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The Super Wireless Office: Networking Beyond Office Walls With 5 GHz Bands

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All wireless offices are not created equal.

Most do a great job running from desk to desk and cubicle to cubicle, but then there are the Super Offices where networks are able to leap from tall building to tall building, faster than a speeding bullet... and without a single wire.

That's the real promise of today's wireless offices -- not just the flexibility of a wireless LAN, but the connectivity of a high-speed bridge that strings together branch offices at remote locations across town as seamlessly as if they were across the hall.

All too often, the fast turnaround opportunity of high-speed bridges get overlooked in the wireless office. Too bad, because high-throughput wireless bridge technology in the noise-free and license-free 5 GHz bands has become a nearly foolproof option that might just offer the best alternative -- particularly for the IT manager running high traffic to a handful of remote sites.

Communicating Over A Wireless Bridge

The latest generation of point-to-point bridges are complete kits that send network traffic wirelessly from one building or one location to another, where a matching system receives the transmission and reconnects to a remote server, router, or hub and then to the local workgroup. And of course, it all works just the same in the opposite direction. The connection replaces the need for modems, ISDN, frame relay, or T1 and transmits over a private radio frequency in the newly available and license-free 5.2, 5.3, and 5.8 GHz bands.

Operating at 5 GHz offers some big advantages for the wireless office. First, a clear signal. It eliminates the noise and instability of 802.11b devices in the crowded 2.4 GHz band, devices that are competing for open airspace with such widely used devices as portable phones, PDAs, intercoms... even microwaves and just about anything else in today's consumer wireless spectrum. Second, privacy. Unlike the ubiquitous devices in the 2.4 GHz band, devices are available in the 5 GHz band that use proprietary technology to create secure network-to-network connections. For example, some wireless bridge systems for the small and mid-size office market use proprietary drivers that are licensed from the bridge manufacturer and therefore provide a secure and essentially hack-proof connection from point to point. In fact, in many cases, the network signal traveling from building to building across a mile-long wireless bridge could very well be more secure than a standard transmission between a server and a laptop inside the walls of the wireless office.

The key components of a wireless bridge system are surprisingly simple. At each end, there is a small processor with a standard RJ45 connector for 10BaseT Ethernet, a specially configured and signal-protected radio, and an antenna, which could be as small as a shoebox or larger for networking over longer distances of several miles or more. The antenna uses a very precise and narrowly focused beamwidth of only a few degrees, and can be configured to suit the specific installation spanning distances -- across the street, across town, or as far away as 10 or 15 miles.

Connecting Offices Miles Apart

Often, the very idea of linking remote sales offices or branch locations back to the main office is never even considered. It's assumed to be too expensive, too complicated, and too risky. After all, digging a mile-long trench to bury a hard network cable, even if you did own the land, is not high on the list of adventures an IT manager has on his "to do" list.

So, the remote staff is often left to fend for themselves, files and systems are duplicated at both locations, problems occur, productivity limps along, and life goes on.

The better option might very well be to install a wireless bridge. At an installed cost of a few thousand dollars, a secure wireless bridge could have a company sending large data files back and forth at Ethernet speeds and with data transfer rates of 10 Mbps, without the cost of a second T1 or an ISDN line leased from the phone company. So, cost becomes another advantage, especially when compared with the phone company alternatives.

Fast, Low-Cost Installation

But wait a minute, something must be wrong here. This seems too easy. Here we have a wireless bridge

system that can connect remote offices over a secure radio link, across distances of a few miles or more. The speeds are as fast as a hard-wired office network or faster. What about installation and operation?

Actually, there are advantages here too. Depending on the location, wireless bridges can be installed by technicians in just a few hours, including locating and mounting the antenna for the best performance. And new compact systems are now coming to market that standardize simple applications and pack the radio, processor, and antenna all in one box for the easiest possible installation.

On the other hand, a T1 might cost \$1,000 or more to install and another \$500 or so each month for service. And, depending on the individual installation, laying a cable involves land rights and permits along with expensive and disruptive trenching and all the risks that go along with it. And you still need to install wired bridges at both ends of the connection.

Success Stories Are Plentiful

Although the 5 GHz frequencies are just now being cleared for wireless applications, the technology itself is already proven for the wireless office. One large car dealer is using a wireless bridge to link the sales office to the finance office several blocks away. Another manufacturing company is connecting to a remote production site. Cities and towns are using wireless bridges to connect police and fire stations back to the main server at Town Hall, and school districts are wirelessly linking various schools to the administration building.

In each case, the key elements are low cost, high performance, easy operation, and "can I have it tomorrow?" installation. But, in some cases, extending the wireless office comes with some very specific performance requirements. Offices may have video, audio, or conferencing needs, for example. In these environments, performance factors such as speed and throughput are critical. Standard office wireless systems in the 802.11b category suffer significant drops in performance as the wireless distance increases. Close to the server, the throughput might be at published levels, but within a few hundred feet, the drop-off can be dramatic.

The high-speed bridge systems in the 5 GHz bands deliver at levels above Ethernet speeds and maintain that level of performance over the entire distance, whether it's a few hundred feet or a few miles. This performance advantage is a deal maker for any office application that requires a constant data link rate, such as streaming video or audio files or signals from one location to another for online conferences. In these cases, the signal packets are disassembled at one end, transmitted, and reassembled at the other end. Since it's all based on precise times, any shift in the transfer rate would shift the way the signals are reassembled and affect the quality of the sound or images at the receiving end.

Conclusion: Up, Up, And Away

The bottom line on high-performance wireless systems today is that bridges are ready for prime time. Any IT manager that has ongoing responsibility for a truly up-to-date wireless network has to get smart about the options and opportunities that are now available with point-to-point wireless bridges.

With advantages of clear, noise-free signals; Ethernet speeds and reliable data transfer rates; low-cost installation and operation; and some of the best security provisions in the marketplace; it looks like the time is now to make our way across the wireless bridges.