The Top 10 Reasons Healthcare Organizations Should Deploy a New IP Network

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ZK Research
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Introduction: The Changing World of Healthcare

During the past decade, the digital era has transformed many industries. The healthcare industry has seen some of the most dramatic changes. Hospitals and other healthcare organizations have been slow to adopt new technology, as it was viewed as safer and more cost effective to stay with the status quo rather than risk potential issues caused by new technologies. For the past few years, regulatory concerns, increased focus on patient safety and competitive pressures have caused healthcare institutions to leverage new technology and move rapidly into the digital age. The following are the most pressing technology issues CxOs and IT leaders in healthcare institutions must be aware of today:

- **Aging infrastructure:** Many hospitals are still using network and compute infrastructures last upgraded for Y2K. Clearly, technology must be upgraded if organizations are to continue to provide quality care.
- **A resilient, robust interruption-free network:** Improving the quality of care is about finding new ways to treat patients. More and more hospitals rely on the network to deliver information to clinicians in real time, making network reliability a key concern.
- **Rapid digitization:** The reams of paper that workers and patients were accustomed to are yielding to electronic records. It's common for medical images, surgical videos and other medical data to be digitized and stored centrally. The evolution of healthcare information creates massive demands on network performance and storage infrastructure. File sizes are also growing, which exacerbates the challenge of managing data growth.
- **Patient privacy:** In every region of the globe, patient privacy and security are top concerns. Keeping records safe is an absolute must. Failure to do so can lead to stiff fines, government penalties and a damaged reputation.
- **New ways to access data:** As paper quickly recedes, doctors, nurses and other clinicians use the network to access patient information, medical images and other data. Tablets, mobile devices, workstations-on-wheels and laptops are commonplace in hospitals, clinics and long-term care facilities.
- **New methods of interaction:** While one-on-one consultation remains the norm, clinician collaboration has increased. Patient-clinician interactions are being conducted over video, which allows physicians to reach more patients, in more places, faster than ever before. These real-time communication tools require very low-latency networks and generate enormous demands for bandwidth.
- **Improving patient care:** Healthcare is an increasingly competitive market where mistakes are magnified because of their impact on patients. Any problem can turn into a PR nightmare and can cause insurance premiums to escalate. New technology can automate tasks, provide more accurate information to clinicians and speed up decision-making processes to lower the risk to the patient, medical staff and hospital.

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Influence and insight through social media

- **Big data:** The advent of big data and analytics can help caregivers use an evidence-based approach to medicine. Next-generation healthcare requires analytics-driven decision support. This creates the need to aggregate, analyze and visualize massive amounts of data to make better-informed patient care and operational decisions.

Healthcare organizations are rapidly moving away from the legacy physician- and facility-centric "fee for service" model and are shifting to patient-centered, value-based healthcare services. A patient-centered network aligns with the new value-based clinical business model. Consequently, healthcare institutions can deliver secure, cohesive next-generation services to patients. With healthcare organizations increasingly looking to revamp the way clinicians work and the way patients are treated, the IT network becomes a vital, strategic asset required to deliver secure, reliable services. However, most of today's networks need to evolve if healthcare is to meet these challenges. To support this dramatic shift, institutions should leverage new network architectures to provide the foundation for current and future technology initiatives.

Section II: Defining a New IP Network

Most networks in today's hospital data centers were built in an era when application and compute resources were static and best-effort delivery of services was the norm. The networks built on multiple tiers were highly complicated and required long troubleshooting and repair times. Addressing performance and reliability often meant overbuilding the network, which is why traditional networks have an average utilization of less than 30%, according to ZK Research. Additionally, the legacy architecture of traditional networks combined with older, inefficient protocols resulted in a network with significant latency. In the healthcare industry, this latency can mean the difference between a physician having the right information to make a critical patient care decision, or not. Clearly, a new architecture is required to meet today's challenges.

A new IP network can be thought of as a network that is equipped to meet the demands of this business era. For healthcare institutions, this means having a flexible, dynamic network that can be a platform for modernization.

Legacy IP networks were optimized for client/server computing (Exhibit 1), whereas a new IP network is optimized for more modern, network-centric compute paradigms such as the cloud, mobile computing and the Internet of Things. In the past, the workplace was fixed as well, with the majority of employees working from the same location every day. A new IP network can support orders of magnitude more connected endpoints and is optimized for a virtual, mobile workforce where information, people and devices are constantly on the move.

