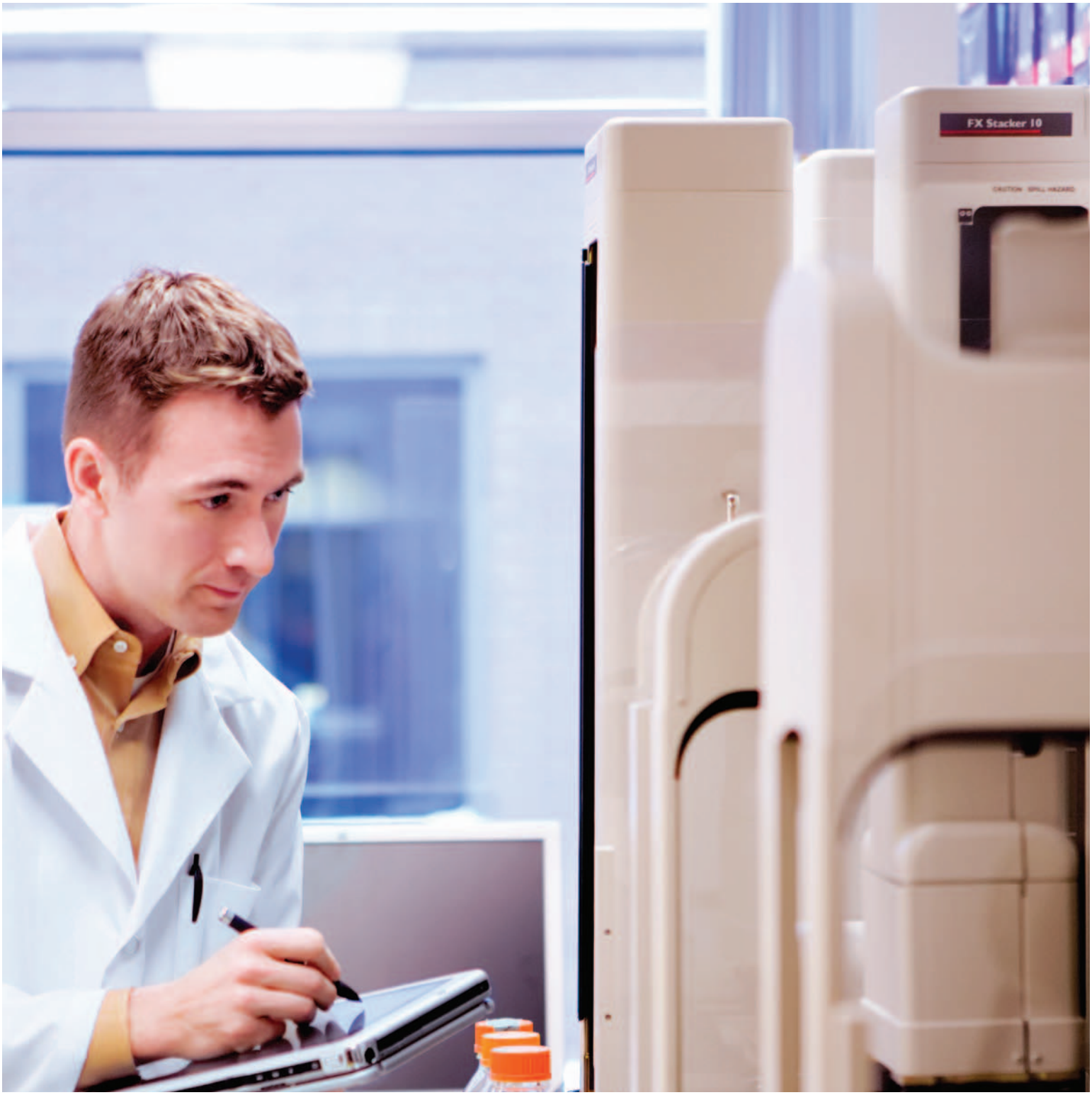


Information Lifecycle Management for healthcare

Improving information flow enhances quality of care

The value of ILM for healthcare enterprises

- Gain efficient access to complete patient information.
- Improve medical collaboration.
- Meet compliance requirements for security and retention.
- Enhance business agility and competitiveness.
- Reduce the costs of storing and managing medical information.
- Ensure disaster recovery and business continuity.
- Keep up with technology changes with less disruption and cost.

