

# Connected Healthcare Architecture: Reusable Network Services Improve Patient Care and Clinician Productivity

## The Problem of Information Silos

Healthcare companies are facing rising costs of providing medical care, increased competition, a greater number of patients, and a constrained number of staff. Older business processes require considerable human intervention, which hinders profits. But new productivity-enhancing technologies promise to help healthcare companies support more patients with fewer staff members.

To boost staff efficiency and patient care, healthcare companies need to make effective information sharing an integral part of their existing business processes. This includes providing access to the right information, to the right staff member, on the right device regardless of where that person is located. Tied to this concept of real-time information is the ability to collaborate and bring multiple experts together to consult quickly without needing to be in the same location. With these capabilities, staff can be more productive and serve a higher number of patients.

However, in most healthcare environments, applications and important data live in individual application silos with, at best, limited visibility to each other. This data includes medical reference databases, patient records and orders, administration systems, and even paging information. There is also a tremendous amount of non-digital data that can only reside in one physical place at a time. These information silos limit the availability and integration of data needed to quickly make time-sensitive decisions.

## Solution: An Architectural Approach

Healthcare organizations can bridge these silos by adopting an architectural approach that describes business processes and the IT interfaces and interactions that work together to support them. This approach also defines reusable IT services such as mobility, storage, and application and network communications that support business processes and can be utilized across an organization. Among the benefits are cost savings, fast deployment of new capabilities, and more innovative approaches to solving business challenges.

Businesses are increasingly using a form of enterprise architecture, whether an industry-standard framework such as The Open Group Architecture Framework (TOGAF) or Zachman, or an internally developed architecture, to improve the linkage of business objectives to a technology architecture. Cisco provides the network infrastructure and services to integrate business tools and devices across silos. Working with your existing enterprise architecture framework, Cisco® network-based services are among the reusable assets that help to lower operating costs, increase productivity, and generate new revenue streams.

## Enhance Business Applications with Network-Based Services

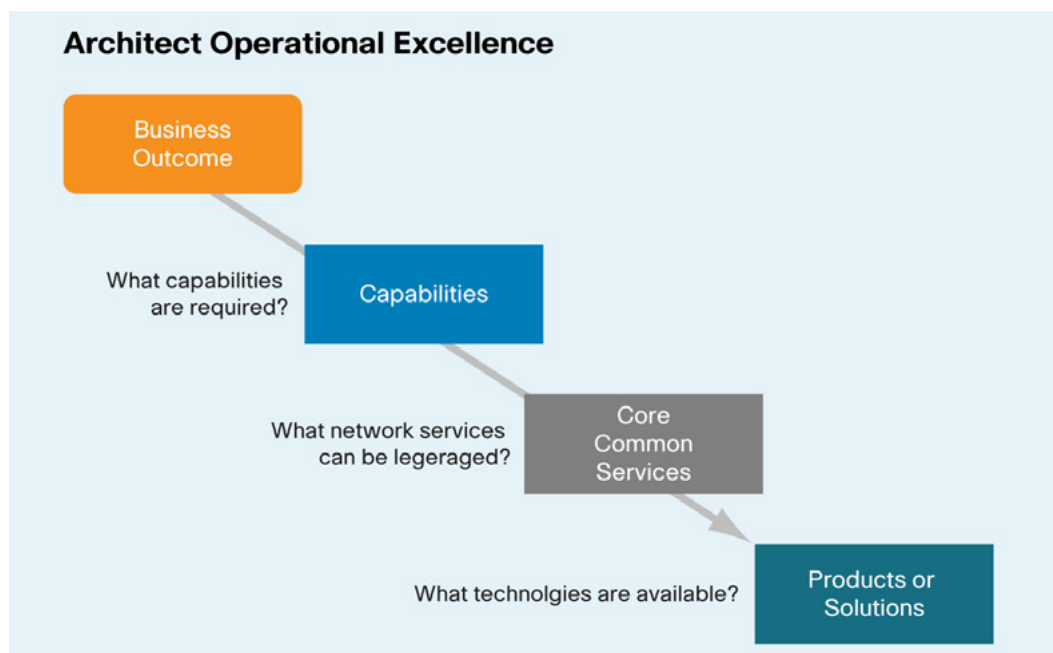
Healthcare companies deploy a diverse set of applications that perform designated functions, many of which are mission-critical—everything from nurse call systems, to monitoring vital signs of patients, to ordering medications and labs.

