Delivering enterprise-grade WLAN coverage to the bedside:

How one hospital is transforming patient care

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Wireless technology holds enormous promise for today's hospitals—with the potential to enable new levels of productivity, patient safety and quality of care. But new wireless solutions are also placing greater demands on WLAN network performance. Take new mobile point-of-care solutions, for example. Without a comprehensive and reliable wireless infrastructure, a hospital can find it difficult to provide the quality of service needed for many of these applications. Hospitals without ubiquitous wireless coverage and capacity often experience long adoption cycles, or sometimes abandon the initiative altogether. According to a recent report from Spyglass Consulting Group, 71 percent of nurses say that the wireless service in their hospitals is too unreliable for them to do their jobs.[1] This figure is up from 64 percent the year before, so the problem isn't going away—it's only getting worse.[2]

This was the situation we faced at the University Medical Center of Southern Nevada when we set out to implement the CareFusion Pyxis® Specimen Collection System. The CareFusion solution would allow more than 1,500 personnel from nursing, respiratory care and pathology to use 245 Wi-Fi enabled barcode scanners and 145 printers for mobile lab orders and point-of-care patient and specimen correlation. The solution had enormous potential in terms of patient safety and staff efficiency, but would provide little value if it wasn't 100

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percent reliable—24/7—across the facility. The mission-critical solution required an enterprise-grade wireless network—something we didn't have. It was at that point that we turned to Black Box Network Services (BBNS) and Enterasys, two wireless vendors who worked together to help us implement an innovative Wi-Fi strategy that would give us the foundation we needed—not only to implement CareFusion successfully, but to pave the way for implementing our vision of mobile patient care.

Providing wireless coverage across 850,000 square feet

For a facility the size of UMCSN—the largest hospital in Nevada—providing comprehensive wireless coverage was no small feat. Our facility has the only Level I Trauma Center in Nevada, the largest emergency department in the

state and a service area that covers 10,000 square miles. Our main campus comprises 850,000 square feet in eight different buildings that range from three to seven floors, housing 544 hospital beds. UMCSN has 4,000 employees and over 1,500 physicians. We provide for 177,000 inpatient days per year and deliver an average of 12 babies every day.

Needless to say, UMCSN required a particularly robust WLAN solution in order to successfully deploy CareFusion—or any other wireless point-of-care solution—across our organization. We made a strategic decision to replace our conventional WLAN system and to deliver wireless utilizing a distributed antenna system (DAS) and WLAN solutions from BBNS. We were able to remove or replace approximately 1,000 legacy access points (APs) from the ceilings by connecting 335 Enterasys RoamAbout® 4102 2.4/5 GHz APs to a the layered WLAN solution provide by BBNS. This has resulted in a huge savings not only in APs, but also in cabling and power. The solution allows us to take full advantage of our WLAN switch architecture, and it gives us centralized control from our secure data center.

BBNS provided voice- and location-grade wireless coverage that was designed specifically for our needs—a solution that would deliver seamless, uninterrupted wireless across all of our facilities—with ubiquitous coverage and signal strength. From day one, our experience has been that the solution met or exceeded the minimum

signal strength quoted to us by BBNS. But the real test would come with CareFusion's certification of our network. The CareFusion certification team performed a comprehensive test of the implementation and concluded that we had achieved the best wireless coverage and most consistent signal strength of any hospital they had certified. They confirmed that the CareFusion Wi-Fi devices could be taken anywhere in the UMCSN campus—floor to floor, hall to hall, building to building—and never lose connectivity. Unlike our previous WLAN, we also didn't experience any signal loss or channel overlap issues.

Ensuring a consistent user experience—while reducing costs

By having a campus-wide positive patient identification system like CareFusion, UMCSN is able to improve patient safety and satisfaction as well as improve staff workflow and reduce operational costs. Nurses are able to stay logged into the CareFusion application as they move between patient rooms without worrying about losing connectivity or data. Our phlebotomists can cover the entire campus and are able to receive orders in real time without having to return to the main lab.

Our use of—and reliance on—the wireless network has seen tremendous growth since the layered WLAN implementation. Mobile users across the organization have experienced what it can do, they trust it, and they are actively seeking new ways to leverage it. We have already adopted more than a dozen new wireless applications, ranging from guest access on one layer that doesn't interfere with clinical applications

on another layer, to retrofitting older portable X-ray machines with low-cost wireless bridges to make them mobile. Yet despite the number of applications running on our new Wi-Fi system, we are utilizing only 20 percent of our available capacity. This is due in large part to capacity improvements enabled by the WLAN layers.

Spending less IT time troubleshooting wireless

From an IT perspective, the BBNS and Enterasys solution has driven new levels of wireless reliability, resulting in a dramatic drop in wireless-related help-desk calls. A typical hospital might encounter as many as 30 calls per month due to wireless connectivity issues. However, despite being operational for over a year, we have received only one such help-desk call. We have also realized a significant reduction in the number of hours spent on wireless infrastructure maintenance—roughly 70 percent fewer hours. Time savings like these are substantial for healthcare organizations and give scarce, valuable IT resources the freedom to investigate new solutions and opportunities.

These tangible benefits are due in large part to the redundant coverage that's built into the solution and to the proactive monitoring we are able to provide. Not only does Enterasys monitoring allow us to view key performance indicators necessary to plan new applications, it enables us to identify and remediate performance and configuration issues, such as detecting rogues or isolating an AP issue, before service is impacted. We have had only two APs fail since the initial installation, but due to the fact that we have redundancy throughout the network, we were able to identify

these problems and correct them without any interruption in service. Additionally, repairs are easier to perform since APs are collocated in secure spaces rather than mounted on the ceilings in public and patient care areas. Easy access to the APs is a huge bonus for my IT staff.

Performance—and partnerships—that we can build on

The level of wireless performance enabled by BBNS and Enterasys has tremendous implications for an organization like UMCSN, enabling us to explore any number of clinical opportunities that otherwise would have been beyond our reach. The DAS and WLAN solution provides a blanket of RF coverage that we can now use for virtually any wireless service, from 802.11n clients to 3G/4G smartphones—all without going back into our ceilings. In the near future, we plan to implement additional CareFusion modules, smart IV pumps, and medical telemetry.

We have the confidence that comes from working with wireless technology professionals like BBNS—whose RF-knowledgeable team not only equipped us with cutting-edge solutions and provided valuable project management services, but treated us like partners through the entire implementation process, helping us address problems or concerns immediately and empowering us to make the most of these powerful technologies.

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1 Spyglass Consulting Group, "Point of Care Communications for Nursing," November 2009.

2 Spyglass Consulting Group, "Point of Care Computing for Nursing," November 2007.

Black Box (NASDAQ: BBOX) is leading communications systems integrator dedicated to designing, sourcing, implementing and maintaining today's complex communications solutions. Black Box services more than 175,000 clients in approximately 150 countries with approximately 200 offices throughout the world.

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