Cisco Connected Imaging

Connected Imaging: Improve Medical Imaging Collaboration, Performance, and Workflow

Cisco Connected Imaging enhances collaboration among radiologists, physicians, and technologists in different locations and improves Picture Archive Communications Systems (PACS) performance and image availability.

Executive Summary

Healthcare organizations that want to provide high-quality healthcare and imaging services are facing new challenges from today's more complex imaging workflows, larger studies, and geographically distributed imaging services. Today, patient images can reside in multiple siloed locations that are not integrated and do not communicate with each other. This makes it very challenging for clinicians and technicians to easily access all of the studies for a patient—or in the case of clinical trials—a pool of patients, in a timely fashion. These factors create an urgent need for efficient communication and collaboration among radiologists and physicians in different locations. In addition, delivering more and larger image studies in a timely and cost-effective manner requires scalable image access, transport, routing, and storage.

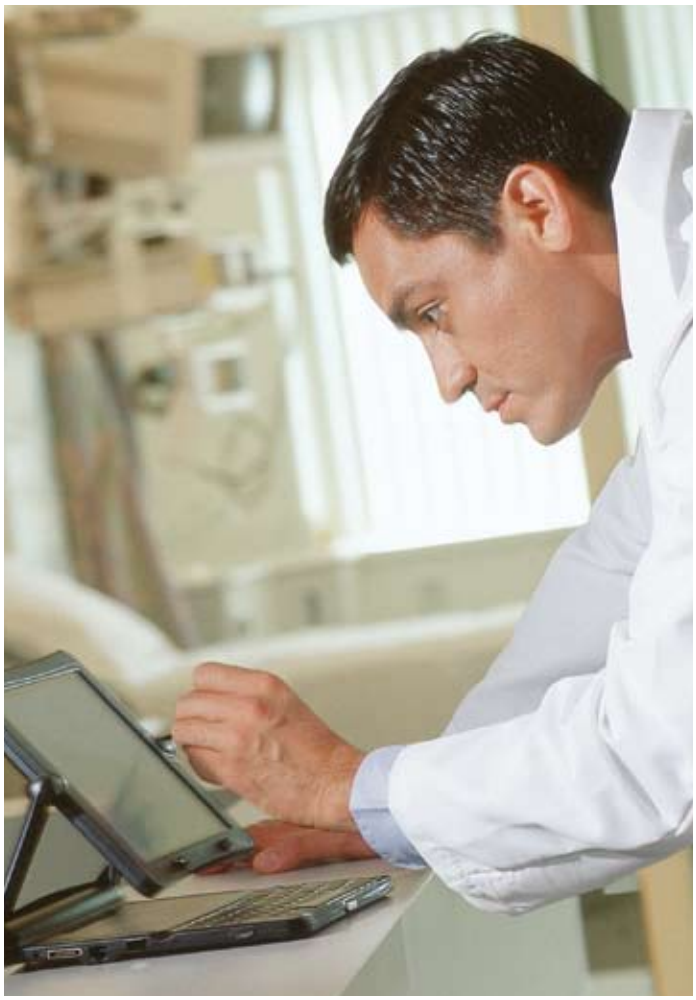
Cisco Connected Imaging combines technologies from Cisco and its healthcare partners to deliver imaging as a service from the foundation of the Medical Grade Network. Images are virtualized and optimized in a medical archive, making them available anywhere across a healthcare enterprise. This can dramatically reduce the overhead for extra storage in siloed imaging applications. And it can dramatically improve a clinician's access to data in a timely fashion, which ultimately reduces the time to diagnose images.

Connected Imaging has two main components: Collaboration and Reporting and Medical Image Architecture. Collaboration and Reporting facilitates and optimizes collaborative image interpretations, and helps manage the constant interruptions that can otherwise impede imaging productivity to improve the efficiency of radiologists, physicians, and technologists. Medical Image Architecture enhances the performance of the imaging infrastructure with an architecture that optimizes image access at a lower operational cost, which leads to more timely diagnoses.

