

802.11n and Wi-Fi Telephony

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White Paper

In June 2007, the Wi-Fi Alliance launched their 802.11n certification program based on the IEEE's draft 2.0 version of the standard, which is expected to be ratified in mid 2009. While the overall WLAN market is growing at about 15% annually, revenues for 802.11n based products are growing at over 30% per quarter¹. There is much industry buzz about what this means to the market, vendors, and most importantly, customer decisions about the technology. The bottom line is that customers can confidently move forward with an 802.11n WLAN within a timeframe that fits their Wi-Fi applications needs and, at the same time, be assured that current SpectraLink Wireless Telephones will continue to be interoperable as their wireless network evolves.

Technology and Market Background

The Wi-Fi Alliance (WFA) announced in May 2007 the launch of the long-awaited '802.11n draft 2.0' certification program. The new program is based on the in-process IEEE 802.11n standard, and according to the WFA, offers "the potential to deliver up to five times the throughput and up to twice the range of previous-generation Wi-Fi gear." 802.11n is the next generation of wireless LAN from the IEEE, using new radio technology and enhanced media access functions to deliver higher throughput and greater range along with mechanisms to support multimedia applications. The final, ratified version of 802.11n is expected to be complete in mid 2009.

Residential WLAN products have been the first to include pre-802.11n technology, which now makes up 20% of shipments¹. The home is where there is a clear growing demand for the high-bandwidth applications that 802.11n can support. Streaming video, digital image sharing and gaming all have the potential to be made wireless within the home, allowing devices to share content via the network. With one or two access points offering good coverage, 802.11n can operate in the 2.4GHz band with up to two 40 MHz-wide channels offering optimal throughput while supporting 802.11b or 802.11g clients.

802.11n access points for the enterprise began shipping in small quantities in late 2007 and are expected to become a strong part of the portfolio in 2008. But unlike the home market, both products and adoption will likely come as a trickle rather than a flood. One of the leading barriers to adoption is that the increased throughput from the WLAN creates the need for greater bandwidth support throughout the network. For most enterprise customers, this means deploying gigabit Ethernet workgroup switches if that haven't already. In addition, most Wi-Fi infrastructure vendors use WLAN switches for feature implementation, management and traffic control. The result is all traffic to and from the WLAN must pass through these wiring closet devices. With the increased bandwidth flowing through the access points, existing WLAN switches may need to be upgraded as well. With upgrades in both the LAN and WLAN, it can be an expensive investment to create an 802.11n-capable enterprise network.

802.11n for Handheld Devices

Besides offering throughput greater than 100 Mb/s and twice range of traditional WLANs, the promise of 802.11n includes backward compatibility, ensuring support for 802.11b/g/a clients. So the investment in client devices today is protected, as these devices will work on the 802.11n networks of tomorrow. And although legacy clients will decrease overall network performance, the increased bandwidth offered by 802.11n will support the growing demand for wireless devices and applications. Like the need to upgrade the wired network, there is growing demand to

¹ Synergy Research, "Q4 2007 Wireless LAN and Mesh Market Shares", February 2008



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increase the capacity of the WLAN as more and more wireless applications result in productivity and efficiency benefits for the enterprise.

802.11n radios will slowly find their way into enterprise-grade client devices, particularly handhelds. Why? If two or more antennas are used, which are required to realize the high throughput benefits of Multiple Input Multiple Output (MIMO) technology, then the device has to support the increased power consumption required. The drain on battery life will make 802.11n unfavorable for users until new developments in battery technology compensate for the tradeoff.

In addition, the maximum throughputs and range of MIMO will be difficult to achieve in small handhelds because the close proximity of the two radios will decrease performance. For these devices 802.11n offers a single antenna option that increases compatibility on the network, albeit at lower bandwidth capacity and with less range improvement.

Polycom's Perspective

As a client device provider Polycom closely aligns our SpectraLink Wireless Telephones with the future offerings of our WLAN infrastructure partners. As the leader in Wi-Fi telephony, we provide the best technology available based on customer requirements for cost and performance. Our SpectraLink 8020/8030 handsets include an 802.11b/g/a radio that gives customers the freedom to deploy in either the 2.4 GHz (802.11 b/g) or 5 GHz (802.11a) bands, based on what makes sense for their environment and application needs.

As customers begin to deploy 802.11n access points, they can remain confident that SpectraLink handsets will work in accordance with the backward compatibility mandated by the WFA and IEEE. With the expectation that most enterprise customers will deploy 802.11n in the 5 GHz band in order to accommodate multiple non-overlapping 40 MHz channels, customers can prepare for tomorrow's networks by investing in SpectraLink 802.11a-capable handsets today. Careful site planning of 802.11n networks is crucial however, as 802.11b/g/a client devices have less range than their MIMO counterparts. Because Wi-Fi telephony requires seamless coverage to meet the needs of mobile users, the capability of legacy clients must be factored into 802.11n deployment decisions.

Polycom is watching the adoption of 802.11n closely. In the near term, we will serve our customers well with SpectraLink 8020/8030 handset technology. Unlike video and multimedia, voice applications are low bandwidth; so 802.11n would not necessarily deliver a better user experience or richer features. This, along with the issues of antenna technology and battery consumption, means 802.11n for handheld Wi-Fi telephony devices is likely years away.

Conclusion

802.11n is the next generation of wireless technology for the enterprise and will drive the move toward the truly wireless office. Increased throughput and range will drive adoption of wireless connectivity as the default, rather than the exception, for all client devices. In a few years it will be as easy and inexpensive to have all our devices – computers, phones, printers, scanners, cameras, you name it – connect to our enterprise network without wires.

With widespread support from vendors, 802.11n appears to be the technology that will facilitate this change. Fortunately, the requirement for backward compatibility to support today's Wi-Fi devices means that users can upgrade their networks to 802.11n infrastructure first, then migrate applications and client devices to 802.11n as the technology evolves.

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