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New trend in technology for enhanced qualit Wireless Mesh Network: Alternative of Broadband Internet Connection

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Suppose you want a broadband internet connection but you are operating it in a county with more cows than people, and DSL and cable simply aren't available? Having access to fast broadband is important for both individuals and businesses. If you are in a rural area, it is unlikely that you will have access to cable broadband. Wireless Mesh Networks have become popular and are used everywhere as an alternative to broadband connections. The ease of configuration of wireless mesh LAN, the mobility of clients, and the large coverage make it attractive choice for supporting wireless technology in LAN and MAN. The most recent report from the Organization for Economic Co-operation and Development ranks the U.S. 12th in total broadband penetration. "There are a slew of technologies out there, but it looks like fixed wireless has taken forefront, [with] satellite service being a good alternative in some areas," Scott Lindsay, head of the Rural Broadband Coalition in Washington said.

Wireless mess technology, an end-to-end solution specifically designed for service providers deploying wireless community services for cities, has the flexibility and capacity required to deliver many different applications to millions of users across an entire city. ISPs can offer many different services on their network. The types of services offered depend on the competitive environment and the business needs of the service provider. A local cable company could use a community Wi-Fi network as a mobility enhancement for their residential broadband service. ISPs that provide dial-up service may move to Wi-Fi as a way to own a broadband connection to their customers. Rural telephone companies could operate Wi-Fi networks as their primary infrastructure for reaching their customers.

WMNs offer considerable advantages as an Internet broadband access technology:

- **Low Upfront Investments**: Since there are no cables to install, the significant upfront investments typically associated with cable and DSL are largely bypassed. A bare-bones WMN providing minimal coverage can be used to service the first customers (an operation commonly known as "seeding"); as the number of customer increases, the network can be upgraded incrementally.
- **Customer Coverage**: Due to its multihop routing ability, line of sight to a single base station is not required; as long as a client has connectivity to any other client, it can obtain Internet access.
- **Fast Deployment**: Adding a new client to an existing WMN can take several hours instead of several months, the typical delay for installing new wires for cable or DSL.
- **Mobility**: For WMNs capable of supporting user mobility, it is necessary for the physical layer to support the shift in frequency and adapt to the fast fading conditions commonly associated with mobile users.
- **Reliability**: Especially if multiple gateways are used, all single point-of-failures are eliminated. A responsive routing protocol can quickly route around failed links or nodes; and, in the case of a gateway failure, it can redistribute the orphaned nodes to nearby gateways.

The third generation of cellular systems, commonly known as 3G, can offer relatively high-speed connections (up to 2Mbps for stationary users and 144kbps for highly mobile users in macro cells). In the mean time, most mobile users seeking connectivity outside the sparse coverage of WLAN hot spots have to settle for the slow and expensive 19.2kbps cellular digital packet data (CDPD) or, more recently, for GPRS (usually 20-30kbps - theoretical maximum 171.2kbps). Properly designed WMNs can easily deliver higher bandwidth than the best 3G technology. Thus, all of the promises of 3G (bandwidth, mobility, voice quality) can be accommodated by WMNs with lower upfront investments (and possibly without expensive spectrum licenses), making WMNs a serious competitor to 3G cellular systems. Currently, the main customers for such systems are small governmental agencies (e.g., fire and/or police departments) in small- to medium-sized towns, which can improve the access data rates while significantly reducing their monthly bill.

In Silicon Valley, Microsoft is working on what it calls "self-organizing neighborhood wireless mesh networks." The network is created with a Mesh Connectivity Layer (MCL), which is a loadable Microsoft Windows driver that let users communicate over a wireless mesh network using Wi-Fi or WiMax services. The driver tricks the computer into thinking it's directly connected to an Internet connection. The software creates a virtual network adapter that the computer interprets as a regular network connection and uses an Internet Engineering Task Force (IETF) protocol called Link Quality Source Routing (LQSR) to route data among computers in the neighborhood. Wireless Mesh Networking is pushing wireless communication into a new era. Identifying market needs is crucial for a company in understanding the opportunities and acquiring a competitive advantage. In early 2007, the US-based firm Meraki launched a mini wireless mesh router. This is an example of a wireless mesh network (on a claimed speed of up to 50 megabits per second). The 802.11 radio within the Meraki Mini has been optimized for long-distance communication, providing coverage over 250 metres. In 2008 Open-Mesh, which went into business providing low-cost mesh WiFi routers and offering ad free service. The management software used is open source and is deployed on top of OpenWRT. In present

Cisco, Hot Spot, Aruba, Firetide, HotPort, Motorola, and Strix Systems, SkyPilot, D-Link are so many companies which are proving hardware for Wireless Mesh Networking.

Wireless mesh networks leaped from the drawing boards into reality. Numerous start-up companies are pursuing he technology and use it to satisfy the needs of numerous application, providing broadband Internet access, WLAN coverage and connectivity. The technology has the potential to successfully compete with several traditional technologies (3G systems, WLANs and WMANs). We expect that future wireless communities will be oriented toward providing broadband access to nomadic users. To this end, we have proposed that wireless network access be shared in a peer-to-peer, reciprocal manner. Thus, ubiquitous broadband Internet access can be achieved at a low cost, at least in metropolitan areas where there is abundant wireless coverage, providing an inexpensive alternative to broadband cellular services.