Using services to replace or enhance common application features has long been a proven strategy for application development and deployment. The use of reusable services allows for greater standardization and centralization over the application environment. These services can bridge the gap between application silos and lend new capabilities to applications—all of which helps to improve the overall user experience.

The Cisco Service-Oriented Network Architecture (SONA) utilizes a range of technologies that make the network a platform from which to deliver services that are available across the healthcare enterprise and can be used and reused by different business- and healthcare-specific applications, as well as by the suite of Cisco healthcare solutions. Within this framework, Cisco has defined the Medical Grade Network Architecture that uses the same capabilities and network services but ties them to specific healthcare applications and business priorities.

The Cisco SONA is an open framework for network-based services used by enterprise applications to achieve business results. This top-down architectural approach focuses first on business objectives, and then identifies what business capabilities are available in the form of applications and business services. The next step is to understand what functional services are common across the business capabilities and finally to deploy the foundation to deliver the required services.

**Figure 1.** Steps of a Top-Down Architectural Approach

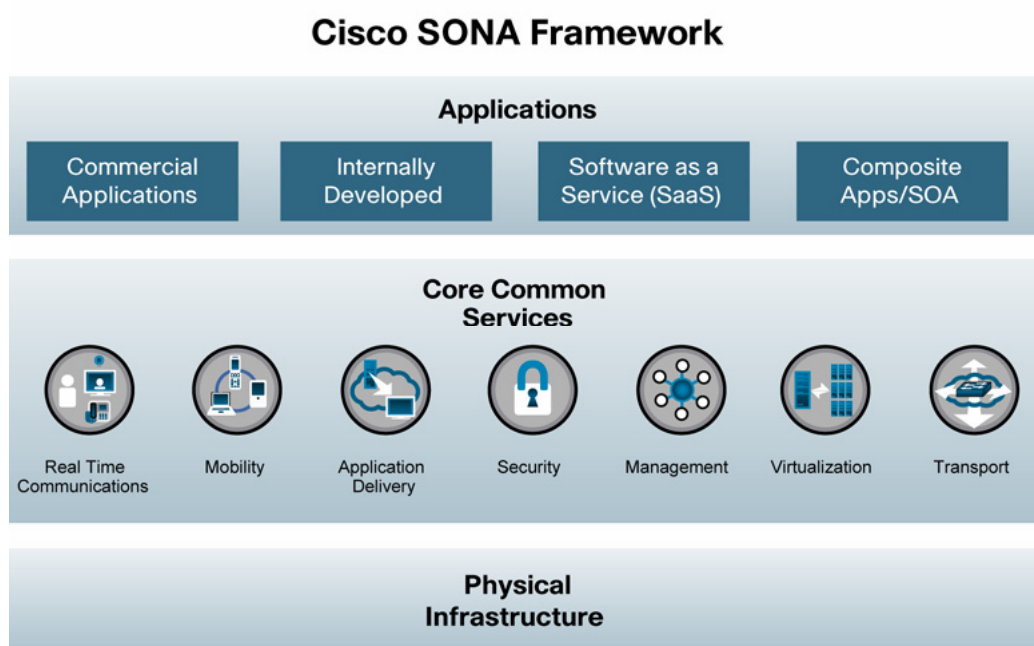


The Cisco SONA framework consists of seven core service groups that deliver consistent and robust capabilities throughout the network. A core service group is a collection of one or more functional services that create a common quality, ability, or feature that can be used or developed by higher-level applications such as electronic medical records or digital imaging. The core services are delivered by physical infrastructure, which may include one or more products or solutions. The core service groups consist of the following:

- **Real-Time Communication Services** offer session and media management capabilities to enrich communications and collaboration from the emergency room to the doctor's office.
- **Mobility Services** offer access to location information and provide connectivity for wireless devices and sensors.

