



Broadband @ the Speed of Demand

Nokia RoofTop Wireless Routing Solutions

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CONNECTING PEOPLE



Take the Internet to New Heights

The rapid growth of the Internet has created explosive demand for broadband access. Many service providers, however, have not been able to keep up with this demand due to the costs and delays often involved with upgrading wired infrastructures.

you quickly begin collecting service revenue for a rapid return on investment. And getting a head start now could translate to a larger subscriber base in the future.

Not only is this wireless access solution easy to deploy, it is scalable as well. This enables you to build your network in line with subscriber growth to respond quickly to changes in the marketplace. You can react to demand and expand your network where it's needed to take full advantage of a growing market.

Plus this scalable capacity means that the Nokia RoofTop Wireless Routing solution helps you minimize upfront equipment costs so network capital does not become tied up in unused investments. This allows you to invest as your network grows and only take on the costs associated with the latest subscriber base figures.

Unlike alternative wireless solutions, Nokia RoofTop lets you create routed mesh networks that mirror the wired Internet, eliminating traditional line-of-sight problems without large towers or masts.

The resulting mesh design enables a robust wireless broadband network for high-speed Internet access in residential neighborhoods and business parks where line-of-sight tends to be difficult.



Combining the performance of broadband with the latest innovations in wireless technology, Nokia Wireless Broadband solutions redefine the way Internet access is delivered. Bypassing the complicated, expensive and time-consuming process of installing wired Internet access enables new business opportunities in diverse geographic areas. And by changing the playing field of Internet service delivery, Nokia provides a way for carriers and service providers to offer broadband access to a larger customer base than ever before.

Nokia makes this possible with a groundbreaking wireless routing solution that is more robust, flexible and cost-effective than other wireless broadband systems.

Think fast, think wireless

The Nokia RoofTop™ Wireless Routing solution is designed for a quick time to market so you can capture subscribers before the competition. This fast deployment capability also lets



Extend the Internet...rooftop by rooftop

The Nokia RoofTop solution provides broadband access via a network of intelligent, adaptive wireless routers. These networks are quick and easy to install as well as cost-efficient to deploy and operate, offering the ideal solution to meet mass market demand.

The Nokia RoofTop Wireless Router functions as both a router and a modem, sending and receiving transmissions from an integrated, omnidirectional

antenna. Each wireless router can forward traffic through the network of neighboring routers, eliminating the need for direct line-of-sight from every subscriber to a central base station.

Planning and building a Nokia RoofTop network is simple. Begin with a central aggregation site, called the "AirHead", that will connect the neighborhood mesh network to a high-speed uplink, or directly to the Internet access point. From there the wireless

routers can be quickly deployed to create a mesh network, extending the reach as you add subscribers.

Because a Nokia RoofTop network can grow as needed in an adaptive fashion, this solution eliminates large upfront investments in expensive infrastructure. Costs and time-to-market are further minimized because the wireless routers operate in license-free frequencies. So you can invest as you grow with less risk and fewer delays.

