

# Mobile Healthcare

White Paper  
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## Abstract

Mobile computing offers healthcare institutions and medical facilities countless opportunities for enhanced productivity, streamlined efficiency, innovative new capabilities, increased revenue streams, and significant cost savings. Many organizations are already realizing unprecedented benefits by implementing secure wireless networks to eliminate paper-based systems, automate procedures, integrate billing processes, and improve patient management.

This white paper details the challenges medical organizations face with respect to wireless technologies, switches and storage solutions, and offers a brief overview of wireless mobility solutions for healthcare. The latter portion delves into storage and switching solutions, and wireless IP camera technologies that enhance surveillance and monitoring capabilities. We also describe various D-Link® solutions that address mobile healthcare needs head-on.

## Reduce Costs, Gain Revenue and Improve Patient Care with Mobile Healthcare Solutions

Improved network access to medical data is rapidly transforming the healthcare industry. Today, wireless networks are extending the pervasiveness and ease of access to critical information. Hospitals, medical offices, retirement homes, clinics, waiting rooms, labs, cafeterias, pharmacies, radiology departments, and other specialized departments are all rolling out wireless networking technologies to reduce data access friction, streamline communication flows, and improve patient care. There are, however, challenges that organizations need to address when considering a solution.

### Wireless Mobility Challenges

Doctors, nurses, and medical support staff need access to information in order to better serve patients. While most medical organizations now have extensive data resources available across their networks, getting at that information at the right time and place has proven difficult.

Wireless network access offers a solution – however several factors need to be considered before launching a wireless network in a healthcare setting. First, the solution needs to be extremely reliable. The urgency, timeliness, and sensitivity of medical information do not tolerate downtime or inaccessibility. Security is also crucial. The right Wireless Local Area Network (WLAN) solution needs to ensure compliance with Health Insurance Portability and Accountability Act (HIPAA) privacy guidelines. The network itself has to have tight security, but strict device usage policies need to be in place, as well. As new Wi-Fi enabled devices, like dictation hardware, PDAs and cell phones come into the workplace, security measures need to anticipate and deal with the potential for breaches and vulnerabilities.

Critical medical services also demand that wireless coverage be ubiquitous and unified, so users can roam about premises and always have access to data. Typical wireless coverage in retail settings and offices is often spotty, with pockets of coverage and gaps between isolated networks. Medical scenarios need to exceed this level of coverage.

Finally, small organizations in particular cannot afford to dedicate resources to maintaining and monitoring a wireless infrastructure. So, the right WLAN solution needs to be easily maintained, managed and monitored by non-expert staff. Fortunately, today's wireless equipment is easy to install and manage day-to-day – even by lay workers and non-IT employees, if necessary. This new equipment does not require constant attention from network administrators.

## Wireless Helps Lower Costs, Improve Efficiency and Enhance Revenues

With robust, integrated wireless network deployments, medical organizations become much more productive and cost efficient. Mobile applications offer several distinct benefits. Staff spends less time on administrative tasks such as retrieving records, for example. This frees up time that can be better spent exploring medical solutions and attending to patient needs. Streamlined admission, assessment and patient management processes enable rapid patient processing in emergency care settings.

Real-time access to medical reports, patient records and drug information ensures that appropriate, responsive care is delivered. With wireless devices and applications, nurses can easily consult with family members, physicians and specialists at the bedside, for example. This eliminates the need to coordinate schedules around office visits. Facilities can even stream real-time DICOM (Digital Imaging and Communications in Medicine) video over IP networks to mobile devices. Patient information is always accessible, so decision-making and progress can be made at the point of care. All these benefits translate to superior patient care and life saving capabilities.

### Key Benefits:

- Clinicians enjoy secure, continuous access to critical patient and medical information
- Paper-based systems replaced and eliminated
- Real-time health insurance eligibility information easily accessible
- More time spent assessing and attending to patients
- Retrieve information on the fly – anytime, anywhere
- Enhanced data searchability (X-rays, patient files, drug information, etc.)

