

## Hitachi Clinical Repository Leading the World in Data Storage Solutions for Healthcare



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### Hitachi, Ltd. and Hitachi Data Systems

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Founded in 1910, and built on a commitment to innovation, the parent company of Hitachi Data Systems, Hitachi, Ltd., embodies a powerful corporate philosophy of contributing to society through technology.

As a global provider of complete information systems and services, Hitachi has set the goal to become the business solutions partner the world calls first.

Traditional IT infrastructures and particularly storage architectures purchased separately for disparate healthcare applications have become both cost prohibitive and restrictive in addressing today's massive demand for online patient information. Add to this the demand for instant access, often 24x7, together with increased regulatory constraints, and a new application-aware infrastructure is required.

### The Business Issue

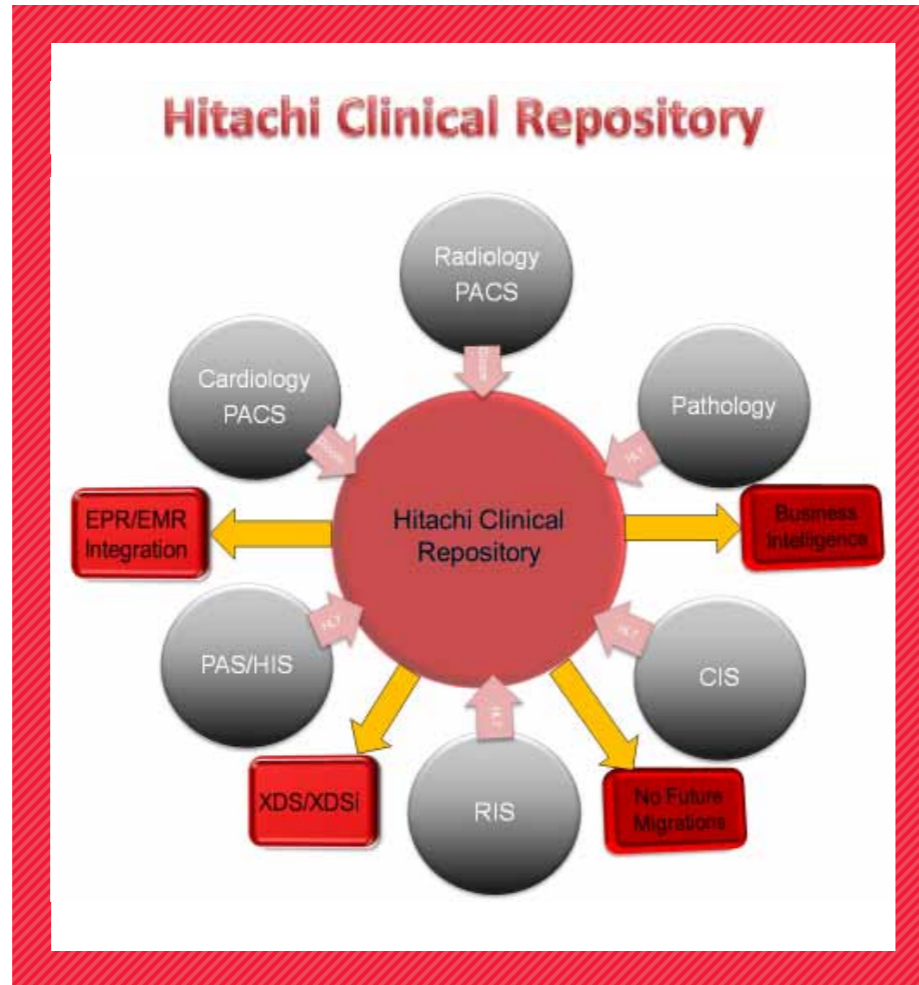
There is a clear need for healthcare providers to efficiently manage the data generated by disparate applications across the organisation.

