Excerpt From:

The Connected Couch Potato:
Living it Up in the Wireless Home

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Peer-to-Peer Wireless Mesh Technology

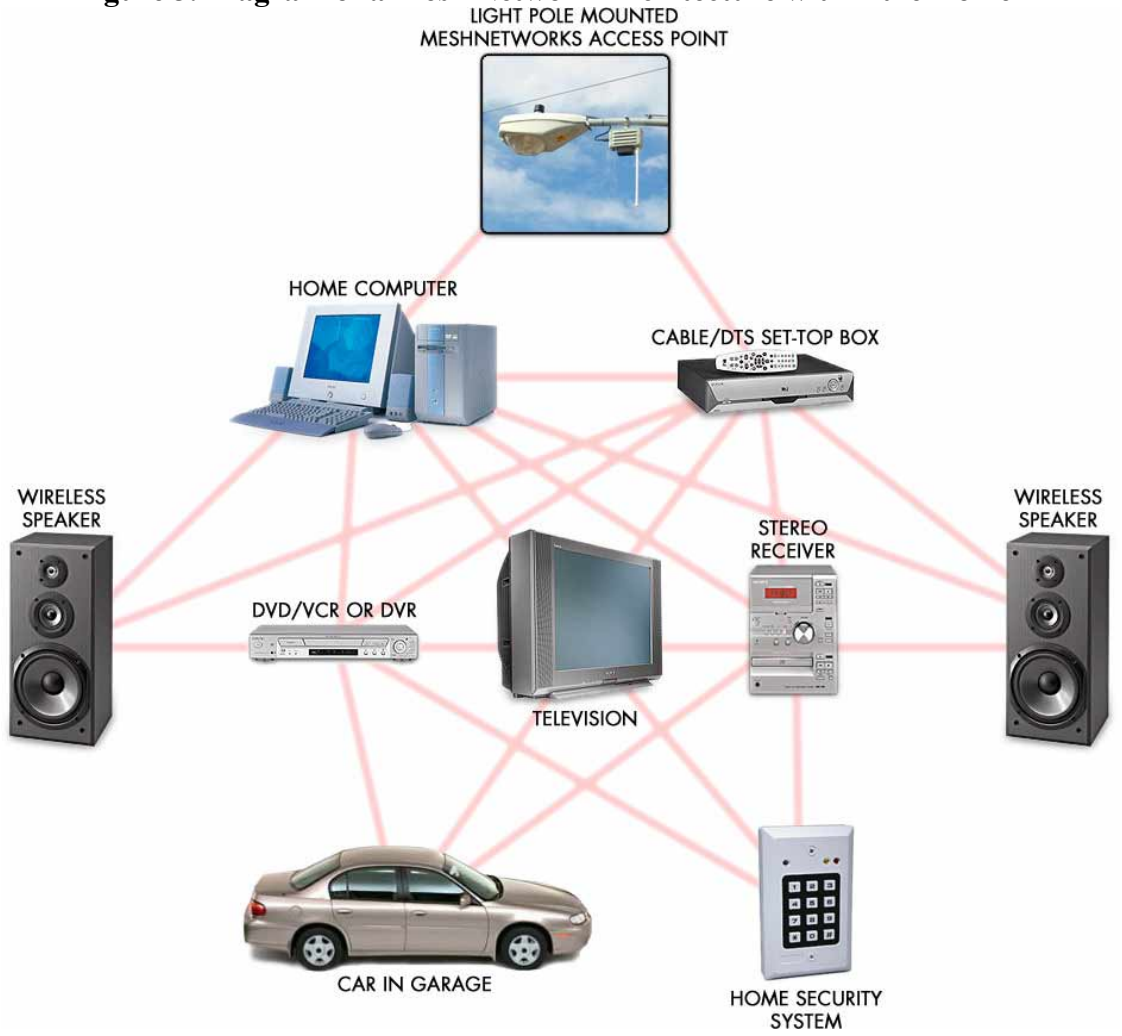
Intel is perhaps the most famous proponent of wired peer-to-peer technology, where processing power is, in a sense, shared among all devices, and idle resources from one device are used by another. One company, MeshNetworks (www.meshnetworks.com), has been developing a wireless peer-to-peer architecture. Its name is derived from the mesh architecture of its mobile broadband technology which it has developed through its patented ad hoc peer-to-peer routing technology.