Gaining better control of medical information

The healthcare industry is in the midst of a fundamental transformation in the way medical care is delivered, tracked, governed, and paid for. Overriding issues such as quality of care, cost reduction, pay-for-performance, patient satisfaction, and regulatory compliance drive the need for greater information access and analysis. Yet, increasing organizational complexity, rapidly growing volumes of data, security regulations, and a broad disparity of systems and file types often stand in the way of gaining the full value of information to address these issues.

Many healthcare enterprises have invested in highly sophisticated technologies to improve diagnosis, treatment, and management of patients. Typically, however, these technologies have been deployed on a departmental basis, resulting in a patchwork of systems—from admissions and finance, to radiology and cardiology, to the lab and pharmacy. In addition, there are a myriad of communication records ranging from physicians' notes and patient correspondence to insurance forms and EDI submissions. Managing and sharing information across multiple disconnected systems and departments can be slow and cumbersome, making it difficult to coordinate care, understand the costs associated with complex diagnoses, and generate a comprehensive health record for each patient.

In today's demanding and dynamic healthcare environment, new solutions are needed to leverage the full range of medical information more effectively and efficiently. Best-of-breed interfaces and integrated systems are beginning to address the need for consolidated patient data. But there are other challenges: Medical policies and government regulations, such as HIPAA, often dictate that patient information be securely retained for extended periods of time—in some cases, forever. And the enormous volume and variety of information required for both immediate reference and long-term retention continues to mushroom.

So, how can you maintain a common point of reference for each patient that draws from clinical information systems, financial systems, lab and pharmacy systems, and sometimes even paper records? How can you efficiently store and manage such a broad array of information as its value and relevance changes over time? And how can you ensure that patient records are properly secured and protected, yet still easy to find and retrieve when needed?

A key requirement for addressing these issues is to move away from an infrastructure of disparate systems and data to an infrastructure of knowledge. HP can help ease this transition with Information Lifecycle Management (ILM) solutions.

Asante saves thousands each day with automated archiving

Asante Health System is a not-for-profit healthcare system that provides comprehensive medical care to more than half a million people throughout the Southern Oregon and Northern California regions. Asante has built a strong reputation for quality care and continues to invest in highly qualified people, new technology and modern, comfortable facilities.

In keeping with this commitment, Asante launched an initiative in 2005 to eliminate film and digitize everything from x-rays and MRIs, to CAT scans and more. With such a major undertaking, however, the organization knew it would need a storage environment that could scale and protect this critical medical information for the long term.

In evaluating its options, Asante set some criteria for the type of storage solution needed to support its Picture Archiving and Communications System (PACS) initiative. With PACS data growing at a minimum of five terabytes per year, and regulatory requirements for retaining data for decades or longer, flexibility and the ability to out-live technology changes were key considerations. In addition, Asante wanted a solution that could deliver the high levels of availability necessary to support critical care. Asante found the ideal solution in the HP Medical Archiving Solution.

With the Medical Archiving Solution, Asante has been able to eliminate the need for expensive and labor-intensive backup administration while gaining solid protection and disaster recovery for its PACS data. The health system has not only realized dramatic financial savings in the process, but also improved accessibility for healthcare providers, leading to higher quality of care and increased patient satisfaction.

