



5 Challenges and Solutions When Deploying Networks in Healthcare

Medical staff are asked to perform impossible tasks on a daily basis. On the frontlines of the pandemic, healthcare organizations have faced perhaps the most abrupt and demanding changes. An industry-wide shift is taking place to move away from desktop computers and fixed technology in favor of laptops and equipment that can work anywhere and minimize the amount of interaction between people. The rapidly evolving world of wireless technology is helping to bridge the gap between people, departments, and devices. But with its added advantages come added pressure and challenges for healthcare IT teams to deliver reliable, mission-critical connectivity across multiple locations, for an ever-increasing number of patients, in a way that is economic, scalable, secure, measurable and efficient.

At Extreme, we understand how healthcare facilities are using connectivity to increase the collaboration, flexibility and productivity of their workforce, and to improve and even personalize patient

experience. We have seen first-hand how connectivity makes it possible to track valuable and critical assets/data in real-time across the medical campus and temporary locations. We've come across deployments that have complex management, some that aren't optimized for high capacity, others that don't make it simple to administer secure access or troubleshoot – all of which place more of a burden on IT.

We share a vision with each of our partners that centers around leveraging our joint solutions to enable positive change for our customers. Together, we understand what healthcare technology teams experience on a daily basis and how, at the end of the day, the systems they manage must drive operational efficiency AND keep patients' data secure in ever-changing environments. Read below to see how Extreme can help alleviate the pains of challenges specific to your customers in the healthcare space.



Challenge #1

Complex RF environment that is in constant flux, especially with pop-up sites added on an as needed basis

Healthcare facilities, especially hospitals, are notoriously complex and challenging RF environments, where devices need to work everywhere. Most are physically built to support enormous amounts of weight, and contain vast amounts of RF interference, all of which creates a unique set of challenges. Even more, resilient healthcare organizations are having to find new ways to diagnose and treat patients outside of hospitals in pop-up testing locations and telehealth treatment options. When deploying wireless, IT must take into consideration:

- Multi-floor campuses, wing expansions, mazes of hallways, construction materials (like concrete, lead-lined walls, and other dense material), and areas that are intentionally shielded for RF
- Obstructions such as liquids, human bodies, and equipment ranging from massive MRI machines to microwaves in breakrooms
- Various forms of technology competing for the same airspace

- A particularly designed flow of patients, personnel, and equipment that are constantly moving and roaming around the environment at any given point
- Approvals/Compliances that can delay network installation and upgrades
- Navigating the complex management of the entire network and location-specific intricacies
- Secure ways to keep staff and patients successfully connected as the network becomes increasingly distributed

With so many dimensions to a healthcare setting that create a not-so-friendly Wi-Fi environment, alongside increasing demands and limited resources, it is clear that in order to ensure a highly connected environment, a robust solution is required.

Solution

Extreme ensures a long-term Wi-Fi investment with a solution tailored to specific healthcare needs

It all starts with proper planning in the first place - there should never be a hard-and-fast deployment recommendation without knowing the facility layout, interference possibilities, capacity plans and the existing wired network. To keep users and medical devices connected to the network, Extreme created a flexible wireless LAN architecture specifically engineered for the capacity needs in healthcare today and in the future, which provides customizable and adaptable options, including:

- A distributed control plane in which access points actively manage available bandwidth; provide seamless roaming; distribute client load; and adapt to changing RF conditions
- Directional antennas that deliver the best possible signal, exactly where and only where it is needed
- External antennas that protect an AP from harsh conditions while providing optimal placement for the RF

- Intelligent technology in software selectable dual 5 GHz capable access points, that will automatically adjust to dual 5 GHz or remain multi-band in order to provide the best coverage and lessen interference
- Integrated spectrum analysis that can detect and avoid potential interference
- Pluggable ATOM access point that allows IT staff to plug in additional coverage or capacity when needed

By putting the right equipment in the right place, Extreme can ensure the reliability and connectivity of the network to automatically adapt to inference and changes in the environment in real-time. Less disruption by obstructions and minimal interference from harsh medical settings means greater productivity of staff and more patient lives saved.



Challenge #2

The amount and variety of devices being managed and monitored

Clinicians and staff are becoming more and more dependent on mobile and connected devices to do their jobs, while patients and guests expect connectivity from the moment they enter. The rapid growth of IoT and connected medical devices, which include various types of physiological monitors, biomedical devices, medical apps, smart tags, MRI/CT/ultrasound scanners, etc. are coupled to the usual tablets, phones, or laptops that are either facility issued, BYOD or patient owned. The increasing quantity and types of devices demanding access to the WLAN can easily overwhelm the IT teams who must keep track of all hospital assets while ensuring the network is robust enough to meet connectivity expectations:

- Support all connected devices (new and legacy) during periods of high traffic or not
- Prioritize device access to distinguish a clinician accessing records during a routine check-up versus a clinician rapidly accessing records in the emergency room
- Understand the different information being communicated (e.g. mission-critical data versus guest or IoT “chatter”)
- Support the applications and bandwidth of each device (anything from a family member streaming Netflix to a nurse running a mobile app to administer life-critical meds)