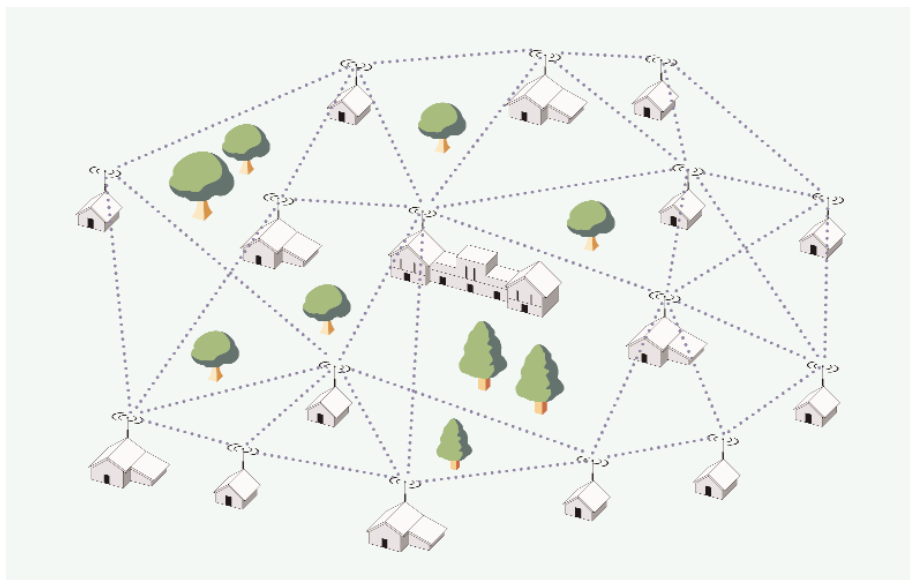
Increase coverage, not costs

Because this unique technology only requires line-of-sight to another router in the network, it can be deployed in areas that otherwise would be too costly or difficult to cover. Traffic can be routed around obstructions to the AirHead site, dramatically increasing coverage.

In this way the Nokia RoofTop Wireless Router enables a flexible and scalable mesh topology, which greatly simplifies network planning, increases overall penetration and improves link reliability. The more routers that are added to the network, the more potential paths that are created, and the more robust the network becomes.

Scale with demand

Set-up, expansion and operation of the Nokia RoofTop network is made easy with the Nokia AIR Operating System (OS). Thanks to this wireless-aware operating



software, the Nokia RoofTop network is self-configuring and "self-healing". This allows the network to select the best traffic route in real-time, continually adapting to changes in link availability and network traffic. And this allows you to add new subscribers incrementally, growing with demand, effortlessly.

The Nokia AIR OS consists of a suite of highly efficient protocols that optimize the performance of the wireless broadband network. These protocols schedule traffic among the wireless routers to non-conflicting transmission times and radio frequency (RF) channels. Their adaptive routing intelligence automatically detects changes and reroutes traffic accordingly, creating an inherently reliable network.

This operating system also optimizes frequency spectrum use for maximum data capacity, allowing you to serve more subscribers. And in order to further strengthen network efficiency, link and neighbor management protocols in the Nokia AIR OS confirm

transmission success across every hop, eliminating retransmissions across the entire link.

In addition to an intelligent operating system, this solution also includes the Nokia RoofTop Router Management System (RMS), which enables you to easily configure, monitor and upgrade a Nokia RoofTop network from a central location, using a dynamic graphical user interface. Tasks such as provisioning service levels and setting network security parameters are made quick and easy. Once installed, the wireless routers can be managed remotely, including such tasks as loading new software across the network to update the operating system.

All-in-one home gateway

The Nokia RoofTop solution not only provides fast Internet access, it also offers home gateway functionality. With its phoneline networking feature, multiple PCs can be connected using the existing home wiring.



In addition, built-in routing features such as NAT and DHCP server allow PCs throughout the home to dynamically share the connection via one IP address. As a result, your customers can get the most out of their new broadband connection.

Nokia knows service

In addition to high-performance equipment and technology, complete Nokia solutions include network planning, deployment, support and training services.

With multiple Nokia RoofTop Planning and Deployment Service packages from which to choose, you can select the level of service you need to plan and implement your network in order to launch services quickly.

The Nokia RoofTop support offerings include Software Support, Network Management services and Hardware Replacement programs to help you maintain the highest network performance in the most cost-effective way.



Additionally, Nokia offers a variety of training and education programs to help you bring your staff up to speed quickly, so you don't waste valuable time getting off the ground.

All of the Nokia Professional Service offerings are designed to help you plan, deploy, manage and operate your network as quickly and easily as possible. As a full system supplier, Nokia makes it their business to provide complete network solutions -- so you can focus on your business.

Nokia Wireless Broadband Systems:

- Short time-to-market with quick and easy deployment
- Scalable capacity lets you expand to meet demand without a large upfront investment
- Makes coverage possible where wires cannot go
- Complete system integration means lower costs, higher quality and greater reliability.



Nokia Wireless Broadband solutions integrate the power of broadband Internet access with the versatility of wireless communications.

No wires. Minimal upfront investment. Scalable, flexible networks. Rapid time to market. End-to-end support service packages. The advantages of Nokia Wireless Broadband solutions add up to a revolutionary way to deliver broadband at the speed of demand.

Nokia Networks
313 Fairchild Drive
Mountain View, CA 94043
Phone: (650) 625-2373
Fax: (650) 625-2380
www.wbs.nokia.com

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