



Congestion brings better service for mesh networks

By Hilary Smith

February 11, 2002

Traditional point-to-point and point-to-multipoint wireless broadband networks have proven to be a costly and frustrating undertaking for those brave enough to blaze the trail for the fixed-wireless industry.

But as the industry continues to evolve, a possible solution is emerging in the form of a new network architecture that copies the model of an already successful technology and service—the Internet.

Mesh networks mirror the structure of the Internet by routing data and voice traffic not only through central base stations, but through customer premises equipment as well. Each node, or radio, provides access for connected users, but it also becomes part of the network infrastructure.

This type of architecture eliminates the need for direct line-of-sight to the base station because a subscriber unit only needs to have line-of-sight to another subscriber unit—which could be the house next door.

"The technology is able to hop through subscriber devices to make up long distances through several very short lengths," said Rick Rotondo, director of disruptive technologies for MeshNetworks Inc., based in Maitland, Fla.

"The more subscribers you get in the network, the stronger the network is. It's the opposite of a cellular system. When you get a congested area you get denial of service. In a congested area in a mesh network, you get better service," Rotondo added.

Because the strength of the network relies on how many subscribers participate, a possible drawback of the mesh-network set up is if a lack of subscribers exists in a certain area. Andy Kelm, head of the wireless routing business for Nokia Networks, Americas, said in order for Nokia's RoofTop Wireless Router system to achieve approximately 90-percent coverage, there has to be five or six subscribers in a 1-2 mile radius. Nokia and others solve the problem of absent subscribers by installing routers on poles and buildings that can pick up the slack.

According to proponents of the technology, advantages of a mesh architecture include its relative low cost and ease of deployment.

Kelm said base stations that go in local multipoint and multichannel multipoint distribution system networks cost anywhere from \$50,000 to \$100,000. Mesh networks allow a provider to distribute the cost of the base station over the cost of the user devices. Nokia said its subscriber unit is priced at \$780. It includes an omnidirectional antenna that forms signal routes as allowed by the surroundings.

"Should the trees sprout leaves in May and links become unusable, it (the antenna) won't try to route packets over those links anymore," Kelm said.

Nokia's base station is priced around \$1,500.

And then there are providers that have eliminated the base station from the architecture entirely. Radiant Networks plc in the United Kingdom uses integrated ATM switches at every node to allow circuits to be established between any node and the trunk network via paths through the other nodes.

It seems each technology provider has a unique way of approaching the mesh network, particularly when it comes to the subscriber unit. Radiant requires a user to have both an indoor and outdoor unit, while MeshNetworks' technology works off a single PCMCIA card users can install in their desktop or laptop computers, or on handheld mobile devices. Rotondo estimated the card's price at around \$150.

Each version of the technology also has the potential to operate in different frequency bands. Most technologies, once they are launched, will operate out of the unlicensed frequencies, but Fremont, Calif.-based CoWave Networks Inc. said the first version of its technology will operate in the PCS frequency band.

Ideally, mesh network providers would like to have access to the licensed 2.1 GHz MMDS band because they can get more range.

Beta networks have been going up for several months in selected areas, but widespread deployment of a mesh network isn't expected until late this year or early 2003. Internet access via a mesh network should cost about the same as cable modem or DSL access.

For example, CoWave plans to offer download data rates at 300 kilobits per second and upload rates of 100 kbps for \$35 per month.