New Challenges in Medical Imaging

Once confined to radiology departments, imaging services are now pervasive across all departments and clinical specialties. PACS and other advanced digital imaging services have become the standard for medical imaging, extending imaging services across multiple organizations, creating a set of new challenges:

- **Improving image access and lowering operational costs:** Most data today lives in proprietary silos, which is not cost effective. The application, network, and storage architecture must provide virtualized services from any location to manage growing image volumes, deliver imaging application services as needed, scale grid-based image storage, provide patient centric access to images, and protect networks and modalities from security threats. Imaging services are more cost-effective when healthcare organizations have a standards-based medical image infrastructure capable of delivering needed application, storage, and intelligent image routing services.
- **Enhancing physician relationships and collaboration:** With today's more complex image studies, faster paced interpretation environment, and delivery of interpretations to and from remote sites, radiologists need advanced collaboration tools to communicate easily and directly with technologists, physicians, and specialists. Radiologists capable of delivering collaborative consults can differentiate their services to their customers—the referring physicians.
- **Increasing productivity:** Healthcare organizations face a shortage of radiologists and technologists, whose productivity is compromised by constant interruptions. Radiologists need communications tools to help them manage interruptions and eliminate delays caused by poor collaboration.



The Cisco Connected Imaging Solution

Healthcare providers throughout the world are meeting these challenges with Cisco Connected Imaging, a suite of secure, scalable imaging solutions that improve productivity, lower operational costs, enhance collaboration, and increase the value of imaging services across the hospital imaging workflow. Connected Imaging solutions focus on improving the imaging infrastructure with the Medical Image Architecture, and enhancing workflow productivity with Collaboration and Reporting. Medical Image Architecture helps healthcare stakeholders answer the question, "How do I address the challenges of image volume growth with a cost-effective infrastructure?" Collaboration and Reporting promotes multi-specialty and multi-radiologist collaboration and results reporting for effective image consultations.

Medical Image Architecture

Image studies are increasing in volume and complexity, overburdening existing infrastructure and archive resources. For example, Computed Tomography (CT) scans are now hundreds of megabytes compared to 20 megabytes just a few years ago, consuming more application, network, and storage services. In addition, today's broadly distributed imaging services can be a multi-vendor PACS with an environment of silos of image data. Imaging modalities and infrastructures often reside in multiple disparate systems that are not integrated and do not provide a patient centric view of imaging. This makes it very challenging for any clinician or technologist to easily access all of the studies for patients in a timely fashion.

The Cisco Medical Image Architecture solution helps enable secure, fast, scalable imaging services by providing advanced application and storage virtualization, high performance networking, and intelligent image routing. Healthcare organizations that adopt the solution can intelligently route medical images based on clinical requirements, and can process each imaging study using the most available application services in any location. After processing, images are routed to their destinations based on clinical rules, and stored appropriately and cost-effectively based on care requirements.

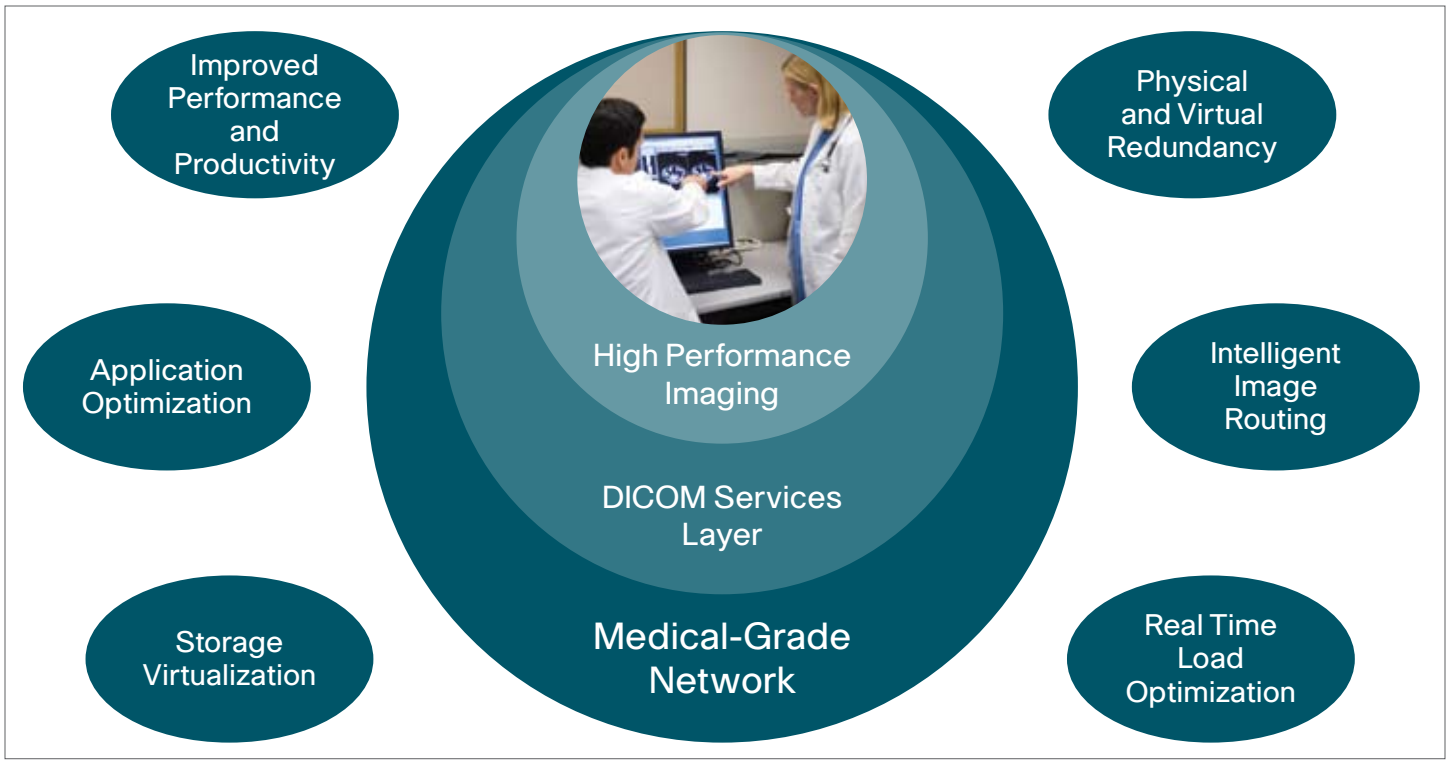
Case Study: Center for Diagnostic Imaging Performs 60 Percent More Scans, with Lower Costs