- Many PACS vendors' database schemas store significant amount of clinically relevant data.
- Vendor neutrality protects the independence of clinical data and is the first step towards data mobility. Data, independent of the application, can be made available to other applications regardless of location or vendor, thus providing information to the hands of the care professionals that need it most.
- In an ideal world data should be stored in a vendor neutral format that facilitates storage of proprietary DICOM tag data. This data should be stored in a repository and include all clinical information - DICOM and NON-DICOM - as well as receive HL7 messages for insertion of patient updates that can merge different formats.
- Vendor neutrality creates a platform where the life cycle of clinical data is primary and the focus is on long term asset preservation.

The Hitachi Clinical Repository allows any type of fixed content data, including images, EPR summary records, laboratory results and video files, to be stored in one system. Providers can now combine clinical and nonclinical data into one data management system consisting of the actual data and the metadata registry.

### Challenge

Much of the data generated has to be kept for a number of years and varies by content and by country. For example, intelligent management of this information is essential to ensure compliance with Freedom of Information regulations and to establish a patient centric repository that can be managed, protected and retrieved easily at the point of care. After an initial analysis of the infrastructure, Hitachi Data Systems can offer a more economical and manageable platform to enable both clinical and IT data to be collected and managed from a single point.



### Products and Services

#### Hitachi Clinical Repository (HCR)

The Hitachi Clinical Repository provides a single online repository that enables protection, search, and retrieval across all healthcare data content. The Hitachi Clinical Repository fully leverages Hitachi storage capabilities for high availability, performance and multi-petabyte scalability.

Based on records management and archival science specifications, it takes a policy-based, object oriented approach to ease the access and retrieval of various content types spanning multiple applications. With the Hitachi Clinical Repository, Hitachi Data Systems uniquely blends superior storage technologies and information management with Visibion's expertise in clinical data management and standards based workflow.

The Hitachi Clinical Repository solution enables healthcare organizations to bring together clinical and non-clinical data from disparate sources.

### Solution Positioning

The Hitachi Clinical Repository provides a vendor neutral infrastructure for healthcare implementations. It comprises both software and hardware, and supports policy-based integration from multiple distributed or centralized repositories such as radiology, mammography, cardiology and other imaging systems.

Hitachi Clinical Repository ensures the secure archival quality retention, preservation or verifiable destruction of content. Users can leverage a set of common and unified archive services such as centralized search, policy-based retention, authentication and protection.

The Hitachi Clinical Repository includes open standards based access protocols such as DICOM 3.0 and HL7 v2.x that are native to the product. Files are stored in their native format, unlike current competitive content addressed storage (CAS) offerings.



It also provides robust encryption capabilities with customer selectable algorithms. Full text indexing and search is embedded in the product versus metadata only search provided by some CAS offerings.

Employing Hitachi Clinical Repository enables you to:

- **Meet regulatory and governance requirements:** WORM functionality is employed to set specific file retentions to ensure compliance for content preservation and retention.
- **Protect your business:** Reduce risk of fines and penalties for not meeting regulatory compliance or providing timely responses to audit and legal discovery requests.
- **Protect your data:** RAID protection and remote replication capabilities ensure the highest levels of availability to your data at all times.
- **Discover:** The Hitachi Clinical Repository provides powerful indexing and search capabilities that enable proactive e-discovery. This simplifies multiplatform end user search, content indexing and restore from a single user interface for faster productivity and business competitiveness.
- **Investment Protection:** By utilising open standards based access protocols and native file system interfaces, clients avoid proprietary 'lock ins' allowing the freedom of future proofing their business data archive.
- **Protect your Patient:** The Hitachi Health Care Repository incorporates a "digital shredding" feature that overwrites deleted files with a random pattern. This technique guarantees the contents of an object are permanently removed (scrubbed) from the system when it is deleted in accordance various directives and regulations.
- **Authenticity:** A digital signature for each incoming file is created utilizing any one of the following hashing algorithms to ensure data integrity: MD5, SHA-1, SHA-256, SHA-384, or SHA- 512. The Hitachi Clinical Repository periodically computes the digital signature and compares it with the original value stored when the file was first archived, ensuring data integrity.
- **Grow with your business:** Scale horizontally to support multiple applications and content types; scale vertically to support continued data growth



