

# Achieving Cost-Effective, Vendor-Neutral Archiving For Your Enterprise

## How To Merchandise Data for Clinical Use

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Healthcare providers faced with burgeoning volumes of medical data have two key challenges:

- 1) Creating a secure and scalable vendor-neutral repository that can store imaging studies and a diverse array of patient information; and
- 2) Equipping on-site and off-site clinicians with rapid access to patient-centric information that can enhance care in any environment and image-enable existing electronic medical record (EMR) systems.

This paper outlines the key requirements for an efficient enterprise-wide clinical data repository and describes how access to relevant patient data and efficient data sharing can impact cost efficiencies, staff productivity and patient care. In addition to discussing on-site archiving solutions, we will also describe the option of purchasing a remotely hosted archiving service. This software as a service (SaaS) model carries a fee-for-use basis that can reduce overall expenses, provide expert IT resources and protect against equipment obsolescence.

## Identifying Challenges a Modern Repository Must Address

### Consolidating islands of storage

Healthcare providers often have dozens of specialized archiving systems. These dedicated systems increase acquisition and maintenance costs, while making it difficult to share information. Data silos can be so fragmented that even a simple task such as knowing the storage utilization status, or balancing storage across different departments, can be impossible. Replacing all of these systems is not financially feasible, but establishing a vendor-neutral, enterprise-wide repository that serves multiple departments can

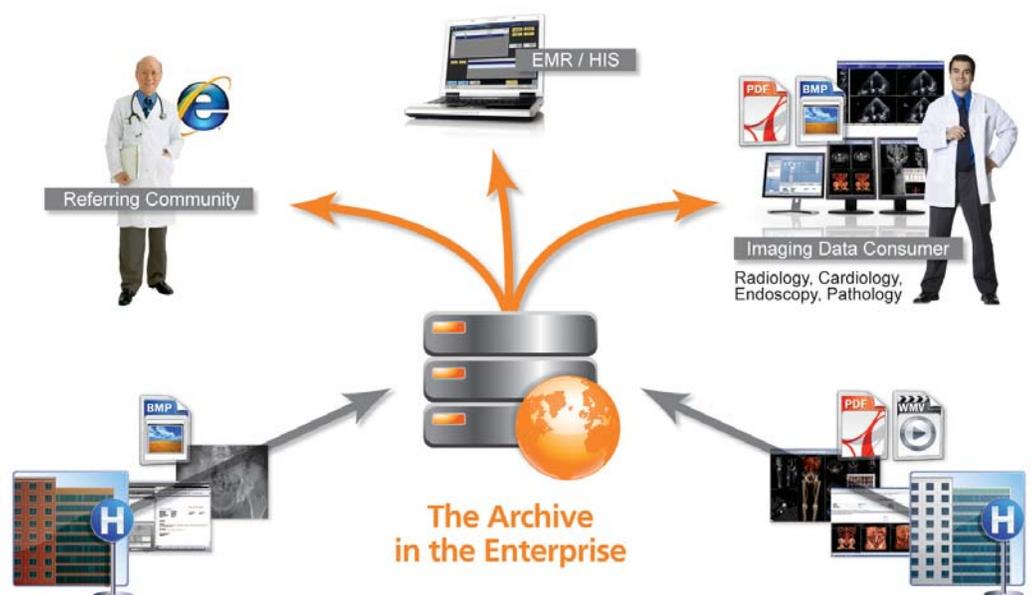
eliminate future purchases of application-specific storage archives and gradually achieve consolidation of data.

### Establish centralized access to diverse patient data

Storage silos with legacy architectures make it difficult for clinicians to access patient data scattered across the enterprise. In most healthcare systems, images may be located and accessed through departmental PACS systems (radiology, cardiology and others) while related patient documents such as lab reports, video files, JPEG images and other content are stored in HIS/RIS applications. Typically data needs to be accessed from each system, which makes the process of collecting pertinent patient information both difficult and time consuming.

### Lifecycle management redeploys storage space

Information lifecycle management software is an important asset for any data repository. This software manages data by applying storage rules defined by local regulatory requirements and the storage resources of each healthcare organization. Rules are specific to the type of



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exam since pediatric and mammography exams, for example, may need to be retained for longer periods than chest or extremity exams. This management process automatically deletes exams that no longer need to be stored and allows that space to be reused. This optimizes the return-on-investment for the storage infrastructure.

### Scalability enables greater flexibility, cost savings

Archive architectures need to be modular and easily expandable to allow users to purchase the solution that meets today's requirements, while providing the flexibility to add more storage, computing power and connections as their needs evolve.

### Built-in data security and business continuity/data recovery

In addition to security features, every medical archiving solution needs to be designed with business continuity and data recovery in mind. Government regulations worldwide require healthcare providers to meet standards that restrict data access to authorized users and guarantee backup copies of data that can be used in the event of an emergency or natural disaster. For maximum functionality, these capabilities need to be built into the original archive design.