### Wireless Applications for Healthcare

- Patient safety and work flow management
- Automate daily patient management and administration procedures (avoiding errors and streamlining processes)
- RFID location-based solutions provide location and status of high-value health care assets and equipment via wireless networks (wheel chairs, IV pumps, monitors, portable CT equipment, etc.)
- Locate staff carrying Voice over WLAN (VoWLAN) handsets or PDAs
- Communicate across facilities with VoWLAN or VoIP phones
- Integrated IP cameras for security, theft deterrence and evidence gathering
- Offer wireless coverage to patients and visitors in common areas such as waiting rooms

**Hospital-Specific Applications**

- Bed management applications (e.g. reduce time required to turn over ER beds)
- Increase availability of ICU beds
- Increase revenue associated with room and medical services

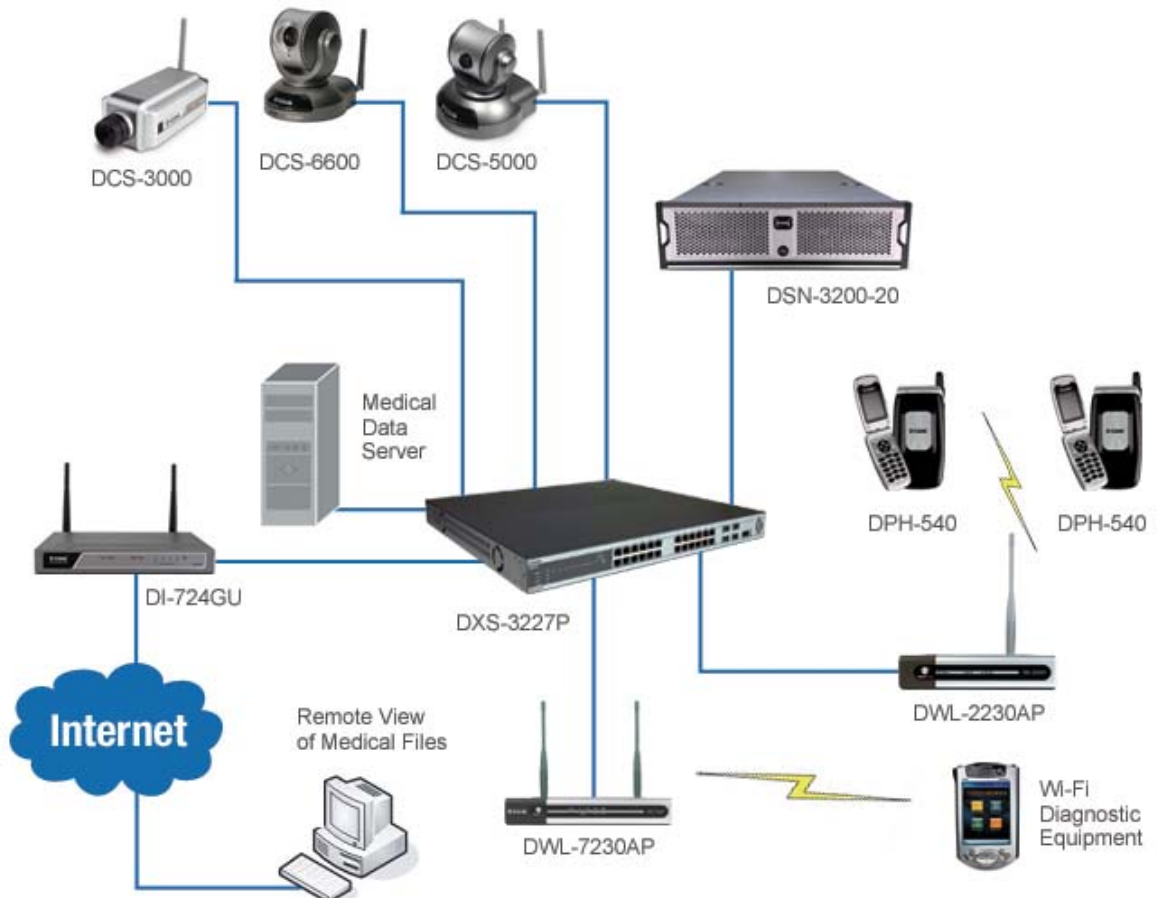
**Switching and Storage Solutions for File Management**

Medical facilities also require robust switching and storage solutions to manage digital images and medical records. Healthcare industry sources estimate that image volumes for CT, MR, Ultrasound and X-Ray images are growing at approximately 10 percent per year due to aging populations, increased usage of imaging technology, and new medical applications for detailed images. The size of files is growing, as well. As new CT and MR equipment hits the market, file sizes inevitably increase as the image quality improves. Currently, CT, MR, Ultrasound and X-Ray images range anywhere from .5 MB to 20 MB per file, and patients can generate dozens of images depending upon the evaluation in progress. As a result, storage planning and equipment considerations are critical to any medical facility.