Solution

Extreme is engineered for the complexity and productivity needs of healthcare

Whether a multi-floor hospital, 24-hour clinic, or the administration offices found within, our industry-leading microservices-based fourth generation cloud solution helps increase staff flexibility and productivity. Extreme can turn entire healthcare facilities into integrated, intelligent, unified systems where communications connect all doctors, nurses, admin, patients and devices seamlessly and expedite communications between machines and people automatically. ExtremeCloud IQ's unique microservices based architecture ensures performant, dependable networks while reducing operating costs. Coupled with machine learning and artificial intelligence capabilities, these technologies create a highly reliable, highly intelligent, and flexible networking platform that allows healthcare IT to:

- Actively manage available bandwidth, so each user has what they need based on who they are and what they are doing while on the network
- Allocate bandwidth for higher-priority medical devices/data and restricts availability for the more troublesome ones
- Adapt to changing RF environments and prioritize important users and devices

- Allow legacy devices to work with modern communication capabilities which makes them more valuable and extends device life
- Empower new devices to make full use of their feature sets
- Reduce IT workload with a self-service registration tool for patients and guests which prompt the user to enter their registration information, issue network credentials for them, or log them on directly to the WLAN under the correct compliances necessary
- Create customized patient and guest onboarding experiences with our customizable Captive Web Portal
- Use APIs that enable custom onboarding and identity lifecycle management applications for secure guest and BYOD access

Healthcare customers can begin replacing or relocating devices in areas of expected need with future-proofed Extreme access points and be assured that all clients will receive expected performance and security levels.



Challenge #3

Network security

When looking at WLANs across different industries, healthcare is at the top of the list for being one of the toughest, yet most vital to secure:

- The high volume of endpoints accessing the network, and increase in patient data creates numerous attack opportunities
- Meeting bandwidth and critical services demands across many locations without compromising security means IT constantly patching and updating devices with latest security updates
- Access control, identity management, and data management are just a few of the areas that are critical to WLAN security
- Strict compliance to specific regulations like HIPAA must be followed and applied across numerous devices to protect patient privacy
- Data and information need to change hands quickly and seamlessly
- Cumbersome security protocols can slow down staff or encourage them to circumvent protocol
- A secure connection must follow users/devices seamlessly across a large physical area, regardless of urban or rural geographic locations, and in both permanent and temporary sites

Securing a WLAN in the healthcare space means protecting the safety and privacy of patients, staff and visitors.

Solution

Extreme provides security and control for all devices on the access network

Extreme knows that the wireless network must have all of the security and privacy of the strongest wired elements in the network – lives can literally be at stake. Whether onboarding guest or corporate-issued devices, monitoring IoT devices, or providing context-aware policy enforcement, the security and accessibility of Extreme's solutions lies in automatic actions that are taken predominately by the network itself. Our integral security measures include:

- Ability to tie into any type of authentication scheme, which allows production devices to be separated from administrative, staff, guests, patients, etc.
- Means of establishing security and QoS policies based on the users or device context, including the priority, identity, device type, location, and application
- Integrated firewall and policy enforcement at the edge for applications
- SAE support within our ExtremeCloud IQ cloud management platform, as well as multiple WPA3 supported devices
- Private Pre-Shared Keys (PPSK) for BYOD, guest, and IoT is a simple and scalable way to get the simplicity of PSK with the unique and secure access of 802.1X
- Private Client Groups provides secure, isolated, per-room networks while operating across a single SSID and VLAN (say goodbye to that overhead!)
- Flexible, identity-based security allows IT to uniquely identify and apply secure, granular, context-based access policies (i.e. time of day access; location access; firewall and application access; device availability; etc.) to just one user and device or to groups of users and devices
- Active monitoring tools such as wireless intrusion prevention (WIPS) systems monitor the network for potential internal and external threats and alert administrators to attacks, such as denial of service (DoS) attacks or rogue access points and clients. The administrator in turn can activate anti-threat protection methods manually or automatically to contain or eliminate the threat
- Extreme A3 brings additional onboarding, security, management and control to all devices with simple workflows and a streamlined user interface
- Extreme has achieved ISO 27001 certification, demonstrating best-practice security measurements in cloud-managed networking
- Contact tracing enablement and occupancy management helps healthcare organizations better comply with government guidelines and requirements for safer working environments through data analytics and APIs designed to fuel applications on-premises

Extreme enables administrators to ensure their networks are not being abused, and if so, identify threats and adjust security policies accordingly.