This peer-to-peer technology theoretically enables every subscriber device in the network to act as a router and repeater for all other subscriber devices in the network. This means that subscribers can "hop" through neighboring devices or Wireless Routers to communicate with each other and reach network access points. This Multi-Hopping capability is designed to create a robust meshed network that automatically routes around congestion and line-of-sight obstacles, while improving throughput as subscriber density increases. MeshNetworks positions its technology as providing enhancements to the network architecture and capabilities found in the wired Internet (which in itself is a peer to peer network), and going so far as to make these features mobile.

MeshNetworks' network architecture is made up of four hardware and software elements: (1) the Transceiver Module/modem within a Subscriber Device, (2) the Wireless Router, (3) an Intelligent Access Point (IAP), and (4) the Mobile internet Switching Controller (MiSC). Subscriber devices consist of two complementary parts. The first will typically consist of an off-the-self laptop, handheld computer or PDA. Subscribers can use devices they already have. The second piece will utilize the company's transceiver technology in the form of either a PC card/CompactFlash modem, embedded MeshNetworks chipset, or software license running in the device. In addition to providing access to the network, the transceiver acts as a router/repeater for other subscribers. Thus, subscriber devices (and their associated transceivers) are also a key part of the network infrastructure.

The Wireless Router is a shoebox-sized, wireless device that is primarily deployed to provide coverage in large geographic areas and campuses. The Intelligent Access Point (IAP) is also a shoebox-sized device, but it acts as the transition point from the wireless network to the wired Internet and Public Switched Telephone Network (PSTN). Each IAP offers up to 18Mbps of voice, video and data capacity to subscribers. The Mobile Internet Switching Controller (MiSC) provides the connectivity between the IAPs and wired world. The MiSC is comprised of off the shelf hardware components such as: packet gateways and routers, VoIP gateways & softswitches, as well as various network servers. It also provides for authentication, authorization and accounting, as well as billing mechanisms.

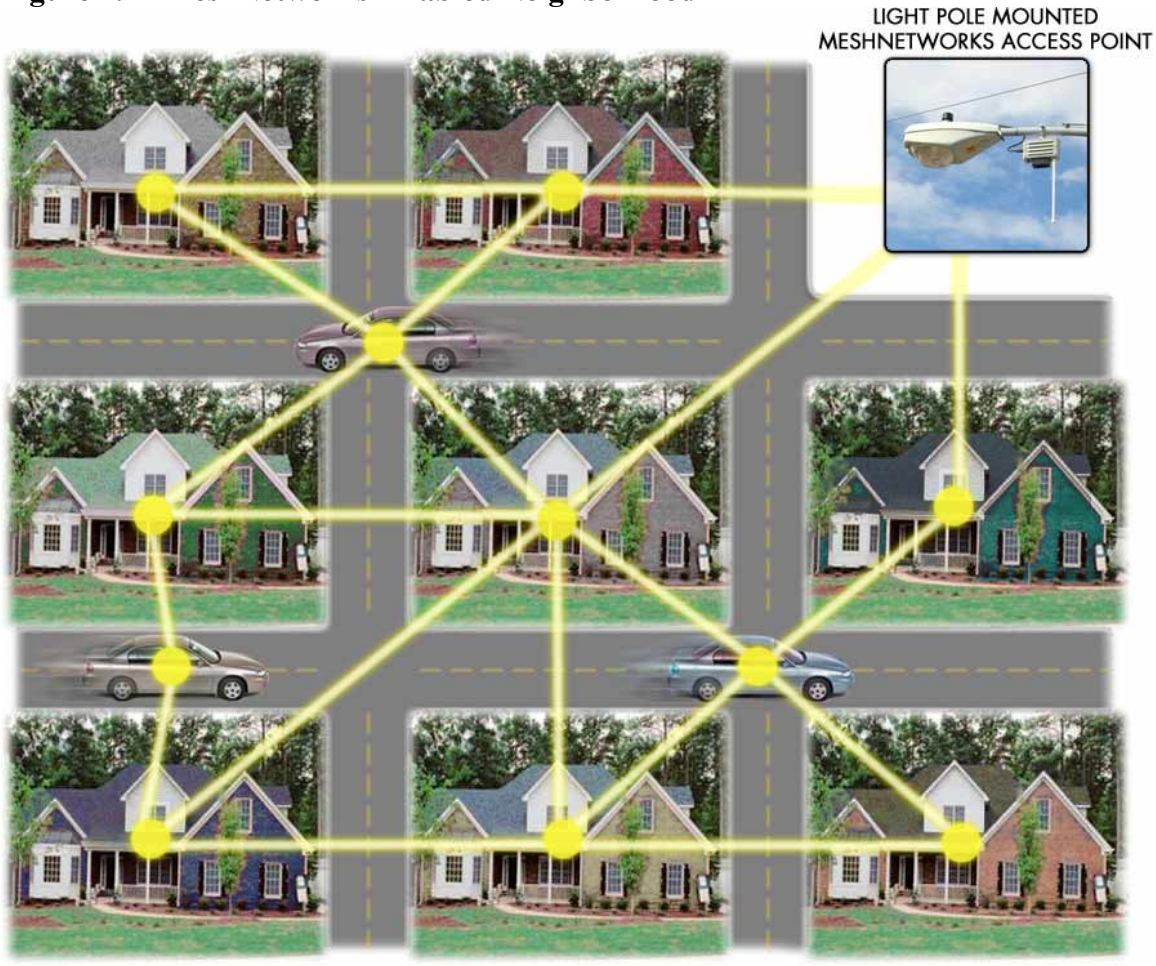
Figure 3. Diagram of a Mesh Network Architecture within the Home