### Embedded migration management can reduce costs

While medical data must often be stored for many years, IT and storage technologies are often replaced every three to five years. Consequently, data is often migrated several times during its lifecycle. Modern storage solutions should be capable of integrating next-generation storage hardware and migrating data in a managed, automated, and secure way. New architectures also support the ability for storage arrays to be joined as an additional seamless tier next to existing legacy storage—which avoids data migration.

### Industry restructuring creates large-scale implementations

Like other industries, the healthcare industry is restructuring through mergers, large private consortiums, and government-driven regional or national medical archive projects. This trend increases the need for large-scale solutions capable of delivering patient-centric data access to multiple facilities and locations, along with advanced features such as multi-site data synchronization.

## Steps Required to Merchandise Data for Clinical Use

Implementing a fully featured data archive addresses one side of the equation; the other side is effectively merchandising the data for clinical use. Storage systems play an important role in delivering complete, accurate clinical information into the hands of healthcare professionals. Rapid access to relevant patient data can help enable a faster and more accurate diagnosis—and can ultimately enhance the quality of care.

Optimal clinical information management requires an archiving architecture that:

- Collects information from one or more sites or institutions
- Consolidates information related to each patient into a single patient portfolio
- Ensures information is accurate and up to date
- Shares information with authorized clinicians regardless of where they are located
- Can image-enable an EMR.

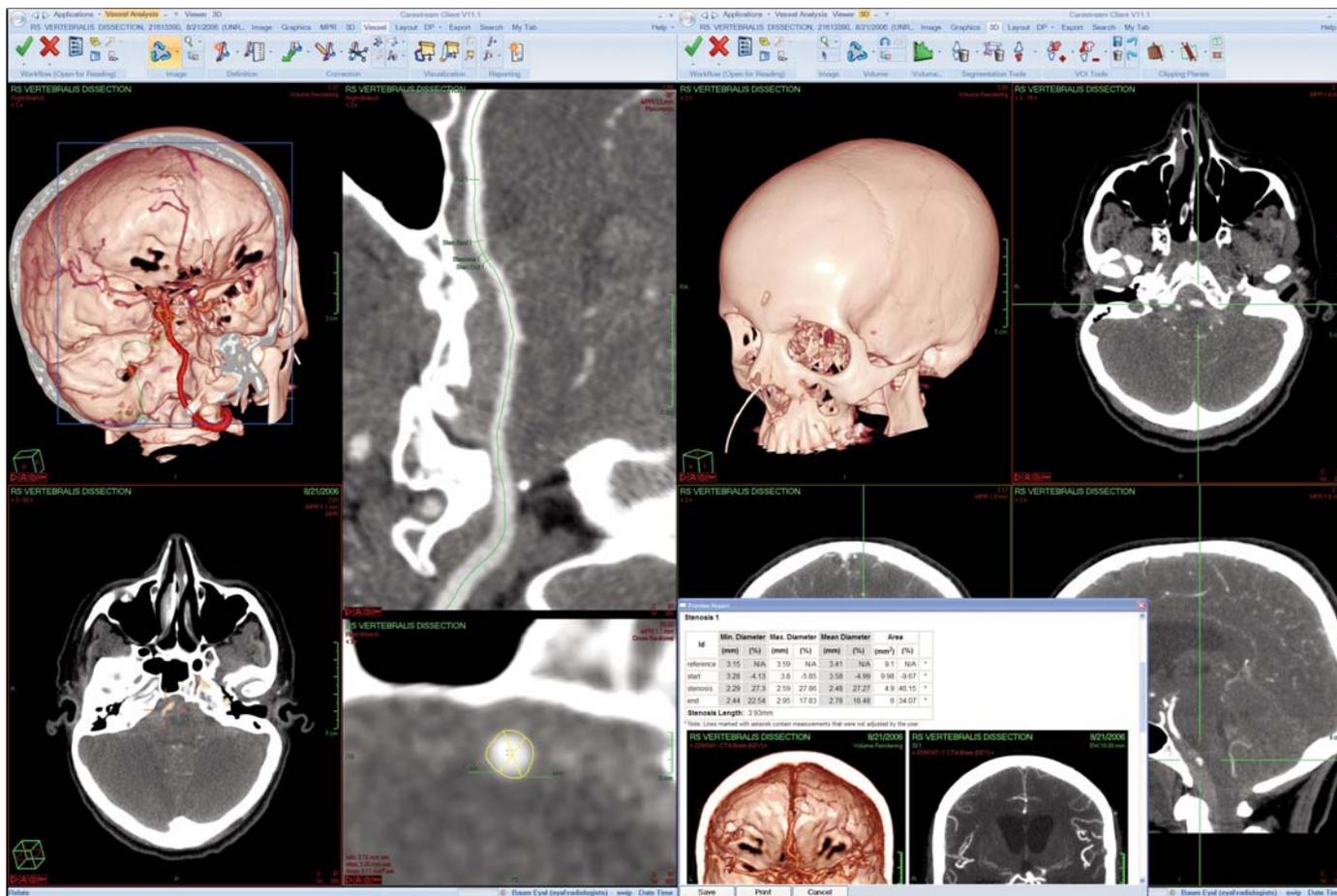
### Collecting information requires support for industry standards

Effective information management requires the means to connect to—and collect—information from many different clinical systems. Integration among information systems has always been a challenge, but the healthcare industry has set up initiatives such as IHE (Integrating the Healthcare Enterprise) that permit more efficient integration through standards such as DICOM, HL7, XDS, PIX and others. Any healthcare information management or archiving platform should support these standard protocols and the related integration scenarios (known as IHE profiles). These platforms should also support general use interfaces that include transport-level industry standards such as FTP, CIFS and NFS.