Challenge #4

Maintaining a 24x7 environment with no time for down time

As healthcare institutions become dense networks of sophisticated, computerized, mobile medical gear, healthcare network availability takes on a much more critical role. It must be available 24 hours a day, seven days a week. Think of the alternative: if the network fails, a facility would be left with tons of useless devices that cannot perform the life-saving functions for which they were designed. If medical devices are measuring key parameters of a patient's health, a disruption in connectivity means a disruption in accurate data being reported to nurses and doctors. A WLAN in a healthcare setting must be designed to meet a variety of peculiar requirements unique to this industry, the most important of which being:

- It must never go down
- It must be monitored, maintained and updated without the luxury of scheduling downtime

Solution

WLAN that simply works and keeps working

Extreme's technology is based on a unique cooperative control architecture and a true microservices-based fourth-generation cloud platform. Coupled with machine learning and artificial intelligence capabilities, these technologies create a highly reliable, highly intelligent networking platform. The result is a smart, flexible network that includes:

- A self-organizing, self-optimizing, and self-healing WLAN that can intelligently respond to situational and environmental changes
 - Next-generation diagnostic and troubleshooting capabilities that enable IT to resolve issues quickly and effectively, without being on site, and often before they become noticeable to users
 - Superior network analytics that provide comprehensive visibility and control:
 - Network 360 allows viewing of key performance indicators by day, week, and month
 - Client 360 collects, processes, and analyzes vast amounts of client experience data, and distills it consumable and actionable insights
 - An industry-leading cloud management platform with continuous operation and continuous innovation ensures industry-leading uptimes
- It needs to be able to accommodate workloads that are always in flux
 - It needs to control an ever-growing number and variety of devices, as well as support telemedicine and remote practitioners
 - It needs to be managed centrally and at a distance to accommodate temporary sites such as triage tents, drive-through testing and pop-up treatment locations
 - It must be able to support added protocols of keeping employees, medical staff and the public safe
 - Healthcare environments need to be ready to immediately address Wi-Fi reliability, performance, or security any time of the day or night, any day of the year.
- Stability so if the cloud management platform should have an outage, the on-site network can keep operating and provide continuous connectivity
 - Asset tracking to know where devices are at all times
 - Consumable data gathered in easy-to-read reporting metrics, both in real-time and historical views, with suggested remedies
 - IT can perform remote monitoring, provisioning and troubleshooting of all site types from one central location
 - Zero touch provisioning means deploying new hardware is as easy as plugging it in
 - The ability to start small and grow the network as capacity and density needs arise, or as budgets allow
 - A "future-proofed" network that can meet the demand for bandwidth requirements, floor space expansion and multi-site deployments
 - Support additional IoT technology that enables workplace safeguards like occupancy protocols, temperature screening kiosks, heightened sanitation, or devices and analytics that can help manage safe social distancing



Challenge #5

Interoperability and integration of new devices

With the rise of connected medical devices, and the increase in patient, guest and staff devices accessing the medical facility Wi-Fi, interoperability and integration of these devices are increasingly key industry issues for healthcare IT who must consider:

- The impact of how these new devices will coexist with current equipment
- The ability of connected systems to safely, securely, and effectively exchange and use information
- The cost of mitigating the risks brought on by potential incompatibility to other wireless-based systems

Solution

Extreme reduces network costs and complexities

The very definition of mission-critical, seconds in healthcare are like the pennies in retail. As new technologies are adopted and new applications are being developed, Extreme solutions can adapt to allow these applications to interact with the network. Extreme's platform offers features like:

- Location, presence and proximity APIs which cooperate with and enable critical applications
- Access points that include two radio technologies to provide location-based services - Wi-Fi and Bluetooth Low Energy (BLE) allow facilities to implement asset tracking (i.e. IV pumps or wheelchairs), as well as workflow optimization by providing BLE enabled tags for personnel and patients
- ExtremeCloud IQ provides a centralized, single pane of glass view to handle deployment, monitoring, troubleshooting, reporting, and automation of ongoing network tasks
- Secure and scalable data platform which stores location data and is available to external applications
- Utilizing 4th generation cloud technology and unlimited historical data perspectives to gain rich insights from both connected and non-connected devices to support facilities and leadership teams in managing their environments
- Cloud-driven network analytics enable location and presence tracking and positioning to support safe social distancing tools and applications within facilities
- Extreme provides GDPR compliant data handling to ensure data privacy and compliance with data protection laws
- Well defined REST APIs available with extensive documentation and code examples
- Flexible Telemetry services to receive live data from Extreme's platform

Together with our partners, we've aligned to replace the restrictive, error-prone healthcare networks of today, and relieve the overburdened IT teams tasked with "finding and fixing" problems instead of "empowering and enabling" people and connections. We understand how greater levels of distributed connectivity demand even greater levels of network control, assurance, and insights to help keep staff and patients safe, and help healthcare facilities comply with new policies and regulations. Extreme's healthcare network solution focuses on connected care to ensure that IoT and mobile devices are supported as their numbers increase, and organizations can grow their WLAN architecture to exceed traditional growth limitations. The solution offers easy onboarding of devices, a central management platform, and guest access that does not compromise network security. Gartner stated that one of Extreme's biggest strengths is its ability to connect remote locations of any size organization while easily adding more functionality. An adaptable Extreme infrastructure means allowing data to be processed in a way that gets it into the right hands in a fraction of the time. Doctors are empowered with real-time, accurate, and up-to-date patient information and can make better decisions which lead to better treatment outcomes.