Challenge: The Center for Diagnostic Imaging (CDI) is a United States network of imaging providers. As the center added sites, it needed to ensure that the network could scale to accommodate increased image volume.

Solution: The center upgraded its network infrastructure to a Cisco Medical-Grade Network and deployed the Medical Image Architecture solution from Cisco and its partner Acuo Technologies. The solution helps enable intelligent image routing, optimizes image management and archiving, and improves PACS performance.

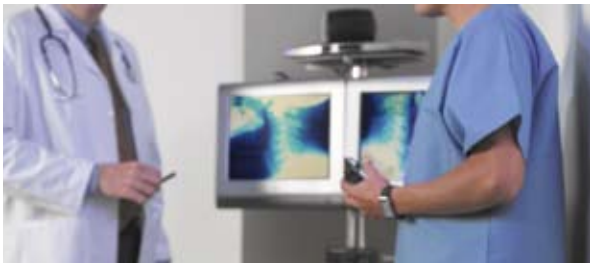
Results: CDI now has the capacity to provide imaging services to more than double the number of clinics, enabling more timely and accurate interpretation of images. The solution accommodated a 60-percent increase in image scans in 2007, even as film storage and transport costs decreased. Geography is no longer a barrier to business success. "The demonstrated success of our image management infrastructure has allowed us to offer high-quality consultations by more physicians, for more patients, than ever before," says Andrew Pip, director of IT, Center for Diagnostic Imaging.

Medical Image Architecture: Key Attributes Deliver High Performance Imaging



Cisco uses a Digital Imaging and Communications in Medicine (DICOM) standard services layer from its partners to provide intelligent image routing and access to grid-based images. And Cisco's integrated load balancing and virtualization ensures that images are stored and retrieved as quickly as possible. A resultant example is that a technologist can send a CT scan to PACS in less time, and radiologists can retrieve the study more quickly because the storage virtualization services deliver the images from the most available source. Cisco Medical Image Architecture virtualizes and optimizes the imaging infrastructure and creates an appearance of a virtual pool of images, making them available anywhere across the enterprise. Benefits of the Connected Imaging Medical Image Architecture solution include:

- Reduced patient scan times, increasing technologist productivity and improving patient satisfaction
- High availability, improving the efficiency of image access
- Improved security, traditionally a weakness of multi-vendor DICOM transactions
- Improved clinician access to data in a timely fashion which ultimately reduces the amount of time to access and diagnose images
- Lower operational costs by reducing excess storage in siloed imaging applications



The Benefits of Cisco Connected Imaging

Case Study: Banner Health Transmits Medical Images 300 Percent Faster

Challenge: Banner Health is a nonprofit hospital network with 20 facilities in the Western region of the United States. Remote sites store PACS images locally and also transmit them over the WAN to headquarters in Phoenix, Arizona, up to thousands of miles away. Banner Health wanted to centrally manage and deliver medical images, to increase physician productivity and avoid the need to staff its remote sites with specialized IT personnel.

Solution: Banner Health implemented a Cisco Medical-Grade Network and Cisco Wide-Area Application Services (WAAS), which delivers LAN-like performance over the WAN and enables centralized management.

