HIGH WIRELESS

The demand from mobile users for more power and automation requires IT managers to improve network efficiency.

To learn more about Shawnee Mission’s wireless infrastructure implementation, go to CDW.com/SMSD
The new generation of mobile IT users is uniquely demanding. These users conduct their work and personal lives through their mobile devices. And since they’ve learned what these devices can do, they want it all.

“There’s a whole new generation of users who are pushing the limits of what we thought we knew or thought we could handle with mobility,” says Donald Meyer, senior product manager at Aruba Networks. A 2014 survey conducted by the company showed that nearly 40 percent of enterprise employees said they own four or more connected devices.

These workers demand enterprise networks that can accommodate their around-the-clock work habits.

Clearly, the pressure’s on for network managers, and it’s not going to ease up. Revenue from wireless LAN equipment sales grew to $1.2 billion in the fourth quarter of 2013, an all-time high, according to Infonetics, a market research firm.

An IT department’s wireless management mission boils down to balancing access demand with available capacity. Maximizing Wi-Fi efficiency plays a leading role. IT staff can use a growing crop of automated technologies and embedded capabilities that address efficiency objectives. These include solutions that prioritize and segment traffic by application and user type, negotiate with endpoints to find the best connection characteristics, and strengthen and focus signals to reduce connection times.

The Password is “11ac”

From a high-level perspective, automation of these and other complicated tasks frees IT staff to treat wireless network management as a way to improve operations. A network designed for the optimal placement and number of access points (APs), dictated by facility or campus layout, traffic patterns and density, makes the most efficient use of resources. Unified management of both wireless and wired networks offers end-to-end visibility for real-time action as well as big-picture insight for fine tuning. Real-time data analysis feeds on-the-fly provisioning decisions as well as ongoing refinements.

Any current efficiency improvement plan should include the newly ratified 802.11ac standard, whether an organization has already implemented the standard or is considering it in its upgrade plans. The 802.11ac standard operates in the 5GHz radio frequency (RF) range, which, in conjunction with the 2.4GHz RF already in widespread use, gives network managers some room to maneuver. The 5GHz spectrum, with far more channels than 2.4GHz, delivers better performance while making more efficient use of overall resources.

“People should consider 802.11ac, especially in situations involving new deployments that are going to have longer system life. Preparing for the future reduces the likelihood of disruption or a future inability to meet demand,” says Jim Berenbaum, a research director with Gartner. He recommends considering 802.11ac for high-density, high-traffic areas where users are experiencing performance issues due to congestion. By shifting these loads to the more capable 802.11ac APs operating at 5GHz, older devices have more transmission time and become more efficient at handling traffic flow.

“Adoption of 802.11ac will pick up as older APs age out and more 5GHz devices are released,” says Mike Fratto, principal analyst with Current Analysis. “Organizations on the older 802.11bg will probably go right to 802.11ac, while those on 802.11n will likely wait a few years, so we’ll see a gradual migration path.”

In a world defined by mobility, many IT professionals consider 802.11ac to be a game-changer. “Wireless efficiency starts with 802.11ac,” says Sachin Gupta, vice president of market strategy for enterprise networking at Cisco Systems. “With solutions built on 802.11ac, it’s possible to see very high rates of efficiency and throughput even as wireless density increases.”

Cisco, Aruba and other wireless providers also have technology that reduces battery consumption for more efficient use of power.

A Match Made in Real Time

This kind of intelligent automation is instrumental to enabling traffic prioritization and segmentation — a
mandate for WLAN administrators facing growing complexities and an onslaught of devices — and well as improving overall WLAN efficiency.

“If you can steer a client to an access point that’s either not over-utilized or has the bandwidth to accommodate certain device capabilities, the network actually works better,” says Meyer.

As increasing numbers of devices hit organizations’ WLANs and battle for limited bandwidth, the ability to pair one with an optimal AP demands technology that can rapidly assess client characteristics while analyzing back-end data on network health.

One product that provides this capability is Aruba’s ClientMatch, which quickly assesses AP and device health to capture an actionable insight that pairs the two, increasing overall network capacity and performance by routing traffic to the most efficient connection.

**An AP in Every Classroom**

The Shawnee Mission School District, is a great example of what organizations — private or public — can achieve in deploying efficient wireless infrastructure. In an effort to modernize its teaching and learning practices, the district wanted to provide tablets to its entire student and teacher population. First, it needed a wireless LAN infrastructure that could efficiently handle its needs, a job out side the scope of its existing infrastructure.