Doctors, clinicians and support staff need near-immediate access to the latest, most accurate images and files, so switching is critical, as well. D-Link offers a wide range of solutions designed specifically for the storage and switching needs of healthcare facilities that manage significant file throughput. Like wireless APs and switching solutions, these are crucial components to a robust information infrastructure. We listed just a few of our solutions below.

**IP Surveillance**

Digital surveillance systems that utilize Internet Protocol (IP) as a network transport mechanism offer hospitals and medical facilities cost-effective, integrated security solutions. New IP-based surveillance and security systems that network digital cameras to existing Ethernet networks provide unprecedented intelligence, flexibility, and ease-of-use. Equipment prices are reasonable, and the user interfaces and configuration utilities are simple and flexible. IP-based surveillance networks are also much more scalable (at reasonable costs) than traditional analog and Digital Video Recorder (DVR) systems.



*D-Link's switching, wireless, storage and surveillance solutions help mobilize the healthcare industry and make it more efficient.*

IP surveillance solutions can be used to monitor assets, offices and treatment facilities with live feeds, remote alert systems, and compressed video that is archived on hard drives for easy retrieval. The IP standard offers simple installation and eliminates the need for specialized skills. IT administrators can easily attach cameras and run Cat-5 cable or Wi-Fi access points to common routers and switches. Staff, administrators and security personnel can then view, manage, and record video locally and remotely using standard Internet browsers like Internet Explorer, Firefox, and Safari. All this makes medical facilities, hospitals and clinics much safer places.

IP surveillance systems with automatic alerts, built-in motion detection, and integrated storage features, can easily satisfy the needs of even the most complex, sprawling facilities. Standardized IP equipment lowers maintenance and configuration expense, and facilities can free up manpower by monitoring areas via digital camera. D-Link offers complete IP surveillance solutions, including hardware designed for low-light applications, high indoor and outdoor temperatures, and low indoor and outdoor temperatures.

#### Key IP Surveillance Benefits

- Utilize existing IP infrastructure
- Highly scalable
- Flexible camera placement: PoE eliminates need for local power source; Wi-Fi eliminates need for hard-wired ethernet cable
- Remote viewing from anywhere/anytime via a standard Web browser
- Standards-based, allowing multi-vendor solutions and integration
- Better image quality than Closed Circuit TV (CCTV) analog systems
- Open storage and server systems scale easily and cheaply, with no need for specialized recording equipment or training
- Secure: Data can be encrypted across the network, so only the cameras and servers know what kind of packets to expect across the system. Without the proper authentication keys, outsiders can't break into the network to steal video data or feed false video into the system. Also, any interruption to the data stream can automatically trigger alarms and alerts.

## Solutions

D-Link switching, access point (AP), storage and IP camera solutions offer industry-leading reliability, availability, and manageability – as well as all the security features required for HIPAA compliance.

### Switches and Wireless Access Points (APs)

#### D-Link DWS-3200 Series Switches

D-Link's xStack™ 3200 Series switches provide effortless wireless technology convergence with traditional Layer 2 data access switching. The xStack switches feature the latest stacking

technology from D-Link (up to 8 units and up to 384 Gigabit ports). The DXS-3227P, in particular, transforms from a standard Layer 2 PoE switch into a unified wired and wireless switching solution with the purchase of a license key. The unified wireless switch provides powerful security such as DoS attack prevention, easy deployment through configuration templates, the ability to detect and mitigate rogue access points, and centralized management for all compatible WLAN components. Centralized management is crucial for wireless technologies deployed in real-time inventory, data mining, and an array of personal electronics that demand seamless integration such as 3G/VoIP mobile phones and able to manage the entire network of wired and wireless clients.

#### D-Link DWL-2230AP

Designed for use with the xStack 3200 Series Wireless Switches, the DWL-2230AP is an 802.11g access point with 802.11b backwards compatibility and integrated 802.3af Power over Ethernet (PoE) support. PoE enables installation in areas where power outlets are not readily available. Since wireless security remains a strong concern among businesses, the DWL-2230AP provides enhanced wireless security features to ensure your data is protected from hackers. Support for WEP, WPA and WPA2 encryption guarantees the privacy of your network data.

#### D-Link DWL-7230AP

The DWL-7230AP is similar to the DWL-2230AP, but includes 802.11a/g compatibility, in addition to 802.11b backwards compatibility.

For more information, please visit D-Link's [switching resources](#) and [wireless networking resources](#).

