. The fact that each backbone connection services all the users within a coverage area means that reliability is critical, and the proven carrier-class design of the SONAbeam™ makes it the obvious choice over competing FSO products.

While the SONAbeam™ retains all of the advantages of Wi-Fi, it transmits none of its shortcomings. It has been noted that a broadly distributed hot spot is not very secure. The extremely narrow beam of the SONAbeam™, however, yields very highly secure transmission. Also, unlike Wi-Fi, the SONAbeam™ link is full duplex with zero latency. Consequently, these negative features of Wi-Fi are contained within the Wi-Fi LAN network itself.

Wi-Fi promises to revolutionize the way we connect to the internet, but it can't do it alone. Most technologies provide only a half-solution from the complete network perspective. Only free space optics, and in particular the high-power and high-reliability SONAbeam™ technology, extend the benefits of Wi-Fi all the way back to the internet itself, providing a complete network solution.

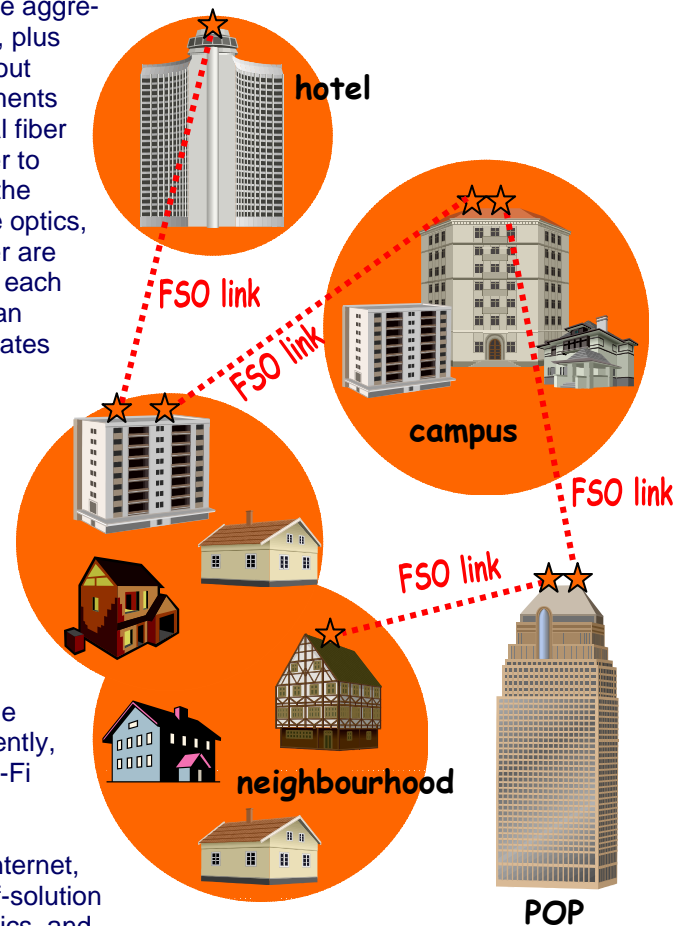


Figure 2. Wi-Fi Network with SONAbeam backbone

fSONA Systems

1750 Tysons Blvd, Suite 240
McLean, VA 22102 USA
703.917.4007
United States/Canada
International

1.877.463.7662
877 (2) 463 7662

11120 Horseshoe Way, Suite 140
Richmond, B.C. Canada, V7A 5H7
604.273.6333
info@fsona.com
www.fsona.com