- **Application Delivery Services** help ensure that applications perform to users' expectations whether on the hospital floor or at a satellite clinic.
- **Security Services** help protect the infrastructure, data, and application layers from constantly evolving threats, and also offer access control and identity functions.
- **Management Services** offer configuration and reporting capabilities across the infrastructure from the hospital floor to the corner office.
- **Virtualization Services** increase the utilization and efficiency of infrastructure for healthcare organizations seeking to optimize their investments and limit space usage.
- **Transport Services** are the common foundation that enables the breakdown of healthcare silos and integration of disparate systems.

**Figure 2.** Core Services Categories



### Utilizing Cisco Core Services to Improve Efficiency

Cisco offers several core services that can be used and reused among multiple business applications in support of healthcare solutions. This drives efficiency, lower time to deployment, and greater investment protection as services deployed for the initial healthcare solution are used again by subsequent solutions and applications.

Cisco core services are pervasive across the networked environment and healthcare domains and may be centrally managed by existing business process management tools or workflow applications. The portfolio of Cisco healthcare solutions is focused on integrating operational silos and improving efficiency with greater flexibility and responsiveness. The services used across the solutions include: transport, virtualization, security, mobility, and real-time communications.

**Figure 3.** Common Services Reuse

**Building Upon Existing Services and Solutions**

Cisco Healthcare Solutions

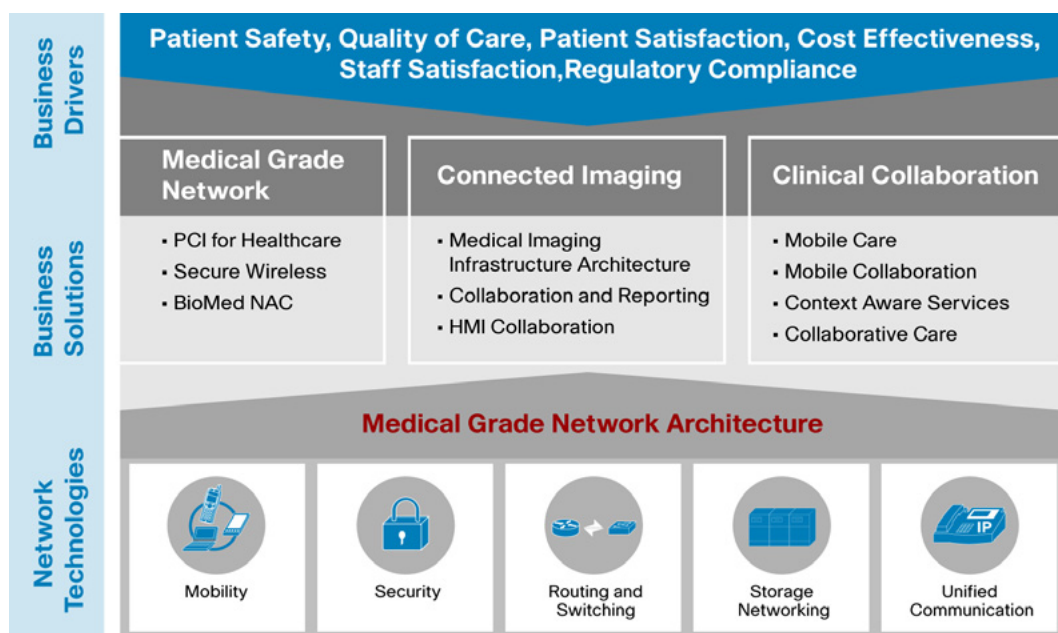
PCI for Healthcare		X	X				X	Operational Excellence ↑
Biomed NAC			X	X			X	
Mobile Care	X			X				
Collaborative Care				X	X	X		
Connected Imaging	X	X	X		X	X		
Context Aware Services	X			X	X			
Common Network Services	Transport	Virtunalization	Security	Mobility	Real-Time Communication	Application Delivery	Management	