## VoIP Solutions

#### D-Link DVX-2000MS VoiceCenter™

The D-Link DVX-2000MS VoiceCenter™, a Microsoft® Response Point™ IP Phone System, is an out-of-the-box solution designed for small businesses with 5 to 50 users. The system integrates easily through the Local Area Network (LAN) to the Internet or via traditional public switched telephone network (PSTN) lines. It offers all the essential telephony features required for small businesses, including voice recognition and built-in Auto Provisioning configuration capabilities. The system also offers call forwarding, call hold, find me-follow me, and several voicemail functions, including voicemail-to-email forwarding and voicemail retrieval over the phone. The solution is perfect for both new businesses looking for an economical phone system, as well as for businesses looking to migrate from old telephony systems to new, cost-saving VoIP solutions.

For more information, please visit D-Link's [VoIP and IP communication resources](#).

## Storage Solutions

**D-Link xStack Storage™ Area Network (SAN) Array DSN-3200-20**  
The D-Link xStack Storage™ Area Network (SAN) Array DSN-3200-20 is designed to provide a reliable network data storage solution for customers in entry-level and SMB segments. Utilizing a 10Gbit iSCSI System-on-a-Chip (SoC) solution that can handle over 80,000 I/Os per second and capable of supporting 15TB raw capacity using 1TB hard drives (and even higher capacity hard drives as they are introduced), the DSN-3200-20 Array can easily be implemented as nearline storage to supplement your primary IP network storage solution or be used as a basic backup and recovery device. This evolutionary advancement in performance is a testament to the tightly integrated xStack Storage architecture and is a sharp contrast to the discrete implementation of competing products.

**D-Link xStack Storage™ Area Network (SAN) Array DSN-3400-20**  
Similar to the DSN-3200-20, the D-Link xStack Storage™ Area Network (SAN) Array DSN-3400-20 is designed to provide a reliable network data storage solution for customers in entry-level and SMB segments. Utilizing a 10Gbit iSCSI System-on-a-Chip (SoC) solution that can handle over 80,000 I/Os per second and capable of supporting 15TB raw capacity using 1TB hard drives (and even higher capacity hard drives as they are introduced), the DSN-3400-20 Array can easily be implemented as nearline storage to supplement your primary IP network storage solution or be used as a basic backup and recovery device. The DSN-3400 series includes all the features of the DSN-3200 series, but instead of eight 1GbE ports, it has a single 10GbE port.

**D-Link DSN-2100-10 xStack Storage Area Network (SAN) Array**  
The D-Link DSN-2100-10 xStack Storage Area Network (SAN) Array is designed to provide a smaller, more value oriented solution for entry-level and SMB customers. The heart of the DSN-2100-10 SAN Array is based on the same powerful System-on-a-Chip (SoC) design found in larger arrays such as the DSN-3000 series of products, but housed in a smaller chassis. The DSN-2100-10 SAN Array platform features 8 hot swappable Serial ATA (SATA) disk drive bays supporting 8TB raw capacity using 1TB hard drives (and even higher capacity hard drives as they are introduced) in RAID level 0, 1, 1+0 and 5 configurations.

For more information, please visit D-Link's [Storage resources](#).

## Internet Cameras

### DCS-6600 Series

D-Link's DCS-6600 Series IP cameras feature dual codec support, 10x optical zoom lenses, 802.11g wireless connectivity, built-in microphones, two-way audio, and low-light sensitivity. The cameras also offer motorized pan, tilt, and optical/digital zoom, giving you greater remote viewing options.

### DCS-5000 Series

D-Link DCS-5000 Series Wireless Pan/Tilt Internet Cameras are fully-featured surveillance systems that connect to Ethernet or wireless broadband networks to provide remote high-quality video and audio. Using the latest 802.11g wireless technology, the cameras securely communicate at 54Mbps and allow viewing of live video feeds on compatible 3G mobile phones or PDAs. This latter feature is designed for users that are often on the road and desire around-the-clock monitoring for applications such as home/office surveillance, checking up on infants, kids, or family members. Users can monitor and manage up to 16 cameras simultaneously, set recording schedules, enable motion detection settings, and change settings to multiple cameras.

### DCS-3000 Series

The DCS-3000 Series cameras offer full-featured surveillance systems that connect to Ethernet or wireless broadband networks to provide remote high-quality video and audio. These wired and wireless (802.11g/b) cameras offer 4X digital zoom and two-way communication capabilities.

For more information, please visit D-Link's [IP Surveillance System resources](#).

For more information about D-Link Medical and Healthcare solutions, please visit <http://www.dlink.com/products/> or call **1-800-326-1688**.