After months of research and planning, Shawnee Mission selected the team that would provide the WLAN technologies and professional services needed to better leverage digital media, according to Leigh Anne Neal, associate superintendent for communications for the Johnson County, Kan.–based school system. The district chose Aruba as its wireless LAN provider and Cisco for its IP telephony and unified communications solutions. By refreshing the entire communication infrastructure, Shawnee Mission strategically positioned itself to address future trends and take advantage of evolving technologies.

Shawnee chose CDW to handle the complex engineering required to map the 802.11n wireless network for optimum performance and efficiency and to deploy the two platforms. Factoring into the decision was CDW’s wireless and UC infrastructure expertise, as well as its close partnerships with Aruba and Cisco. With this choice, the efficiencies gained by implementing an integrated network and telephony platform were further enhanced by entrusting all facets of the project to a single service provider.

The components of Shawnee’s new infrastructure:

**Wireless**
- ClearPass Access Management System
- AirWave Network Management
- Aruba AP-134 and AP-135 wireless APs (2,323 total)
- Aruba 7210 mobility controllers (7)

**UC Servers**
- Cisco UCS C240 M3 rack-mount servers (2)
- Cisco UCS C220 M3 rack-mount server (1)

**Back-End Network Switches**
- Cisco Catalyst 2960-S (187)

**Data Center Networking**
- Cisco Catalyst 6807–XL core router (1)
- Cisco Nexus 7009 data center switch (1)
- Cisco ASR 1002–X Internet router (1)

Shawnee’s new 802.11n wireless network operates in both the 2.4GHz and 5GHz bands, but it’s set up to push...
clients toward the higher band for strong throughput. Neal says the speed and capacity of the district’s new wireless network and the functionality of its UC technologies are encouraging closer collaboration among students and teachers, while providing streamlined access to digital content and other media.

Share the Wealth

Beyond improving wireless efficiency from an RF standpoint, network administrators have several options for realizing efficiencies on the application side. One is through technology that enables WLANs to continuously self-optimize to improve traffic flow based on specific application characteristics.

With AppRF, Aruba gives organizations the ability — both on-premises and cloud-based — to prioritize the way they handle access parameters and security for more than 1,500 commercial applications. Self-optimization functionality includes load-balancing across APs based on individual applications and fine-tuning RF qualities for bandwidth-intensive or latency-intolerant applications.

Where applications are concerned, “it’s imperative that you’re able to efficiently use your entire spectrum of bandwidth,” says Gupta. “You can do bandwidth carving by SSID [service set identification], automate bandwidth prioritization based on application type, such as voice and video, and enable equal sharing of available bandwidth among users.”

Cisco embeds technology in application-specific integrated circuits (ASICs), as well as offering a software-based approach, to enable administrators to prioritize bandwidth allocation based on SSID. With this approach, they can reserve the largest proportion of bandwidth for higher-priority users, generally an organization’s employees, with a smaller part of the bandwidth allotted for guests.

In addition to bandwidth protection, bandwidth-sharing provides all users with a quality experience. This capability, called fair share scheduling, is delivered via an intelligent scheduling algorithm that Cisco builds into endpoint hardware. It takes the total bandwidth available to a designated user type and ensures that every client on the WLAN gets an equal share. This approach addresses a problem that commonly plagues older WLAN infrastructures, in which one device can hog the available network resources by conducting a bandwidth-intensive operation such as downloading a video presentation, leaving little capacity for other clients.

Can You See Me Now?

Network administrators also can find efficiency in unified management platforms that provide end-to-end visibility into both wireless and wired networks, through single-pane-of-glass integration. With this visibility, IT professionals can automate access policy administration, enforce policy through mobility controllers and optimize network paths.

For personnel inside a network operations center, “a single unified presentation of the state of the network streamlines and simplifies management,” says Berenbaum. This design eliminates the need to open multiple applications to get real-time information related to performance, connected users, AP health and other data.

With a single-pane-of-glass view of the network, IT administrators not only resolve issues more quickly but can make long-term decisions about capacity and network build-outs based on data they collect on the users, devices and applications consuming resources.

“IT used to own everything coming onto their networks, and now they don’t,” says Meyer. “They’ve lost the visibility that helped them manage and secure their networks, and they need it back. They have to be able to see who’s attaching to their network, what they’re using and where they’re located.”

