Healthcare organizations around the world continue to invest in radiology and cardiology Picture Archiving and Communication Systems (PACS) to predict, diagnose, treat, and monitor disease. They are also implementing Radiology Information Systems (RIS) to enable radiology departments to store, manipulate and distribute patient radiological data and imagery.

As healthcare organizations implement these clinical systems, they are facing increasing demands for high availability, increased security of protected health information (PHI), and challenged to deploy automated tools to reduce the cost and complexity of managing their expanding imaging environment.

Creating a highly virtualized healthcare IT environment is a critical initial step as healthcare organizations adopt cloud-based computing business models and IT-as-a-Service offerings. And as healthcare providers move along this journey, an important step is to create a virtualized infrastructure that support applications like RIS/PACS by providing the scalability, availability, information protection, and security that users of these clinical applications require.

**SOLUTION OVERVIEW**

The EMC® PACS Infrastructure Solution for Sectra RIS/PACS enabled by EMC Unified Storage and VMware® leverages a rigorously tested, reference architecture to help Sectra customers accelerate deployments with enhanced capabilities. Components of this solution include:

- **VMware vSphere™ 4.1**, a highly reliable platform for data center virtualization. It enables scalable and efficient use of server hardware in a robust, highly available environment
- **ESX™ server**: Abstracts server processor, memory, storage, and networking resources into multiple virtual machines, forming the foundation of the VMware vSphere 4.1 suite
- **VMware vMotion®** which provides the capability to move a running virtual machine from one ESX/ESXi host to another, eliminating the need to schedule application downtime due to scheduled server maintenance
- **VMware Storage vMotion** which provides the capability to move a running virtual machine from one storage device to another. It eliminates the need to schedule application downtime due to planned storage maintenance or during storage migrations
- **VMware DRS** which works with vMotion to provide automated resource optimization and virtual machine placement and migration, to help align available resources with pre-defined business priorities while maximizing hardware utilization
- **VMware HA** which provides easy-to-use, cost-effective, high availability for applications running on virtual machines. In a server failure, the affected virtual machines are automatically restarted on other production servers with spare capacity

**ESSENTIALS**

With this solution, Sectra RIS/PACS users can:

- Gain immediate access to patient images with enhanced availability, reliability, scalability, and performance
- Create a single, virtualized “pool of processing” to dramatically reduce IT capital investments
- Meet recovery-point and recovery-time objectives of business continuity/disaster recovery plans
- Secure patient records, confidential emails, and other communications
- Recall historical images rapidly and meet regulatory requirements for records retention
• EMC Celerra® unified storage system technology which is based on breakthrough architecture and extensive technological innovation, providing consolidated, multi-protocol storage to deliver solutions that enable healthcare IT organizations to meet requirements from the data center to remote clinics or imaging centers

• Celerra Replicator (V2) which enables you to create and manage replication sessions, each producing a read-only, point-in-time copy of a source object at a designated destination.

• LUN migration which enables users to seamlessly migrate data between LUNs within an array without disruption to applications

• EMC Unispheretm Analyzer which gathers storage-system performance statistics and produces charts of the data

• Enterprise Flash Drives which deliver extremely high performance, and are recommended for applications that require fast response times or very high throughput (IOPS). Migrating LUNs from FC to Flash Drives can both boost performance and create significant energy savings

• Celerra File Level Retention (FLR) which is a Celerra Network Server software feature that protects files from modification or deletion until a specified retention date

As depicted in Figure 1 below, this integrated, validated solution included replicated EMC unified storage platforms. These EMC tiered-networked storage platforms provide high availability, reliability, scalability, and performance needed by clinical end-users.

By employing a small number of EMC Enterprise Flash Drives (EFDs) on the array, the solution can provide a better performing and cost-effective alternative to employing traditional practices of high spindle counts and short-stroking disks to service I/O requirements. With the addition of EMC EFDs, read throughput could be nearly double what it is on Fibre Channel drives, while write throughput remains fairly constant on EFDs, a significantly improvement over traditional FC as I/O volumes increased.

The EMC PAC Infrastructure Solution for Sectra RIS/PACS runs in a VMware virtualized environment and provides high availability, disaster recovery responsiveness. This is accomplished in part by running the environment across two ESX servers. If one of these servers for any reason had a reboot command issues from vCenter, all virtual machines that were hosted on that server would move to the second server in the cluster and each Windows virtual machine would restart. Once all services are validated as having started and the
database is available, the Sectra RIS/PACS application would be fully operational again. The entire failover process can take as little time as a few minutes from the simulated point of failure.

With EMC unified storage and Unisphere management capabilities, it’s simpler and easier to meet rapidly growing demand for storage capacity and I/O requirements. For example, using Unisphere, a LUN migration operation can be initiated to move a LUN from FC drives to EFDs with no negative impact to the application while the migration is taking place.

EMC information management and protection software helps attain recovery-point and recovery-time objectives for business continuity and disaster recovery plans. Active archiving components provide secure and rapid recall of historical images with Sectra PACS.

EMC Celerra Replicator provides efficient, asynchronous data replication over Internet Protocol (IP) networks and is used by this solution for the archiving file system. Celerra File Level Retention policy (FLR-compliance) enables retention policies to be set on files/folders using the FLR toolkit. Active archiving platforms from EMC can be integrated easily with this solution to provide secure and rapid recall of historical images and meet regulatory requirements. EMC Centera® enables a single, tamper-proof archive that addresses capacity, scale, distance, and management challenges. Atmos®, EMC’s purpose-built cloud storage platform, is a multi-petabyte offering for information storage, distribution, and archiving, combining massive scalability with automated data placement to help healthcare providers to efficiently deliver medical images and related content and information services anywhere in the world.

**SOLUTION VALUE**

The EMC PACS Infrastructure Solution for Sectra RIS/PAC enabled by EMC Unified Storage and VMware delivers a virtualized infrastructure for Sectra customers, one that economically delivers highly available applications. EMC solution components when combined with clinical application software from Sectra deliver 24x7x365 information availability and protection to enable continuous hospital operations. Benefits include:

- Tiered-networked storage platforms that provide the availability, reliability, scalability, and performance needed by the healthcare enterprise and clinicians seeking immediate access to patient images and information
- Server virtualization to dynamically map computing resources to the healthcare enterprise, resulting in reduced IT costs due treating the data center as “a single pool of processing”
- Information management and protection software to meet recovery-point and recovery-time-objectives for business continuity and disaster recovery plans and help maintain the privacy and security of patient records, confidential emails, and other communications
- Active archiving components to provide secure and rapid recall of historical images and to meet regulatory requirements for records retention

This information infrastructure, built for reliability, supports both short-term access and long-term image archiving and can be integrated with cardiology, radiology, and other clinical and business systems to automate workflow and streamline operations.