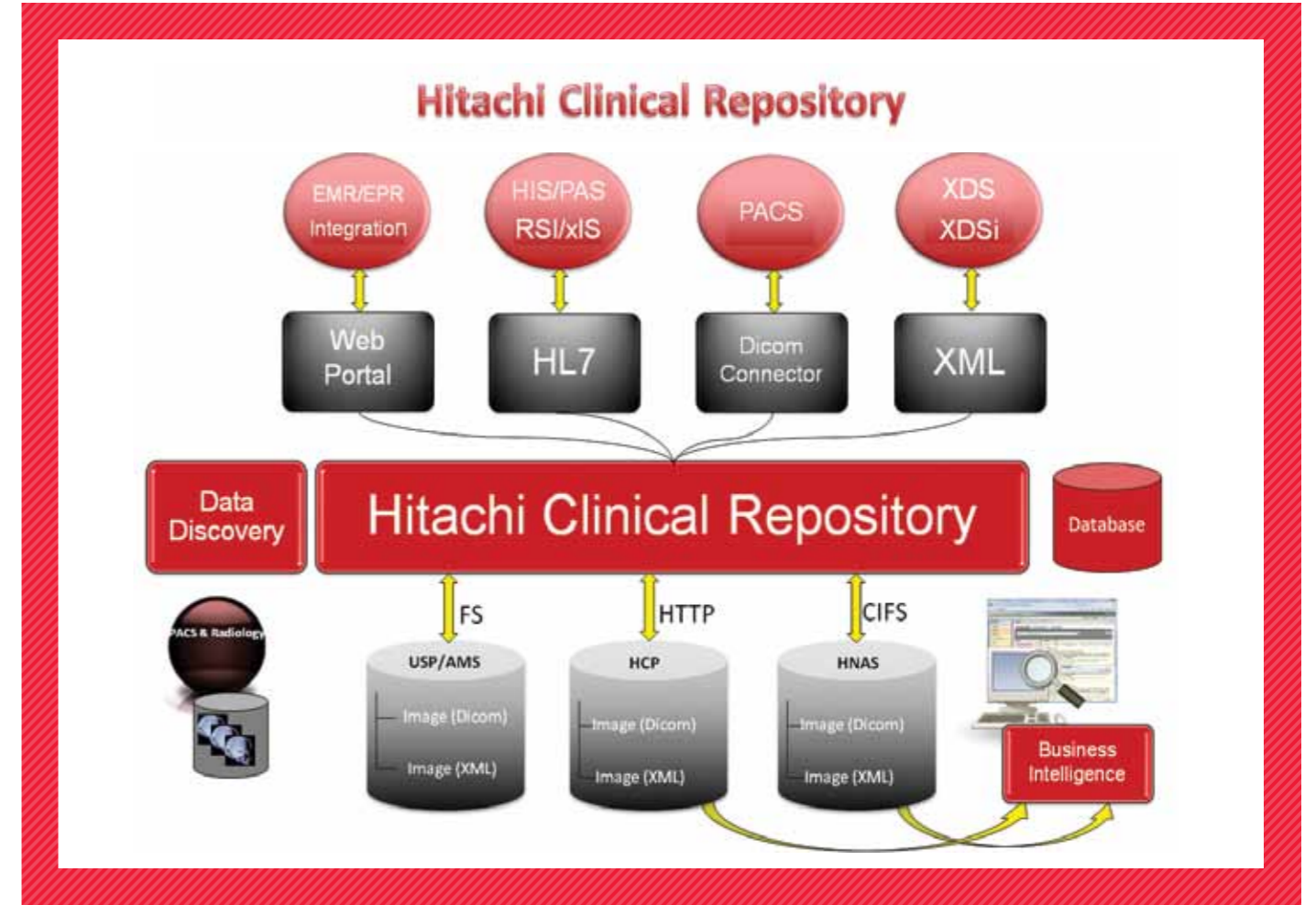
### Hitachi Clinical Repository

**HCR** – is a fully integrated component of the Hitachi storage solutions. The solution is optimized for healthcare enterprises and collects all digital medical images, electronic health records and associated metadata related to patient care, leveraging existing PACS, HIS, RIS and healthcare systems. HCR retrieves medical images and records for authorized hospitals, physicians, researchers and patients and distributes digital images and records securely across healthcare enterprises.