"By moving entirely to a digital environment, we needed a solution that would grow, but that would also not impose increased administration requirements on our IT staff," says Michael York, Senior System Engineer at Asante. "We also did not want to perform backups on data that was static, like PACS images. By storing PACS images on the Medical Archiving Solution, we've been able to save thousands and thousands of dollars each day by eliminating any manual intervention required to manage the files. The solution has been completely hands-off since implementation—the storage and indexing of all the images are managed automatically by the archive. We can also grow easily and economically by simply adding another storage node, and it is automatically recognized and integrated into the archive environment."

"The greatest impact has been on the quality of patient care," notes York. "Care givers no longer have to wait for the x-ray to be located and physically carried from one part of the hospital to another. Instead, the image is available virtually instantaneously to anyone, anywhere in our network. The Medical Archiving Solution also provides built-in disaster recovery and self-healing to ensure that data is always there. We set rules for the archive so that two copies of each PACS image are written simultaneously to multiple sites. If one site should go down for any reason, we can fail over to the other site in just minutes and maintain availability of the images for patient care.

"The archive is smart, too," he added. "It automatically detects if anything happens to the data and, by maintaining multiple copies of the data in multiple locations, will automatically replace the corrupted data with a known good copy to ensure data consistency. That's essential for delivering quality care."

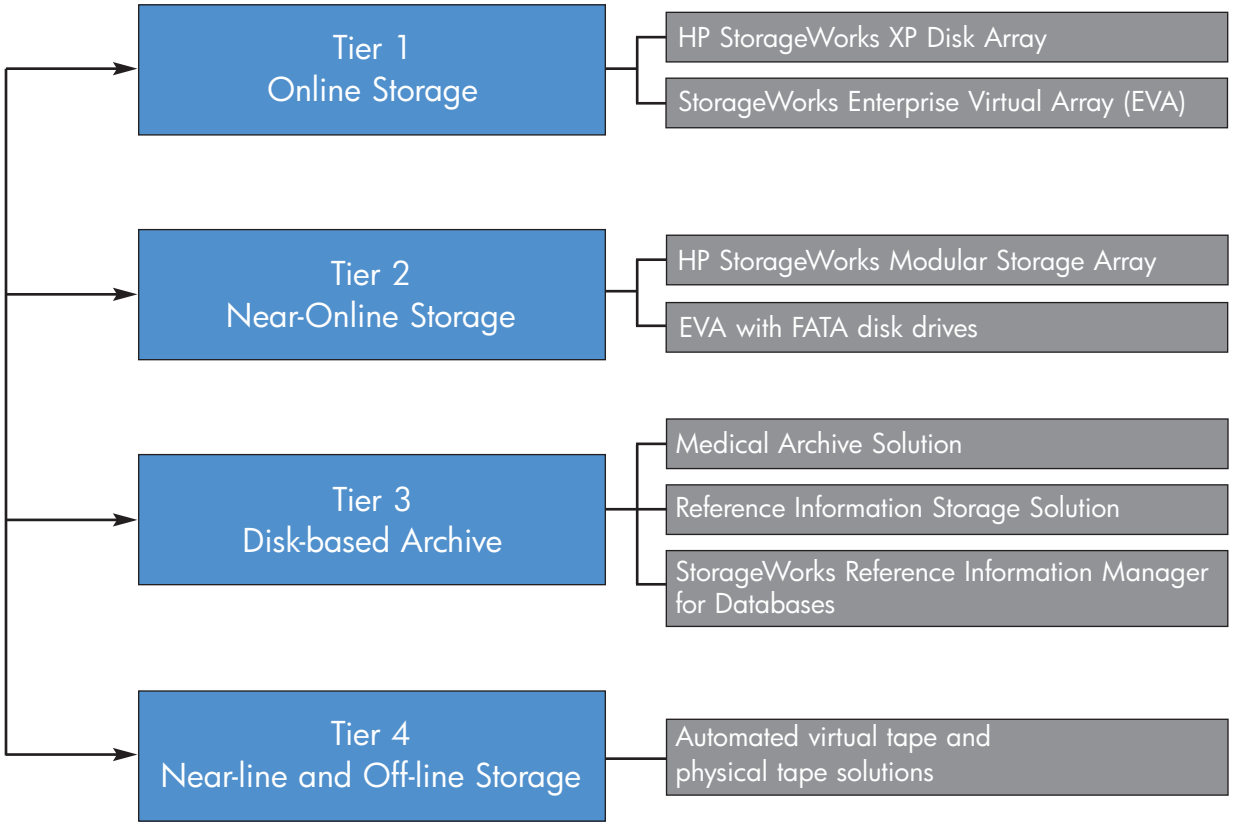
ILM solutions from HP simplify the challenges of data management