Results: Banner Health physicians now experience 300 percent faster response times when they retrieve images over the WAN, improving their productivity. The network provides approximately 60 percent better capacity for PACS and other applications, reducing bandwidth costs. The 20 facilities each achieved payback on the investment in 1.3 to 6 months, and a remote site has already avoided US$8000 monthly for a T1 upgrade. Banner Health also expects to have an easier time recruiting top physicians to its rural facilities because of the excellent performance of the Cisco Medical-Grade Network.

Collaboration and Reporting

The increasing volume and complexity of image studies requires integration between communications and imaging applications to optimize workflow. The need is urgent:

- Imaging applications focus on data management and manipulation.
- In a 2006 study, the Joint Commission (JC) reviewed 3500 sentinel events and identified poor communication as the largest source of medical errors, present in 65 percent of cases.
- Radiologists and physicians spend valuable time just trying to find the correct number to contact each other.
- Interruptions while radiologists interpret complex studies can delay results and cause errors.
- Healthcare organizations need to meet stringent regulatory and audit requirements.

To improve communication, radiologists and referring physicians in different locations need to be able to utilize the appropriate communication tools based on the urgency and acuity of care. A complex study may require viewing the same image simultaneously rather than simply discussing areas of interest.

> "Today, radiologists waste a lot of time playing phone tag before they can reach the right clinician to communicate results. The productivity impact is significant when this happens multiple times per day."
>
> — Dr. Gary Wendt, Enterprise Director of Medical Imaging and Vice-Chair of Informatics, University of Wisconsin Madison, Department of Radiology

The Cisco Collaboration and Reporting solution enables effective, efficient image consultations with radiologists and physicians in any location, using unified communications and collaboration tools that are integrated with PACS. Cisco presence technology, for example, indicates whether colleagues are currently available and their preferred contact method at that time. This allows the radiologists to utilize the most appropriate communication method (voice, video, instant message, SMS text) to collaborate with physicians. Hence, radiologists spend less time simply trying to reach physicians. The technology also lets physicians specify when they do not want to be disturbed, reducing unwanted phone interruptions.

The solution also lets radiologists push specific images to referring physicians and share the same screen while they highlight the areas of interest. The ability to collaborate and share the same screen streamlines workflow to improve radiologist and referring physician productivity. In addition, no patient images are transferred, which eliminates privacy and latency concerns.

One of the key sources of value from the solution is the ability to capture and store an auditable record of results communication and acknowledgements between radiologists and referring physicians. This can help healthcare providers comply with increasingly stringent regulatory requirements.

> "After working with the Cisco team to develop the Tele-Radiology blueprint, I became a strong advocate of the Network as the Platform. It became clear that Cisco is serious about delivering network-based solutions that will help healthcare organizations like us deliver better patient care and services."
>
> — Mr. Fong Choon Khin, Group Chief Technology Officer, SingHealth

Benefits from the Collaboration and Reporting solution integrated with PACS include:

- Efficient and timely delivery of patient diagnoses
- Reduced time spent reaching physicians to provide results
- Ability to manage interruptions
- Ability to collaborate with physicians and radiologists independent of their locations
- Differentiated service appeal to referring physicians, because of collaborative consults
- Capability to capture and store auditable record of results communication and acknowledgement

The Foundation: Cisco Medical-Grade Network

Cisco Connected Imaging solutions operate over the Cisco Medical-Grade Network, a secure, scalable infrastructure that supports the secure transfer and management of large digital files, giving caregivers rapid access to clinical images and results. The Cisco Medical Image Architecture is part of the Cisco Medical-Grade Network. The standards-based architecture provides the resilience, protection, responsiveness, and interaction that improve workflow and operations, for increased productivity and cost-effectiveness.

Why Cisco for Medical Imaging?

- Cisco Connected Imaging provides the solid foundation needed to deliver advanced digital-imaging services, systems, and technologies.
- Cisco works with leading healthcare partners, including Acuo Technologies, Agfa Healthcare, GE Healthcare, and McKesson Medical Imaging Group, to deliver comprehensive, cohesive solutions.
- Cisco solutions enable healthcare organizations to take full advantage of their existing investments in PACS, networks, applications, and devices.
- Cisco Connected Imaging is backed by Cisco best-in-class technical support.

Find Out More

To learn more about Cisco Connected Imaging, visit: www.cisco.com/web/strategy/healthcare/connected-imaging.html

To read case studies from hospitals and clinics that have deployed Cisco Connected Imaging and other Cisco healthcare solutions, visit: www.cisco.com/go/healthcare

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