It seamlessly stores medical images and records with full DICOM functionality and real time fail over access, meeting HIPAA mandates and other governmentally imposed off site storage requirements. We have partnered with industry experts and integrated our solutions to produce the HCR, which provides the flexibility to meet differing requirements of complexity and functionality.

These functions include:

- **Measurement and Reporting** provides process models linked to meters, which monitor both process performance and changes in the operating environment. By analyzing this data, it is possible to forecast changes in external factors, to find possible bottlenecks in processes and to predict future change requirements.
- **Image Exchange** provides the means for transparent and secure exchange of diagnostic data between hospitals and departments. It enables vendor independence and ensures a cost effective and structural overview of data located in different systems.
- **Benchmarking Portal** enabling the process performance (e.g. efficiency) of departmental functions, capacity and utilization rate, time variables such as throughput time, costs and other standardised variables.
- **Image Archive** offers a device- and browser-independent web-based platform for self-care and counselling services. The technology used enables the flexible introduction and implementation of the service, even in a multi channel configuration.
- **Process Management** communicates a description of the current situation to selected personnel, and this description is then further developed so that it becomes a presentation of best practices to be introduced.
- **Image Web** is a general purpose viewing application for medical images and multimedia content. It is specifically designed for medical use, and includes a wide range of indispensable tools for diagnostic work.
- **Multimedia Distribution** provides for producing, storing, reporting and distributing medical multimedia content. The system enables the production of digital multimedia from any analogue or digital modality, making its DICOM-compatibility a non-issue.



HCR can be deployed at hospitals of all sizes, as well as hospital groups and Healthcare Service Providers. By connecting organizations into a single archive, imaging exams can be shared, studies can be interpreted anywhere within the network, with protected and traceable access to the data. Information sharing ultimately improves patient care, as clinicians gain faster access to studies and diagnoses can be performed with greater efficiency.

### The Environment

Today the PACS concept is now moving quite rapidly through different departments within a hospital: Cardiology, Pathology, Endoscopy and many other image centric disciplines.

In today's Healthcare environment it's all about the data. The next evolution in Healthcare is witnessing hospitals and national health systems investing in infrastructure so they can leverage the

market for applications without vendor lock in. It is the infrastructure which is being heavily contemplated and contested and not the application.

By investing in infrastructure, the applications become modular and selectable. For example, mammography workstation, CAD system and modality can all be best-in-class if you have a stable and well thought out infrastructure plan.

Once any institution has made the decision to go digital it is only a matter of time before there is a requirement for the "asset" or image or report to make its way through the healthcare workflow process.

Hitachi HCR provides the ability to move PACS data between different PACS vendors by translating the DICOM header vendor data. It can search on the metadata values attributed to the patient information and then transfer images acquired between multiple PACS applications as appropriate.

Distribution of images across local and wide area networks is enabled efficiently and quickly using innovative DICOM techniques.



**Encryption of Data at Rest**

- Protects content from being recovered from stolen media using patented "Secret Sharing" technology
- Transparently encrypts all content, metadata, and search index
- Implements a distributed key management solution

**Open Interoperability**

- Supports UNIX and Microsoft file systems, can store standard file formats such as XML and HTML, and can leverage other Hitachi SAN storage platforms

**Single Archive Name Space**

- All objects are stored in a single, archive-wide global name space, a well understood paradigm
- Open and easy to navigate with standard tools and applications

**Search and Indexing**

- Provide simple and rapid discovery of archive data (search of files and metadata and custom metadata)

**Retention**

- Prevents file deletion before retention period expires
- Can be set explicitly or inherited
- Deferred retention option
- Can set a Retention Hold on any fileWORM, Immutability and Retention

**Authentication**

- Policy-based object management guarantees archived data is authentic, available and secure
- Guards against corruption or tampering
- User selectable hash algorithms include SHA-1, 256, 384 or 512; MD5

**Duplicate Elimination**

- Find and inspect duplicates
- Remove duplicates, but maintain integrity

**Shredding**

- Ensures no trace of file is recoverable from disk after deletion
- Complies with US DoD 5520-M spec.