ILM is comprised of solutions and services that capture, manage, retain, and deliver information according to its relevance. It is more than just storage—ILM is a strategy for handling medical information from initial examination and throughout the patient's life. ILM solutions from HP take into account the value of each health record and archive data on the most appropriate platform based on automated business policies—ensuring split-second accessibility by placing actively referenced information on the highest-performance disk, while securely retaining infrequently accessed files on more economical systems.

ILM helps you put medical information to work more effectively by creating a universal pool of storage that can support multiple departments, modalities, applications, and locations. Instead of storing information on a departmental basis, you can store it based on patient ID.This approach means that active clinical, lab, and pharmaceutical information for a patient can be accessed and shared more quickly. Archived patient records easily can also be referenced. Even independent data from medical libraries and clinical trials can be efficiently cross-referenced. As a result, administration as well as diagnosis and treatment become more efficient. Patient satisfaction levels rise. Clinicians are no longer impeded from viewing the composite patient history. Departmental barriers to integrated patient records are eliminated by generating a storage pool. System management costs are reduced through consolidation of storage silos. And, most important, quality and continuity of patient care improves.

Imagine, a complete patient record at your fingertips whenever and wherever it is needed. Rather than being consumed by the wave of new medical information being generated, you can be empowered by it—to provide faster, more precise, and more effective diagnoses and treatments. While technologies continue to change and cost reduction pressure continues to mount, with ILM solutions you can respond with agility and embrace change as an opportunity—not an obstacle.

Tiered storage infrastructure



Building on a tiered storage infrastructure

The underlying infrastructure for ILM consists of storage tiers; each is designed to meet a particular retention, protection, and accessibility requirement. For example, active clinical data and PACS images necessary for the immediate care and treatment of a patient would reside on the highest-performance online media with 24 x 7 availability. Following acute care, some patients may need periodic follow-up visits; however, their records may not need to be retrievable instantly. This less-frequently accessed information can be stored on "near-online" media, offering lower cost while still providing rapid retrieval and secure protection.

A patient may only return once a year or not for many years, yet all of the patient's historical records must still be readily available. This reference information can be archived on lower-cost storage media for secure long-term retention, yet indexed for easy retrieval. As information ages, it may be stored on tape for indefinite periods of time—fully protected and stored off-site with complete disaster recovery.

To make it easier to continuously align the right storage media with data as its value decreases over time, data migration software from HP automates policies for moving data between storage tiers. This facilitates the elimination of system management bottlenecks and reduces the need for manual intervention to perform repetitive tasks. The key to maximizing the value of this tiered infrastructure, is implementing policies and software to move information automatically from one storage tier to another.

ILM solutions from HP

HP offers a full suite of storage solutions and services to enable ILM for your healthcare enterprise.

Tier 1 online storage
At the highest end, the HP StorageWorks XP Disk Array family provides enterprise class online storage that delivers state-of-the-art reliability and always-on availability for critical patient information where downtime is not an option. Advanced virtualization technology on the XP array simplifies information lifecycle management, and with support for up to 32 petabytes of external storage, XP systems can easily grow to manage massive amounts of medical information.