### Creating a single patient portfolio

Collecting information does not automatically improve user access. Achieving more efficient access requires an intelligent platform that can recognize relationships between documents and systems and then consolidate information related to each patient into a single portfolio. This patient portfolio contains documents from multiple specialties, created in different formats,

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*A modern clinical data repository offers access to the entire patient record, including clinical images as well as other types of records.*

and acquired using multiple protocols. It can involve patient symptoms and medical history, radiology and cardiology exams, laboratory, pathology and radiology reports, and other data. Linking data with metadata creates a user-friendly clinical data repository, which delivers greater value to the healthcare organization and ultimately the referring physician and his or her patient. Tag morphing and other sophisticated techniques are employed to facilitate interconnection between incompatible devices.

Consolidation faces a completely new challenge when the scope involves regional or national archives. Because the connected institutions are not always using a common patient identification domain, it becomes difficult to recognize how disparate documents relate to the same patient. This is another example of an industry-specific challenge for long-term archive systems: an effective clinical data archive must communicate with a Master Patient Index system to reconcile patient identifiers and their documents.

## Delivering accurate, updated information

Keeping information current requires synchronizing information from several interconnected systems. The recommended methodology is to define master reference systems, usually the HIS or RIS. Participants then receive and mirror updates from these master systems.

## Sharing information efficiently among remote users

It's important to share consolidated patient information with all applications including systems that produced part of it, and even with systems that did not produce data but present it. Integration between systems using IHE standards is crucial. Multi-site healthcare systems, as well as regional and national networks, need an information management solution to share information efficiently with authorized users at any remote location, including homes and offices.

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## EMRs need to include images

Most EMR systems are designed to support a diversity of data types and sources, but they do not include imaging studies, which represent a significant role in a patient's medical record. Therefore, any imaging storage architecture must be able to efficiently communicate with a healthcare system's EMR so that clinicians gain a holistic view of a patient's history and current condition.

## CARESTREAM Clinical Data Archive Meets Evolving Needs

The CARESTREAM Clinical Data Archive is a scalable, vendor-neutral repository that collects and receives images and data from a variety of systems such as imaging exams, lab and pathology data, video files, JPEG images and others to create a cohesive patient portfolio. Users gain rapid access to patient-centric information—regardless of the location of the data or the clinician. Data is also synchronized to ensure that it is accurate when viewed, and this platform easily integrates imaging studies into an EMR. To further enhance user productivity, the archive employs extensive tag morphing rules that standardize the way data is presented throughout the enterprise. Communication with other systems is enabled through support for DICOM, HL7 and XDS, as well as various IT standards.

The Clinical Data Archive supports a wide range of architectures and infrastructures, from departmental and multi-site archives to regional and national medical archive projects. Because it is fully scalable, installations can be expanded easily and affordably. Archive nodes can serve as backups for each other, creating an imaging grid that supports business continuity. Specialized management tools allow viewing of data at any level to reduce administrative costs and enable remote, web-based management of the archive.

It applies clinical information lifecycle management to the data based on clinical attributes such as the type of medical document, the type of imaging exam conducted, and the patient's age. This solution is vendor-independent because it supports all types of storage technologies in any mix, from optical DVDs or standard tape libraries to RAID, content addressed storage (CAS), or virtual tape libraries.

Carestream Health's encryption and security measures meet rigorous patient privacy regulations used by countries across the globe. The platform's multiple tiers of security mechanisms ensure data is accessed only by authorized individuals. It also provides monitoring of security threats and protects the system from tampering.

In conclusion, the CARESTREAM Clinical Data Archive is a powerful and flexible solution that satisfies the information management challenges of an evolving healthcare industry. It also reduces operating costs while enhancing patient care. Its advanced functionality is best evidenced by its implementation at some of the largest healthcare systems and HMOs in the world.

## eHealth Archiving Services Offers SaaS Model

The same functionality of the CARESTREAM Clinical Data Archive is also available in the form of a SaaS solution called eHealth Archiving Services. Purchasing archiving capabilities as a fee-per-use service lowers total cost of ownership by reducing the investment in capital equipment, security technology and management personnel. This cloud-based service also eliminates the danger of equipment obsolescence since Carestream Health continuously maintains and upgrades its data centers and on-site technology.

The company's eMS cloud currently has more than 1 billion stored images worldwide, representing more than 500 terabytes of data. The company operates eight data centers in five countries throughout Europe and North America, with new centers planned for Japan and Argentina.

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