**Future e-Health Community**

The EU eHealth initiative and action plan is the driver for sharing of patient information and networking of expertise across different institutions and countries. Besides organizational eHealth, this initiative encourages national level eHealth; at the same time the focus is being shifted from in-border health to more integrated healthcare provision across the Union.

Modern eHealth emphasizes citizen empowerment and citizens' active participation in health and wellness management. It also promotes coordinated resource sharing and problem solving in dynamic, multi-institutional virtual settings with equal participation by Healthcare professionals, patients and citizens.

The keywords describing modern e-Health include patient/citizen-centric, seamless, shared, secure and trusted, preventive, independent of time and place, networked, cross-organisational, cross-border and interoperable.

Modern eHealth emphasizes two aspects: sharing of patient information and lining up a network of experts from different organisations or even from different countries. Changing the working environment so that patient information can be shared and

the usage of networked expertise is easy and commonplace. It will deliver significant benefits by improving availability of professionals, making specialist capacity available to improve efficiencies in delivery, standardizing working practices and enabling increased knowledge sharing across organizational borders.

Healthcare professionals need access to relevant patient data and knowledge in order to identify the issues (diagnose) and plan for a strategy (therapy, care plan, workflow), with expected outcomes (monitoring and followup of progress and quality of care).

**The Need Being Served**

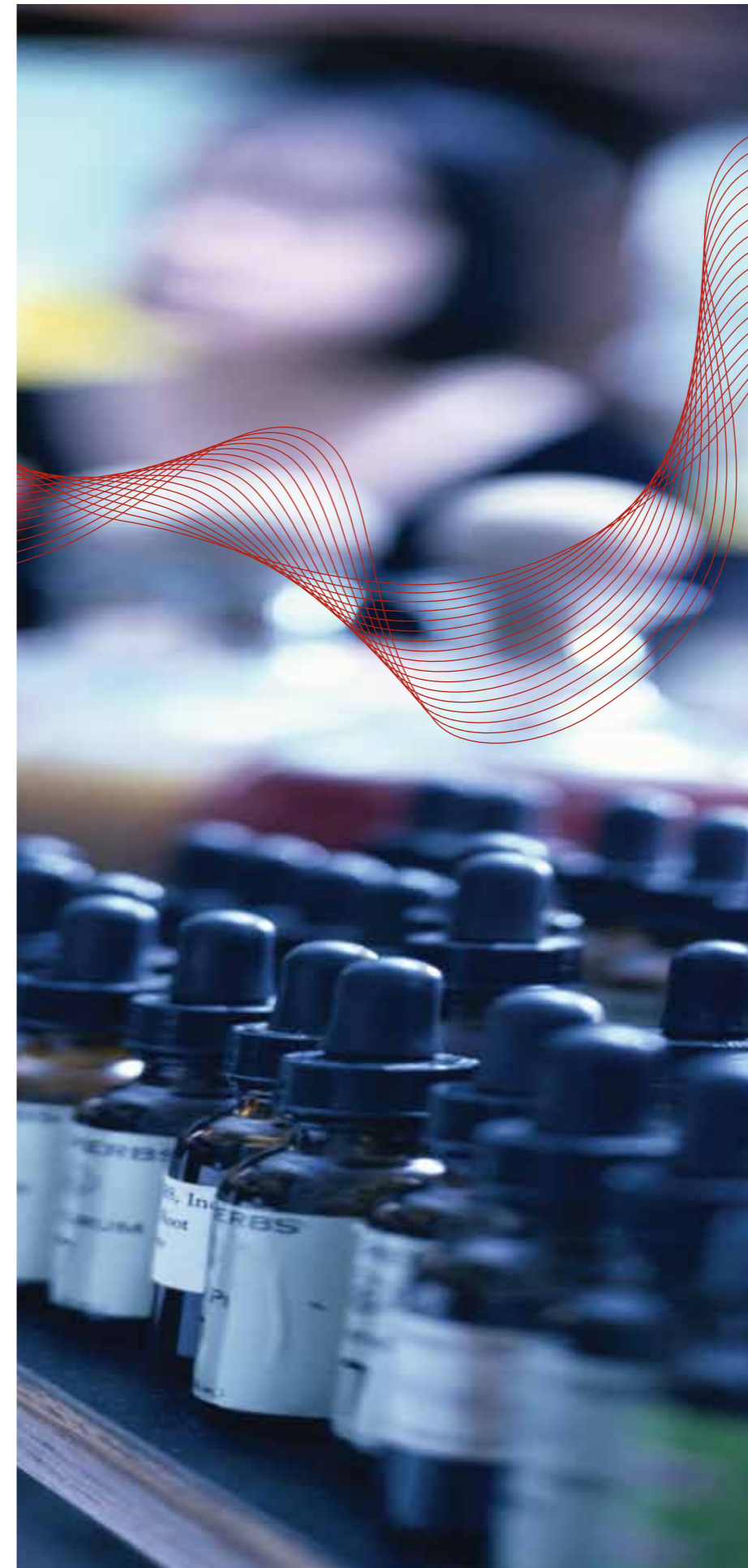
The integration of data from disparate sources is a key challenge in healthcare. The goal is to get to a position where the electronic medical record becomes a reality and the workflow within care providers is sufficiently streamlined to support. In addition information should be available at the point of care when and where it is needed to improve the overall quality of care to the patient.