Source: MeshNetworks

The first graphic shows how connective appliances (stereos, PCs, cable boxes, ect.) can be interconnected. Each can be used as a wireless router for range extension and additional routing paths. So, each appliance has ad-hoc wireless connectivity, and also serves as a routing/repeating unit for other transmissions. Finally, to reach an external network (like the Internet or PSTN), the network can reach an external IAP (Intelligent Access Point which provides network access) or go through a cable box or PC with a broadband connection. MeshNetworks is pushing its technology as being able to provide better range and mobility than 802.11x products, since mobility is provided anywhere within the range of that IAP or another node which can 'hop' to the IAP.

Figure 4. A MeshNetworks-Enabled Neighborhood



Source: MeshNetworks

Figure 4 demonstrates how a Mesh-Enabled neighborhood may interact. The devices within the houses will be able to interact and connect with neighboring house's appliances. Each house makes the network stronger by adding additional routes for transmissions. A practical example would be going to a neighbor's house and maintaining your wireless broadband connection the entire time. Again, the user will ultimately be connected to external networks by an external IAP or a broadband PC/cable box connection.

Although this technology seems to be more of a wireless WAN technology, MeshNetworks touts its technology as truly mobile, enabling network access to extend throughout neighborhoods, towns and metro areas. It supports 6 Mbps Burst, and 2 Mbps Sustained Per Subscriber at 250mph MeshNetworks touts its mesh-enabled networks can support up to 6 Mbps data rates at practically any speed.

Each voice, video and data stream is managed for QoS. Routing algorithms manage each media stream separately when determining network routes. Mesh technology is radio

agnostic, so it can sit over GPRS, OFDM, etc., enabling each respective technology with the companies' peer-to-peer wireless routing capabilities.

Since the technology is rather exotic, and the company is just beginning its alpha deployment of its technology, the company's main challenge will be conveying the benefits of its Mesh technology. In December 2001, MeshNetworks announced the availability of its technology on a PC card. The company offers licensing options for its ad-hoc peer to peer networking technologies, including modem and transceiver design, geo location and QoS management for audio, video and data streams. The company also offers ASIC chipsets and software solutions. It offers a single chip supporting all routing and modem functions along with MeshNetworks' routing software.