**Cisco Connected Health Solutions**

Cisco Connected Health solutions give your business better access to more accurate and timely information throughout your staff and the multiple places you interact with your patients. These solutions support business goals that may pertain to a specific domain within healthcare—such as operational efficiency in the hospital, clinician productivity, or patient care—but also enable communication across domains to facilitate objectives such as: regulatory and safety compliance, vendor management, total patient care lifecycles, and overall patient satisfaction.

The following Connected Health solutions utilize the Medical-Grade Network and operate within the Cisco SONA framework to address many of the key operational issues facing business leaders today. Figure 4 depicts the solution framework, built on the Medical-Grade Network.

**Figure 4.** Cisco Connected Health Solutions



### **PCI for Healthcare**

Payment Card Industry (PCI) Data Security Standards dictate how companies need to handle credit cards to ensure the protection of each user's identity and finances. Ensuring full compliance with evolving credit card policies throughout a healthcare environment requires policies and services to not just protect identity data in motion but also identity data at rest.

Your existing Cisco technology can help you achieve compliancy while making it easier for your company to perform audits and expand healthcare systems. Rather than installing special standalone devices just to secure PCI data, the Cisco PCI for Healthcare solution utilizes the core security and storage services that are already in place for the overall security of information, but which are configurable for these specific requirements.

To learn more about how the Cisco PCI for Healthcare solution helps your company achieve compliancy by reusing flexible network services, visit:

[http://www.cisco.com/en/US/solutions/collateral/ns340/ns394/ns171/ns625/brochure\\_C02-462408-00.html](http://www.cisco.com/en/US/solutions/collateral/ns340/ns394/ns171/ns625/brochure_C02-462408-00.html).

### **Biomed NAC**

With the dramatic increase of healthcare devices that require network connectivity, your organization faces the challenge of connecting these devices while ensuring the security and reliability of the data that they provide. The Cisco Biomed Network Admission Control (NAC) solution provides a system to recognize appropriate devices, assign them to the correct logical network, and monitor behavior of all profiled devices to help ensure proper and safe operations.

The Biomed NAC system helps to capture critical data for EMR integration, improve diagnostic response times, increase network reliability, and reduce the number of overlay networks. Biomed NAC uses your existing wired and wireless infrastructure and your core security services, which can also be utilized for user-based NAC. These security services as part of the NAC framework can also be reused for user-level authentication as well as biomed devices.

To learn more about the Cisco Biomed NAC for Healthcare solution, visit:

[http://www.cisco.com/web/strategy/healthcare/all\\_medical-grade.html](http://www.cisco.com/web/strategy/healthcare/all_medical-grade.html).

### **Mobile Care**

Patient satisfaction is many times tied to the responses they receive when they have questions or concerns about their care. Utilizing the nurse call system from a patient bedside can yield long wait times as nurses track down the appropriate person to answer questions—which can be frustrating, at best, for the patient.

With Cisco Mobile Care, all clinicians can quickly connect using either text or voice alerts on their mobile devices. This not only reduces response time but also tremendously reduces the amount of overhead paging—in some hospitals by up to 85 percent. This solution reuses Cisco Unified Communications and mobility services that are components of other Connected Health solutions. Thus the same infrastructure built to support IP wired telephony can be used to support a new form of wireless telephony without changing the backend services.

To learn more about Cisco Mobile Care for Healthcare, visit:

<http://www.cisco.com/web/strategy/healthcare/mobility.html>.

