

Active Blog
General

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802.11N WiFi - You can buy it at Staples... but is it ready for prime?

802.11n is being touted as the networking standard that will unwire the network world. Most people are not convinced, yet curious to see how one defends such a claim. The 802.11n standard has two top-level mandates (unwiring the world not being one of them): Achieve higher data rates and retain backward compatibility with legacy 802.11a/b/g devices.

The significance of requiring backward compatibility shouldn't be taken lightly since it complicates the development process exponentially. Yet the 802.11n group has come up with a soon-to-be-ratified standard that meets both objectives.

In a previous post: 802.11n, MIMO, and multipath environments I discussed MIMO smart antenna technology, which is by far the most visible improvement being leveraged by 802.11n. In this post, I will touch on how MIMO and other 802.11n technological advances dramatically improve data rates, system stability and reliability. Maybe even convince some that it is a viable alternative to a wired connection/network.

802.11n's improved technology

802.11n's version of OFDM: 802.11a/g already uses OFDM (Orthogonal Frequency-Division Multiplexing) to achieve data rates of 54 Mbps. 802.11n OFDM technology builds on 802.11a/g OFDM modulation by creating support for multiple channels (MIMO), allowing more bandwidth per channel, and higher code rates. This brings the maximum data rate of a single 802.11n OFDM channel to 65 Mbps.

MIMO antenna systems: The 802.11n standard allows up to 4 MIMO transmit/receive antenna pairings. 802.11n OFDM has a maximum data rate of 65 Mbps, multiplying that by the 4 MIMO antenna channels raises the data rate to 260 Mbps, which is a significant improvement when compared to 54 Mbps.

40 MHz channels: To further improve data rates, 802.11n allows the use of 40 MHz channels-twice the existing 20MHz channels used by 802.11a/b/g-which effectively doubles the data rate to over 500 Mbps. 40 MHz channel size is also the most controversial tenet of the new standard, having the potential to disrupt existing 802.11a/b/g networks due to co-channel interference.

Aggregation: Aggregation is an important feature developed to overcome shortcomings of having to be backward compatible with 802.11a/b/g networks. It improves mixed-mode performance and efficiency by bundling several frames together that are destined for 802.11n devices, while still being able to transmit single data frames to legacy devices.

RIFS (Reduced Inter-Frame Spacing): RIFS is a required 802.11n feature that also improves performance by reducing the amount of dead time required between OFDM transmissions. It should be noted that this feature is restricted to greenfield deployments.

Consumer and enterprise interest

With pre-release equipment already for sale and claims of equipment being firmware upgradeable to the ratified 802.11n standard, is it time to switch? What does this mean to consumers and businesses that may want to start using 802.11n equipment?

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Consumer interest: 802.11n promises many things, greater bandwidth, better range, efficiency and reliability. These promises are starting to be tested as pre-release equipment is being integrated into many households. The general consensus is noticeable improvement, especially when considering coverage area, throughput, and reliability. There is also a movement to eliminate mixed mode networks as soon as possible to take full advantage of 802.11n technology.

Enterprise interest: Enterprise use of 802.11n will take longer to integrate because IT departments have to be more concerned about everything working all the time and being cost effective. The introduction of 802.11n equipment by the major wireless networking houses has given the standard an unequivocal stamp of approval, even without final ratification. Network designers and administrators are already looking at several unique uses for 802.11n equipment. With data rates exceeding some wired Ethernet networks, using 802.11n equipment for a backbone link that's difficult to cable may now become a consideration. Increased bandwidth and larger coverage area per device may make it economically feasible to unwire the office or install a wireless network in the new addition.

Conclusion

802.11n is indeed a significant improvement, just like 802.11g when compared to 802.11b. All the theoretical data looks good, but with any new technology there is a learning curve. 802.11n technology is complicated, which means problems are likely to be complicated as well. Consumers and businesses alike will have to decide where along the accumulative learning timeline they feel most comfortable about moving to 802.11n.

In addition – 802.11N has not been officially accepted as a ieee standard. Let's wait and see....

If you require additional information or assistance with this item, please give us a call.