A new IP network is different from a legacy network in the following ways:

- **Simpler network design:** Traditional networks are hierarchical in design and composed of three or more network "tiers." Information must flow up and down, or in a "North–South" direction, to move from one system to another. This was ideal in the client/server era, when most of the traffic flowed between PCs and corporate servers. In today's era of big data and cloud, however, more and more traffic moves between servers, or in an "East–West" direction. A new IP network is flatter and simpler in design and optimized for the growing demand of East–West traffic.
- **Easier to manage:** During the past few decades, legacy networks have had many "patches" applied to them to make up for deficiencies in the original IP and Ethernet protocol specifications. Running a network is akin to managing alphabet soup as protocols such as MPLS, PIM and STP have been merged together. Even the best, most skilled engineers struggle with the complicated environment of current networks. A new IP network runs a more modern protocol that collapses all of the functionality, meaning the network is simpler to deploy, run and troubleshoot.
- **Automation capabilities:** Healthcare IT needs the ability to quickly deploy applications and infrastructure services. Consequently, a new IP network must be agile to instantly adapt to changes within the business. The network's ability to adapt to the speed of the cloud hinges on the automation of network updates and configuration changes based on business policy. Legacy networks have few automation capabilities, whereas automation is a key characteristic of a new IP network.

Exhibit 1: A New IP Network Is an Enabler of the Digital Healthcare Organization

	CLIENT/SERVER ERA	INTERNET ERA	DIGITAL ERA
Connected Endpoints	Millions	Hundreds of millions	Tens of billions
Role of Network	Local connectivity	Company-wide connectivity	Ubiquitous connectivity
Value to the Organization	Connectivity	Tactical support	Strategic enabler
Compute Model	Server centric	Distributed computing	Network centric
Network Era	Multiprotocol	IP networking	New IP network