NEW AP FEATURES COME IN WAVES

Phase 1, also known as Wave 1, products built on the draft 802.11ac standard, launched before the Institute of Electrical and Electronics Engineers ratified the specification, include such features as quadrature amplitude modulation for increased performance and transmit beam forming.

“Transmit beam forming enables an access point to concentrate signals and push more of the radio transmit power in the direction of the client. It provides a more reliable, longer-range connection,” says Mike Fratto, principal analyst with Current Analysis.

The arrival of Wave 2 products, enabled by new chipsets expected to be ready in early 2015, has been eagerly anticipated for several reasons. Leading the list is that the new crop of products will leverage multi-user multiple-input multiple-output (MU-MIMO), a feature that older chipsets couldn’t accommodate, according to Gartner’s Jim Berenbaum.

“The first wave doesn’t include what’s expected to be one of the most interesting features to emerge — MU–MIMO,” he says. Essentially, MU–MIMO enables APs to transmit to multiple devices simultaneously. This allows the network to quickly and efficiently meet the access needs of devices, which, in turn, become more efficient because the time they’re connected is reduced, extending battery life.
A thorough site survey is the first step toward successful management.

By CRAIG COOLIDGE, CDW Wireless Technical Architect

Many network administrators today have experienced the same ah–ha moment: They’re realizing that achieving wireless network efficiency requires looking at both wired and wireless networks.

The conceptual line between managing wired and wireless networks is disappearing. Administrators must adopt holistic designs and management solutions that can dynamically serve prevailing traffic patterns to preserve time–sensitive voice and video content.

To make this happen, network administrators should consider implementing two vital elements — a thorough site survey and a solid network management system that provides a consolidated view from a single pane of glass.

Success Starts with a Survey

Site surveys have always been important; today they’re indispensable. They document the unique communications needs of each organization. Successful enterprises expand the survey with projections that cover the types and numbers of edge devices and applications the network will likely support in the next 18 months. Comprehensive surveys also help administrators plan for new protocols. That’s especially important today as the industry migrates from the 802.11n wireless standard, which supports both the 2.4GHz and 5GHz frequencies used by existing wireless hardware, to 802.11ac, which supports only the higher–capacity 5GHz band.

Enterprises may conduct the site survey themselves or partner with an outside professional services organization.

Manage Holistically

With an accurate network blueprint in place, IT administrators must choose the right network management solution for maximum efficiency. Today, that often means a consolidated solution that simultaneously manages wired and wireless networks.

A central tool gives desktop, networking, security and compliance administrators a clear view into all the edge devices accessing the network. Single–pane–of–glass options can overlay information about identity management, net–flow rates and application usage statistics on top of the network blueprint so stakeholders can see the information that’s most meaningful to them. The result: They make better business decisions and drive greater efficiency.

A Foundation for Future Advancements

As edge devices and applications become more advanced — and the lines between wired and wireless networks disappear — organizations are empowered to deliver new and better services. But they can only do so when they achieve the highest levels of network efficiency with the help of a detailed site survey and consolidated network management system.

Here are four important considerations:

1. SOLUTIONS VARY, SO CHOOSE CAREFULLY.

Sometimes the best option will be what’s available from a current networking vendor — but not always. Organizations must define their needs and look for the right match.

2. FACTOR IN COMPUTING REQUIREMENTS.

Single–pane–of–glass systems aggregate high volumes of valuable information, but this practice requires adequate IT resources. IT administrators should understand how much processing power, memory and disk space will be needed by the solution. The site survey will be essential here, especially for looking beyond today’s needs to assess future requirements.

3. CONSIDER THE CLOUD.

Cloud–based network management solutions can help organizations bypass IT resource hurdles by shifting capacity planning responsibilities to a cloud provider. In addition, some cloud options may be simpler to use than on–premises solutions. The flipside is that cloud products may not collect as much historical information or offer as much flexibility for analyzing the data as their on–premises counterparts.

4. FINE–TUNE EFFECTIVELY.

Single–pane–of–glass systems offer impressive capabilities for flagging and troubleshooting network problems. But unless it’s utilized properly, all that valuable information could end up looking like clutter. IT managers can guard against this by designating an administrator responsible for learning and optimizing the solutions. This may require training sessions with an authorized partner.