### **Collaborative Care**

With increasingly diverse populations, hospitals must be able to communicate in more languages than ever before. In some hospitals, up to 60 percent of all emergency room visits require translation. A mechanism is needed to support not only the most common languages but also those spoken less frequently.

The Cisco Collaborative Care solution provides simple-to-use video technology to dynamically route video calls to a centralized translation service that provides 24-hour access to a wide range of language speakers. The service can connect a translator to any room in the hospital including the emergency room, patient rooms, and even hallways. Clinicians can simply bring a portable video telephony unit to their location and make the call over the secure wireless network.

To learn more about Cisco Collaborative Care, visit:

<http://www.cisco.com/web/strategy/healthcare/clinical-care.html>.

### **Connected Imaging**

The process of collecting, distributing, interpreting, and notifying physicians of medical imaging results is both time-consuming and complicated. This process can take hours, which is frustrating to both clinicians and patients. Because medical images are also a significant source of revenue for hospitals, improving this process not only increases productivity and satisfaction, it also yields greater profits.

The Cisco Connected Imaging solution simplifies this process and the underlying infrastructure required to transport, store, and back up images from various radiology devices across manufactures. The solution technology also improves application performance over WAN links, making it faster to access image data.

The second component of Connected Imaging focuses on a big challenge: the communication between specialists and primary care clinicians over imaging results. This communication can be both time-sensitive and technical. Cisco, working with McKesson and GE, has developed a rich collaboration environment that integrates directly into the radiologist's desktop. Collaboration tools include instant messaging and secure sharing of the desktop environment, so two remote parties can view and discuss an image together.

The solution is based on existing infrastructure, storage, and Cisco Unified Communication services, increasing the returns on your IT investments and the efficiency of your staff.

To learn more about Cisco Connected Imaging, visit:

<http://www.cisco.com/web/strategy/healthcare/connected-imaging.html>.

### **Context-Aware Services**

A hospital is a dynamic environment with equipment and resources moving throughout the healthcare system. Keeping track of assets, supplies, and resources is one of the most challenging aspects of a busy hospital environment. Cisco Context-Aware Services take asset tracking beyond just locating a piece of equipment. Using technology from key tracking tag companies, a context-aware system keeps track of both the location and the condition of assets, such as temperature and humidity level.

In addition the system knows if equipment is in use or idle, thus preventing a search for unavailable equipment. This solution dramatically improves productivity and reduces waste from lost resources or damaged assets. Cisco Context-Aware Services utilize existing mobility and Unified Communications services.

To learn more about Cisco Context-Aware Services, visit:  
<http://www.cisco.com/web/strategy/healthcare/mobility.html>.

## Summary

The portfolio of Cisco Connected Health solutions helps address many of the key operational issues faced by healthcare providers today. Starting with a robust foundation of wired infrastructure and extending it to enable wireless connectivity enables access to more accurate and timely information throughout the healthcare system. This empowers personnel to make better-informed decisions quickly and at a lower risk. Next, enabling real-time collaboration across entire business processes helps your business manage an increasing number of patients and active clinical staff.

By deploying these solutions, your business not only benefits from increased operational efficiency, but accrues additional cost savings and faster time to capability through the use and reuse of Cisco core services. Because Cisco Connected Health solutions and Medical-Grade Network utilize the network-based services described in the Cisco SONA framework, these solutions support business goals while achieving rapid return on investment.

## For More Information

To better understand how your network can become a strategic asset through reusable services, contact your local Cisco representative or visit:

[http://www.cisco.com/en/US/products/ps8222/serv\\_group\\_home.html](http://www.cisco.com/en/US/products/ps8222/serv_group_home.html).

Cisco Connected Health solutions are in widespread use by healthcare organizations worldwide.

For more information on successful implementations and best practices, visit:

<http://www.cisco.com/go/healthcare>.



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