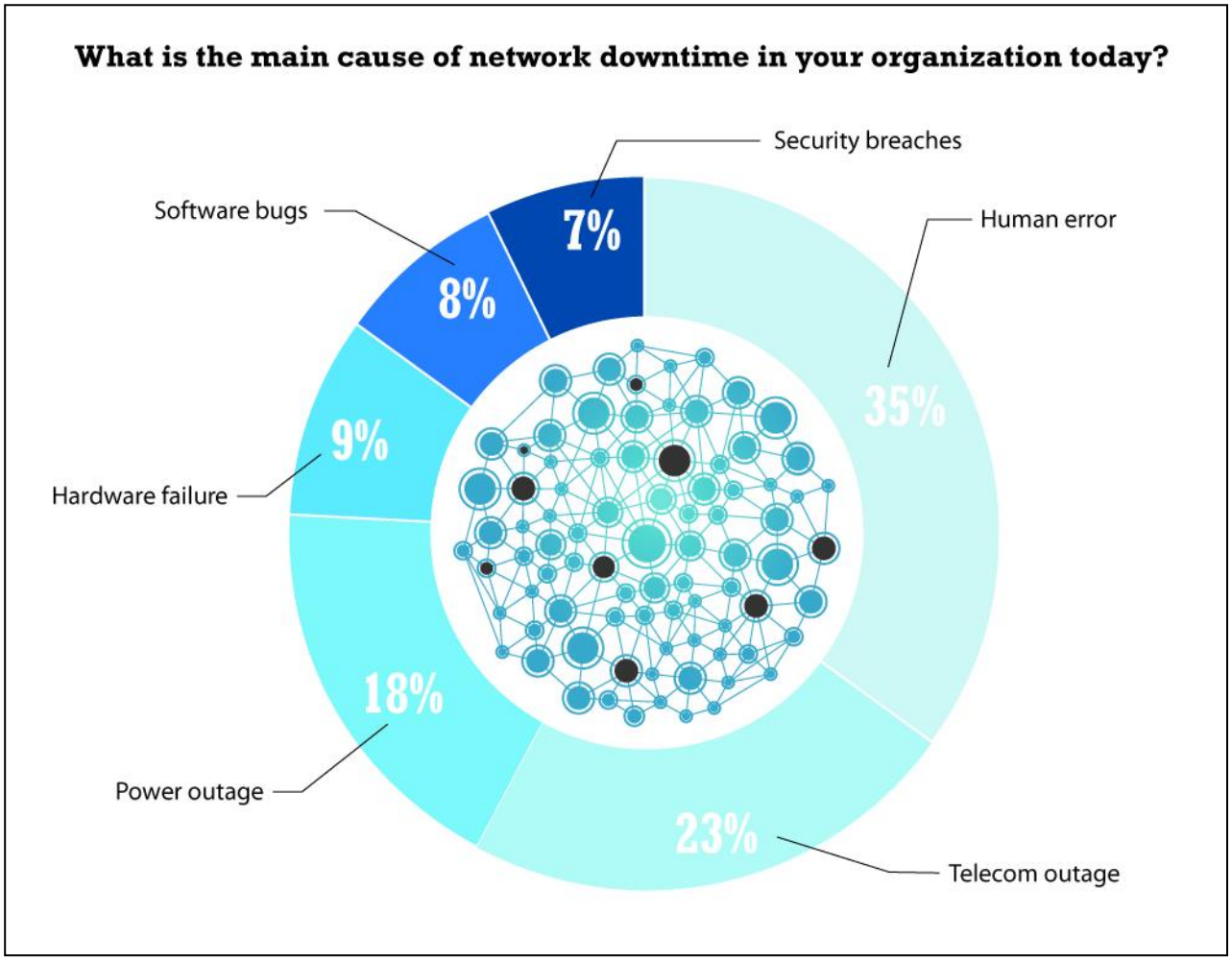
Source: ZK Research, 2016

- **Programmable network:** Legacy networks have no native programmable capabilities. Some highly skilled network engineers have the ability to create scripts to program the network, but this is often done on an ad hoc basis. With a new IP network, programmable application programming interfaces (APIs) bridge the application, control and infrastructure layers. The APIs enable network programmability but also give applications the ability to interact with the network.
- **Dynamic agility:** Making changes to a traditional network is typically done on a box-by-box or even port-by-port basis. Even a simple change can often require many months to complete, as dozens or even hundreds of network devices need to be reconfigured to support the change. The slow nature of change management renders a legacy network inflexible. A new IP network has the capability to make changes almost instantaneously, meaning the network can be reconfigured at the speed of business.
- **Economic flexibility:** Traditional networks typically require a high upfront commitment to purchase infrastructure because organizations are often forced to buy capacity they might not use for years. A new IP network incorporates a subscription pricing model so the network can be a true IT utility. A subscription model enables organizations to deploy the needed level of capacity today, but then add more when the business requires it. With a new IP network, organizations can choose the economic model that fits their business best.
- **High-uptime network:** The ZK Research 2015 Network Purchase Intention Study found that human error is the largest cause of network downtime (Exhibit 2). This happens when network engineers make changes through scripts and then must apply them to every device in the company. This multi-step, multi-device nature of change management is almost impossible to scale. In a new IP network, changes can be automated and initiated by applications. Also, when updates are required, the changes can be applied at a single point and propagated across the network. With a new IP network, unplanned downtime due to human error can be reduced from 35% to zero.

Section III: The Top 10 Reasons Healthcare Organizations Should Deploy a New IP Network

1. **Provides faster access to electronic information:** Physicians, nurses and other clinicians require significant volumes of information when making decisions. Traditional network architecture adds far too much latency to quickly pull up large amounts of data. The flat, efficient design of a new IP network enables much faster access to electronic information.

Exhibit 2: Reduction of Downtime Improves Patient Services



Source: ZK Research 2015 Network Purchase Intention Study

2. **Serves as a key component of PACS, VNA and other imaging technologies:** With medical imaging, massive amounts of storage must be recorded and then archived. A new IP network connects storage systems to imaging systems and is a key component of the overall solution.
3. **Enables the use of consumer devices such as tablets and mobile phones:** Healthcare institutions have been aggressively using consumer devices in the workplace. Hospitals have connected patient monitoring systems to these devices so physicians and nurses can be immediately notified of any critical issue with a patient, meaning any latency in transmission can jeopardize the quality of care. A new IP network provides the low-latency network required to make consumer devices a viable part of healthcare IT strategy.
4. **Optimizes the performance of desktop virtualization to support workstation-on-wheels programs:** The digitization of healthcare means more computer terminals are required in more places to access and input information. However, it's far too expensive to place a workstation everywhere a computer may be needed. To help, hospitals have rolled out workstation-on-wheels programs where computers can be moved from location to location when a physician, nurse or technician requires them. Desktop virtualization allows data to be centralized while still enabling ubiquitous access. Successful desktop virtualization implementation requires a high-performance, low-latency new IP network to optimize performance.