Hitachi healthcare solutions enable centralized information sharing, protection and management at the application and physical disk layer through storage virtualization, HealthXchange and Hitachi Clinical Repository.

For further information on health care based solutions, please visit our web-site at:

[www.hds.com/healthcare](http://www.hds.com/healthcare)

For detailed information on Hitachi Data Systems solutions, please visit our web-site at: [www.hds.com](http://www.hds.com)



**Hitachi, Ltd. a Leader in Medical Technology Solutions**

For decades, the Hitachi name in life sciences and healthcare has been associated with innovation and medical breakthroughs, as the company has provided a wide range of solutions to these critical markets. Hospitals, clinics, and patients have benefited from Hitachi advances in medical technologies.

Hitachi pioneered breakthrough technologies, such as proton beam therapy, DNA sequencers and applied medical biotechnology, including intelligent operating rooms. The company has also provided:

- Advances in diagnostic imaging equipment for clinical providers
- The infrastructure for the demands of clinical and business workflows
- Advances in bioinformatics solutions

### Storage Virtualization

The concept of storage virtualization is increasingly adopted as data volumes and resultant management costs continue to increase. Hitachi advanced virtualization combines multiple storage systems into one easily manageable solution. This technology provides the framework to implement a tiered storage architecture, simplify management, migrate or replicate data across heterogeneous storage systems, and extend the life of existing systems. In addition, utilization of existing assets can be maximized and environmental costs dramatically reduced.



## Benefits of Hitachi Data Systems and Visbion Solutions

### Clinical Impact

- Gain access to critical patient information anytime, anywhere
- Accelerate high quality patient care decision making
- Improve clinical workflow and productivity across the entire healthcare organization

### Operational Impact

- Reduce operational costs
- Streamline operations with automated, policy-based management
- Meet regulatory and clinical "uptime" requirements by implementing business continuity and disaster recovery solutions

### Financial Impact

- Save money by consolidating departmental storage and server infrastructure
- Extend the useful life of existing storage assets
- Improve overall ROI

The collaboration of the Hitachi group companies in healthcare provides end-to-end strength which enables us to go to market as a powerful player with a differentiated story.

Our objective is to make Hitachi in Healthcare a success story and as part of our plan to cooperate we created a mutual identity to demonstrate cohesion and a solutions focus. The Inspiring Healthcare Solutions logo is designed specifically with this in mind and we, as a collaborative group, intend to create initiatives which translate into true solutions for Healthcare and shape the future industry landscape.

Our participation in events and industry literature is underpinned by our brand identity. Customers recognize us as a solutions oriented organization, with a rich and diverse history, in healthcare, working together towards common goal of improving the quality and effectiveness of care.

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