HP also offers the StorageWorks Enterprise Virtual Array (EVA) family for the top-tier online storage. EVA systems provide high performance, high capacity, and high availability virtual storage that conserves space and reduces costs compared to traditionally architected approaches.

London Health Sciences Centre improves quality of care with instant access to PACS data

London Health Sciences Centre (LHSC) is a leading academic health sciences center in Canada, a regional referral and trauma center, and part of a network of healthcare and community partners across Ontario. Each year LHSC's staff of more than 9,000 manages over one million patient visits. To deliver high quality care for each patient, LHSC's care providers rely on fast, reliable access to patient medical records, including Picture Archiving and Communications System (PACS) images.

LHSC previously stored all of its radiology PACS images on a combination of DVDs and tape, but retrieving images from these media could take two to three minutes. What's more, these technologies represented two distinct architectures that were difficult and costly to expand. Instead, LHSC wanted a single, scalable architecture that could cost-effectively support its rapidly growing volume of radiology PACS images.

As a solution, LHSC replaced its DVD and tape technology with an ILM solution using a combination of high-performance StorageWorks Enterprise Virtual Array (EVA) systems for Tier 1 storage and the HP Medical Archiving Solution for secure, cost-effective long-term archive. As a result, care providers can now retrieve PACS images nearly instantaneously, even as the volume of images grows each year. In addition, LHSC has an archive solution that can meet strict regulatory requirements for decades-long data retention and protection while saving thousands of dollars by moving data off of more expensive Tier 1 storage as it ages. And they have a flexible solution that can be applied to multiple applications beyond PACS, including all types of electronic medical records, while also adapting to new technologies without costly and disruptive hardware migrations.

"We needed a single architecture for archiving medical data that was expandable, had a long lifecycle, and could respond to the critical needs of our care providers," said Diane Beattie, Integrated Vice President and CIO at LHSC and St. Joseph's Health Care, London. "The HP Medical Archiving Solution meets all of those criteria, and more. Two to three minutes is a long time for a clinician to wait for an image, but with the Medical Archiving Solution, they can be retrieved in a fraction of a second. That's critical for improving patient care and satisfaction. In addition, with a central archive, we can retrieve images from any location for better collaboration among physicians in our partner network. That can often help us avoid using critical resources that aren't really needed, such as keeping a patient overnight because a local radiologist isn't available That's expensive and adds a lot of worry to the family and the patient. With the Medical Archiving Solution, we can pull an image into London where there are a number of radiologists who can read the x-ray and consult directly with the physician in one of our partner facilities. As a result we can provide access to care much quicker and much more effectively."

"Because of the grid architecture, we can keep copies of the images in multiple locations for secure data protection and disaster recovery," added Peter Gilbert, Director of Information Technology Solutions at LHSC and St. Joseph's Health Care, London. "And the flexibility of that architecture allows us to adopt new hardware technologies without affecting data availability. To us this is huge because we don't have to take the archive devices offline to move data. That kind of project could cost us several hundred thousand dollars every three years. And in a healthcare environment, it's unacceptable to have medical records unavailable for a day while we migrate them. Instead, migration is a function built into the MAS and it occurs in the background without users even knowing it's happening. This is essential to meeting the needs of our healthcare providers: instant access to critical clinical data at the exact time it's needed."

Information at this tier is protected using a combination of snapshot, clone, and mirroring technology to enable non-disruptive backup and instant recovery—meeting the zero-downtime requirements of your most critical information. And with remote replication, HP can help you set up a multi-site recovery solution to ensure business continuity even in the event of a disaster.

Tier 2 near-online storage

As a lower-cost option for near-online storage, HP offers the StorageWorks Modular Storage Array (MSA), which can be easily integrated with both the XP and EVA systems. MSA arrays support both SCSI disk and low-cost SATA disk, making them an economical, high-capacity solution for storing information that does not require a high degree of I/O performance, yet can provide rapid access whenever needed. Additionally, EVA with FATA disk drives is an excellent alternative for customers who have purchased this array. The HP family of network-attached storage servers offers another important option when you need a Tier 2 solution.