5. **Enables improvements to patient privacy:** Manual switch-by-switch or port-by-port configuration is far too slow and error prone to ensure the highest levels of security. The centralized control and policy provisioning of a new IP network fabric means healthcare IT no longer needs to compromise privacy concerns because new services can be enabled quickly.
6. **Provides a robust network for deployment of apps such as video and telemedicine:** The use of video in healthcare has skyrocketed as physicians leverage it to provide better, more personalized healthcare to remote patients. Video is a bandwidth-intensive application that is sensitive to jitter and packet loss. A new IP network is ideally suited to usher in the video era in healthcare.
7. **Increases patient safety through improved quality of care:** Utilizing mobile devices to transmit real-time patient information is a great concept, but patients can be put at risk if the lag between bedside alarms and nurse notification is too long. Electronic notification is only effective if messages are immediately delivered, which can only be accomplished with a high-performance, low-latency new IP network to support the solution.
8. **Delivers a foundational element of cloud deployment:** Many healthcare institutions want to leverage the cloud to further simplify IT and add compute flexibility. Whether IT is looking to leverage a public cloud or build an internal cloud, a new IP network will support the large volume of East–West traffic generated from cloud computing.
9. **Allows for storage networks to rapidly scale out:** Electronic records, medical imaging and other factors place unprecedented demands on the storage infrastructure. Healthcare IT organizations must be able to rapidly provision storage to the systems that require it. A new IP network better accommodates network-attached storage and provides a road map to converged storage, if this option is required.
10. **Allows increased agility:** Almost every CIO in the healthcare industry is striving to deliver a more agile IT environment to support an increasingly agile business. However, true IT agility cannot be achieved without an underlying agile new IP network. Traditional networks are far too rigid to enable IT and business agility.

Section IV: Conclusion and Recommendations

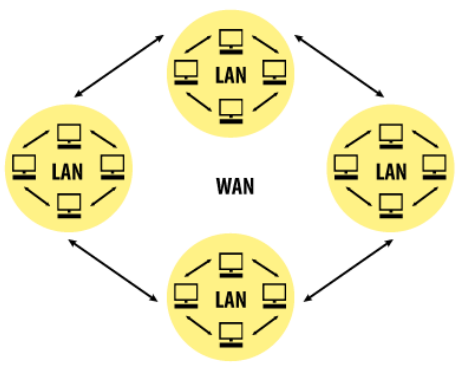
Healthcare is undergoing the most significant technology transformation since the birth of computing. Mobile, cloud and virtual computing are changing the face of healthcare forever, as organizations globally look to deliver better quality services, improve patient safety and provide the highest levels of security.

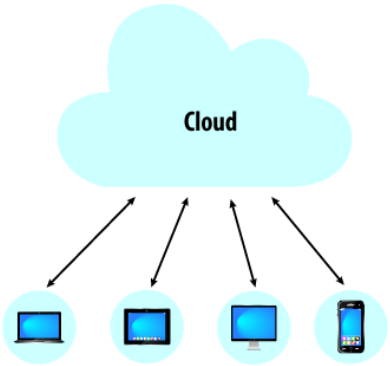
A new IP network is the best network model for healthcare today (Exhibit 3), and business and IT leaders should elevate the evolution of the network to the top of their priority lists.

Healthcare institutions should leverage a new IP network for the low-latency, high-performance network it provides. This will be an essential tool to handle the massive amounts of network traffic and storage requirements healthcare organizations will need in both the short term and the long term. To help with the transition to a new IP network, ZK Research recommends the following:

- **Consider the network a strategic asset.** Healthcare IT leaders must assign the network the same level of importance as compute, storage or application infrastructure. The network was once considered a tactical resource, but the "plumbing" of IT has become a strategic enabler of the future of healthcare.
- **Break with the status quo.** Traditional networks are rigid and costly. CIOs, IT leaders and network managers must shed conventional thinking when it comes to building networks to support healthcare institutions. A new IP network can provide the flexibility, agility, scalability and security required to support healthcare today and into the future.
- **Evaluate vendors against criteria specific to a new IP network.** When choosing a solution provider, it is often easiest to base the decision on market share or incumbency. However, during market transitions, this can be a mistake. Choose a network vendor based on metrics unique to a new IP network such as port-to-port latency, the number of service-facing ports, its ability to handle converged storage traffic and the cost and complexity of scaling up the network.

Exhibit 3: A New IP Network Is the Best Network for Healthcare Institutions





LEGACY IP NETWORK	NEW IP NETWORK
Tactical resource	Strategic enabler
Scales to millions of connected endpoints	Scales to billions of connected endpoints
Closed, proprietary, vertically integrated	Open, standards-based, ecosystem-integrated
Intelligent devices provide value	Intelligent network provides value
3- to 5-year upgrade cycle	Over 10-year upgrade cycle
High up-front costs	Utility-based pricing

Source: ZK Research, 2016