

The 802.11n Ratification Checklist

Overview

Mobility has become a business expectation. IT is coming face to face with an increasingly savvy user community that is demanding the wireless performance required to deliver a ubiquitous computing experience. Wireless technologies are striving to keep up, and the ratification of 802.11n promises to unleash the true power of mobility.

This checklist provides prescriptive guidance on how IT can harness the value of 802.11n, while avoiding the pitfalls. To integrate 802.11n into your enterprise network, follow these steps.

1. **Don't worry!** If you've deployed 802.11n draft 2.0 equipment today, your investment is protected. Draft 2.0-certified equipment such as the Cisco® Aironet® 1140 and Cisco Aironet 1250 Series Access Points are fully compliant with the final 802.11n standard and will receive final standard certification for interoperability from the Wi-Fi Alliance. Additionally, Cisco's portfolio of wireless controllers, including the 5500 Series and the Cisco Wireless Services Module (WiSM) are compliant with the final standard, with no software modifications required. Clients who are draft 2.0 certified are also fully compatible with the final standard.
2. **Check your switching infrastructure.** Wondering why you can't get more than 90 Mbps of throughput from your clients? The Cisco Aironet 1140 and 1250 Series Access Points can provide nearly 200 Mbps of useable throughput per radio, enough to overwhelm a 10/100Mbps Ethernet connection. Access points should be connected to a full-duplex Gigabit Ethernet connection for the best performance. Additionally, ensure that your switches have an adequate power budget to support your access points. Both the 1140 and 1250 Series Access Points can be powered by standard 802.3af Power over Ethernet. Finally, consider your network load and evaluate whether your switch uplinks need to be migrated to 10 Gb.
3. **Know that phased deployments are okay.** 802.11n access points can coexist with 802.11a/g access points. If budget is a concern, look to add 802.11n access points in high-traffic areas such as conference rooms and common areas, and then add 802.11n access points to the rest of your network over time. 802.11n access points will also support legacy clients and will actually provide an enhanced, more reliable link for 802.11a/g devices.
4. **Develop a 5-GHz strategy.** With more devices entering the network, it's important to build denser access point deployments for improved capacity. The 5-GHz spectrum is the best band to deploy in: this spectrum is less congested with other non Wi-Fi devices and offers eight times the number of channels as the 2.4-GHz band. 802.11n uses both frequencies, so now is the time to take advantage of the expanded bandwidth of the 5-GHz spectrum. If you haven't site-surveyed for 5 GHz, now is the time to do so. Cisco BandSelect can help ensure your wireless clients use 5-GHz frequencies effectively. What's more, Cisco access points are Dynamic Frequency Selection (DFS)-compliant to help ensure that the entire 5-GHz frequency band can be utilized.
5. **Deploy 40-MHz channels in 5 GHz.** To get the best performance, 802.11n uses double-wide, 40-MHz channels. You'll want to ensure that your network is configured to support 40-MHz channels. The extra channel capacity in the 5-GHz spectrum makes it ideal for using 40-MHz channels. With limited frequency available in the 2.4-GHz band, you'll want to leave these set for 20-MHz channels.
6. **Use Cisco M-Drive technology and radio resource management.** With a mix of 20-MHz and 40-MHz channel bandwidths and two frequency bands (2.4 GHz and 5 GHz), manual channel assignment for 802.11n can be a challenge. Make sure that you're using radio resource management (RRM), part of Cisco M-Drive technology to automate channel assignment and power output. If you're phasing in 802.11n access points, RRM can automatically ensure that an 802.11a access point's 20-MHz channel doesn't overlap and interfere with part of an 802.11n access point's 40-MHz channel.

7. **Turn on high-throughput data rates.** It may seem obvious, but troubleshooting often reveals that clients can't connect at high-throughput data rates (those above 54 Mbps) because the access point has not been configured to advertise at those rates. Double-check these settings and turn on high-throughput data rates when you install your 802.11n infrastructure.
8. **Select 802.11n adapters when acquiring new devices.** Your existing installed base of 802.11a- and 802.11g-based wireless clients will not seriously affect the performance of 802.11n clients on the network. 802.11n will still achieve superior performance in the presence of 802.11a/g clients. In addition, migrating to newer 802.11n-based clients will help ensure that the overall performance of the network improves over time. Cisco ClientLink can help ensure that legacy wireless adapters operate as efficiently as possible, which in turn allows the network to operate efficiently. Cisco recommends that wherever possible, IT should disable the use of 802.11b as a method of ensuring optimal performance.
9. **Recognize that not all 802.11n adapters are the same.** There are many different types of 802.11n adapters on the market. While the majority is Wi-Fi-certified to the 802.11n draft 2.0 specification, many adapters use different combinations of antenna technology, which yields varying degrees of performance. Look for 2x2 and 3x3 multiple-input multiple-output (MIMO) chipsets that will yield better performance on your network than 1x2 multiple-input single-output (MISO) or 1x1 single-input single-output (SISO) 802.11n chips. 802.11n adapters that are integrated into the laptop outperform add-on PC adapters because of their superior antenna design and optimized power consumption.
10. **Improve legacy coexistence by disabling legacy data rates.** To improve capacity on your network, look to disable legacy data rates such as 1, 2, 5.5, 6 and 9 Mbps. This will help ensure that 802.11 protocol "overhead" takes up the least amount of time on your network. As you increase access point density and migrate more clients to 802.11n technology, you can continue to disable legacy data rates such as 12 and 18 Mbps.
11. **Evaluate your security posture.** 802.11n requires the use of Wi-Fi Protected Access 2 (WPA2) with Advanced Encryption Standard (AES) encryption for high-throughput data rates. Ensure that AES is turned on in your network and that your clients are set to prefer AES if an option is available. Also, 802.11n rogue access points may not be detected by existing wireless IDS sensors or monitoring access points that utilize only 802.11a/g radios. Migrate to 802.11n for enhanced detection of rogue access points.
12. **Turn on Wi-Fi Multimedia (WMM) for quality of service (QoS).** 802.11n uses principles from the WMM quality-of-service protocol for protocol improvements. To use these, WMM will need to be set to "Allowed" or "Required" in your network if it's not already turned on.



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