Tier 3 disk-based archive

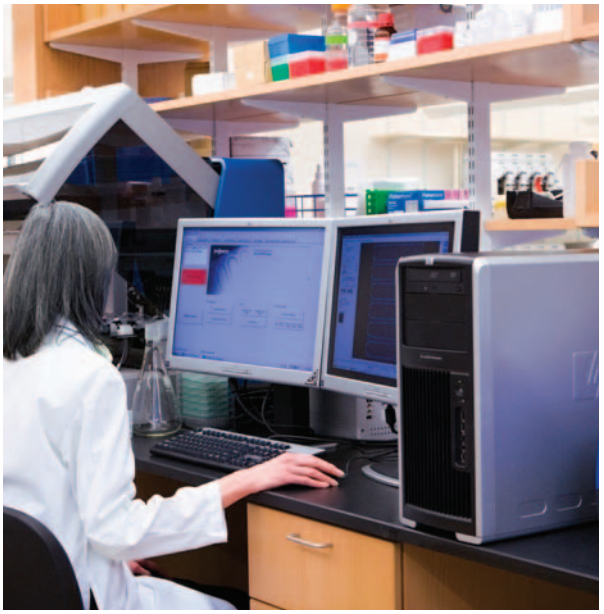
To store and protect reference information, HP offers a range of disk-based archive solutions, including:

- Medical Archive Solution – a grid-based solution for efficient archive and rapid retrieval of PACS images, clinical data and patient health records, designed to span multiple sites and applications,
- Reference Information Storage Solution – an active-archive for email (Microsoft Exchange and Lotus Notes) including Microsoft Office documents and other attachments,
- StorageWorks Reference Information Manager for Databases – an ILM solution that improves database application manageability.

All of these archive solutions provide online accessibility that is fully indexed and searchable, and all are seamlessly integrated with your existing information network. Patient information can be accessed quickly and easily for decades. Archive solutions from HP also facilitate simple upgrades to the latest technology, providing cost-effective protection from hardware obsolescence. Ultimately, active archives play a critical role in not only improving the quality and efficiency of patient care but also in meeting stringent requirements for security and long-term data retention.

Tier 4 near-line and off-line backup

For indefinite long-term off-site backup and archive, HP offers automated virtual tape and physical tape solutions. Our virtual tape solutions use tape emulation to enable seamless integration into current tape-based data protection environments. Automated tape libraries from HP are based on the StorageWorks Extended Tape Library Architecture (ETLA), which provides improved backup and restore reliability by insulating the tape library from the SAN, and enables simplified backup through more automated management of the entire library.



Cost-effective archiving and access for medical information

With the volume of medical information growing exponentially year after year, effective archiving has become imperative for healthcare enterprises. The HP Medical Archive Solution (MAS) is designed to address your most pressing information issues—simply, flexibly, and affordably.

Our MAS is a comprehensive out-of-the-box solution comprised of hardware, software, and services. It incorporates industry-standard application programming interfaces (APIs) such as CIFS and NFS, so the solution connects directly to your existing PACS with no special programming. Because the MAS is implemented in a storage grid architecture, you can consolidate information from multiple applications, departments, and facilities into a single, unified storage system for all fixed medical content generated by your enterprise—including lab results, patient charts, and PACS images. A built-in rules engine allows you to create policies for moving information from higher tiers of storage to the medical archive automatically, based on time, data classification, frequency of access, or other parameters.

Non-disruptive upgrades and expansion
Leveraging a grid architecture, the HP MAS can also expand seamlessly to accommodate massive data growth. Additional hardware can be added or upgraded with no downtime or impact to the operational performance of your enterprise. This is especially important because the information being stored will, in many cases, long out-live the hardware. The MAS is resource aware, so new hardware can be added to the grid and the archived data automatically re-built. There is no need for costly and time-consuming migrations, which can save your organization tens of thousands of dollars. The grid also provides multi-site hospitals with a high availability strategy for their critical patient records. If one node in the grid is brought off line, all traffic is automatically and transparently rerouted to other active nodes. This load-balancing redundancy ensures fast, dependable access to patient information.

24 x 7 availability and protection
Data protection of archived information is of vital importance to business continuity and regulatory compliance. With the HP MAS, built-in redundancy provides the 24 x 7 information access that is essential for effective and timely patient care. In addition, with automatic, real-time replication and automated failover across the grid, reference information is protected against major outages or entire site loss. Automatic load balancing among sites on the grid also promotes fast response times for image and document retrieval.

Data integrity is also essential at all storage tiers, and HP employs Write Once Read Many (WORM) technology in the MAS. All data that is written to the archive receives a unique digital signature. Regardless of where this information is transmitted around the grid, its integrity and authenticity are continuously assured. Proactive verification and self-healing capabilities are built into the solution to notify system administrators when there is an error or an anomaly and ensures that the required levels of resiliency and access are maintained.

Optional encryption for the MAS is available to provide additional security. Access restrictions at the application level can be further enhanced with the MAS using passwords and IP addresses. Multiple organizations can share the same ILM infrastructure by creating partitions that can be managed separately and kept fully isolated.

Community Medical Centers increases availability and reduces costs for electronic medical records

As a health care leader for more than a century, Community Medical Centers has a rich history of medical excellence and compassionate care. With more than 6,200 employees and 1,100 physicians, it also is the largest and most comprehensive hospital system in California's San Joaquin Valley. As part of its mission to improve health in the region it serves, Community wanted to maximize the accessibility and protection of electronic medical records (EMR), as well as other critical patient data, including Picture Archiving and Communications System (PACS) images for radiology and cardiology.

Community stores production information on high-performance HP StorageWorks Enterprise Virtual Array (EVA) systems. While the EVA arrays provided both primary and secondary storage, Community was quickly running out of capacity as the volume of clinical data continued to grow at 40 percent annually. To extend the value of its EVA systems and manage static clinical data more cost-effectively over the long term, Community implemented the HP Medical Archiving Solution. With the archive currently in production for EMR data, the organization has already reclaimed nearly 2 terabytes of valuable Tier 1 storage capacity, reducing the cost of retaining and managing static information while improving accessibility and disaster recovery. As PACS images are added to the archive, these benefits will increase further.

"We were consuming a lot of expensive first-tier storage for EMR, which was growing very fast," said Richard Cummins, Director, Technology Services Group, at Community. "It would cost us much more in the long run to continue keeping all EMR data on the EVA, so by archiving instead, we gain back that valuable storage and can reallocate it very quickly for other applications. Based on policies set up in the Medical Archiving Solution, all EMR files older than 150 days are automatically moved off the EVA and onto the archive. That allows us to keep actively used records on the primary storage longer while gaining a more cost-effective and secure solution for retaining static data virtually forever. And archived records are still very accessible—they can be retrieved from the archive in nanoseconds, rather than the minutes that would be required with a tape library.

"Unlike other solutions that require middleware, the Medical Archiving Solution is seamless and very easy," Cummins continued. "Indexing and redundancy are all built in, which is a huge benefit from an administrative viewpoint. It saves staff time, and there's no additional cost for middleware and software maintenance, which adds up over time."

"Instead," he added, "we can focus IT resources on more strategic projects, knowing that we automatically have a secure, authenticated record that can be accessed in seconds. That allows IT to operate more efficiently and, ultimately, enable our healthcare providers to deliver better care. If you can't look up information on a patient, that's a serious problem—whether it's an exam or an emergency situation. With the Medical Archiving Solution, we're able to consistently make sure that physicians get the information they need, when they need it."

Rapid retrieval regardless of age

Regardless of how dated, when a medical record is needed for diagnosis and treatment, or for audit and litigation requests, retrieval speed is critical. The HP MAS ensures rapid access to reference information by employing byte-level streaming technology, rather than the store-and-forward techniques used by typical archive solutions. As a result, our solution requires lower network bandwidth for data transmission, accelerating replication and retrieval of data. Several layers of transient full file cache provided around the grid further accelerate access to archived content.

Reduced total cost

As the volume of medical data continues to increase, so does the cost of storing and managing this information over the long term. With the HP MAS, you can support multiple applications and organizations with a single unified solution and expand it as your archive requirements evolve. Protection against hardware obsolescence is built in, preserving your investments. Because the MAS has lower network bandwidth requirements, there is minimal need for costly network upgrades as the solution expands. And because the solution stores, manages, indexes, and replicates all metadata and object pointers, tracking data location throughout the grid, you do not need costly middleware.

From initial implementation and for the life your enterprise, the HP MAS delivers secure long-term retention, rapid access, solid data protection and disaster recovery, and lower total cost of ownership.

Secure retention and rapid retrieval of email

The prevalence of electronic communication means email messages and attachments have become an integral part of a patient's health record. As the number of messages grows the challenge for healthcare enterprises is not only how to store the sheer volume of email but also how to locate and retrieve a single essential message.

HP provides scalable email archiving with powerful search and retrieval capabilities to find the exact email you need in a matter of seconds. Our StorageWorks Reference Information Storage Solution is a comprehensive solution that includes hardware, software, and services to provide both cost-effective and long-term storage of email and attachments. Messages are stored securely to mitigate risk, while also helping you comply with regulatory requirements for email retention and protection. The Reference Information Storage Solution helps reduce costs through automated data migration policies and easy retrieval that can be initiated by end users rather than data center personnel. Your email is protected with optional remote replication as well as backup to tape.

Database archiving to maximize application performance

Healthcare enterprises must maintain extensive transactional data, which also must be stored and managed over long periods of time. As databases fill up with closed transactions, this unused data can slow application performance.

With the HP StorageWorks Reference Information Manager (RIM) for Databases, you can relocate closed transactions to an online, easily accessed archive database, significantly reducing the size of the production system and improving application performance. By reducing the size of the production database, RIM for Databases can boost application performance by as much as 70 percent, while improving stability and cutting costs for applications such as ERP and CRM by millions of dollars annually. RIM for Databases uses the interfaces, forms, and reports of the source application to retain transparent, online, real-time access to both production and archive data. In this way, RIM for Databases helps improve application performance, reduce storage costs, and meet regulatory requirements.

Maximizing the value of your information assets

By eliminating disparate, segregated storage pools and applications, HP ILM solutions enable physicians, nurses, clinicians, pharmacists, researchers, and administrators to access the information they need, when they need it—whether it is a medical chart, PACS image, email message, lab result, or billing record. With greater access to more complete information, healthcare professionals can gain insights never before possible. They can analyze patient population trends and patterns and give clinicians accurate timelines of each patient's illness, care, and outcome. This new level of knowledge and insight can then drive across-the-board changes to improve overall quality of care.

HP understands that as healthcare enterprises strive to create an infrastructure of knowledge, they need an intelligent and efficient way to manage information that originates from many sources and must be retained over extensive periods of time. Information Lifecycle Management provides a powerful solution for bringing together all forms of clinical and administrative information into a common environment that:

- Meets clinicians' speed and high availability needs for access to medical records,
- Maximizes the utilization of IT resources,
- Preserves the integrity of the information,
- Ensures security and protection to comply with regulatory requirements, and
- Reduces the total cost of managing information from creation to disposition.

For more information

For more information on how Information Lifecycle Management solutions from HP can help your healthcare enterprise improve the quality and continuity of patient care while reducing costs and achieving regulatory compliance, contact your HP representative or visit www.hp.com/go/ilm.

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