



“As early as 2003, Zhongda Hospital implemented an organization-wide ‘informatization’ of its operations with the aim of building a high standard, high quality open platform that meets the needs of our development strategies. In 2009, our hospital implemented the Hitachi Content Platform. It does a great job in helping the hospital handle high volumes of data storage, archive, analysis and retrieval, and lays a solid foundation for further realizing our vision of digitalization.”

*Dr. Naifeng Liu
 Chief Hospital Manager
 Zhongda Hospital*

Zhongda Hospital, Southeast University

INDUSTRY Healthcare

SOLUTIONS **File and Content**
Hardware — Hitachi Content Platform 500



Hitachi Content Platform Empowers Medical Data Services at Zhongda Hospital, Nanjing Southeast University

Amid economic globalization and community “informatization,” China’s hospitals are entering a new era of digitalization and are now equipping themselves with advanced IT facilities and cutting-edge healthcare solutions to meet future challenges. With the popularity and increasing usage of medication management systems and medical diagnostic solutions, many hospitals are effectively taking advantage of information infrastructure and data storage technology.

Hospital operations are complex in nature, involving vast amounts of diverse and highly sensitive data. To meet the long term challenge of constant data growth, it is vital that healthcare systems are intelligently architected with the highest levels of business continuity, mission critical performance and robust security.

IT Infrastructure of Zhongda Hospital

Located in Nanjing, Jiangsu Province, Nanjing Southeast University’s affiliated Zhongda Hospital is an integrated tertiary grade-A hospital that has combined healthcare, education and research for the last 80 years. Zhongda Hospital currently has 1,000 beds, 32 clinical rooms, 20 medical technique rooms, and serves more than 920,000 outpatients and 26,000 inpatients per annum.

Southeast University’s affiliated Zhongda Hospital is in the vanguard of next generation healthcare providers. Whether in software, hardware or new applications, Zhongda Hospital has a long history of testing and studying new technologies. For this reason, the health care systems in Zhongda are more mature than at other hospitals of its kind. Before deploying the Hitachi Content Platform, Zhongda’s principal storage facility was an EMC CX3-20 with a centralized mirror disaster recovery system. Its information system operated on a Fujitsu and Sun UNIX platform, running Neusoft’s Hospital Information System (HIS), Electronic Health Record (EHR), Laboratory Information System (LIS) and Radiology Information System (RIS).

Setting New Goals to Meet New Challenges

A substantial amount of medical data is nonstructured or semistructured, such as medical imaging data, electronic medical records and electrocardiogram (ECG) data. All these data files are collected from daily patient diagnoses and are mission critical in achieving and actualizing hospital digitalization. From the perspectives of legal compliance, service quality and information management, it is essential to manage this nonstructured data separately from normal structured data, such as HIS data. This separation created the need for a dual data center disaster recovery system, meaning the storage environment at Zhongda Hospital would also require a significant overhaul.

After examining the various content archiving solutions available from major storage vendors, Zhongda Hospital designed a new storage system that could accommodate both unstructured and semi-structured data, and decided to deploy a centralized, active dynamic content archiving solution. Zhongda knew that a system structured in this way is not only a proven solution for its needs, but would also achieve the following goals:

- Meet compliance requirements to operate a centralized storage system that archives all data content.
- Reduce the damage of data loss on intangible assets.



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- Provide comprehensive, reliable medical and legal support to hospital departments.
- Minimize total cost of ownership and data storage complexity with a unified information storage and dynamic archiving platform.
- Establish a single, centralized platform for fast and accurate information queries, searches and retrievals.
- Protect archived data with a complete content security solution that verifies content integrity and accessibility, and allows tailor-made rules and policies for content retention.
- Deliver high flexibility for horizontal and vertical expansion in order to ensure high compatibility and capacity for future application development and growing volumes of data.

System Design Objective: Simplify, Optimize and Automate

In addition to the continuous growth of unstructured data, the hospital must also meet new regulatory requirements that call for fast access to archived data in all applications. This is why the ability to execute an integrated search for different kinds of content is especially important. This is in addition to the creation of a high end, high performance and high quality data archive system that uses advanced authentication to protect sensitive data while also providing long term data preservation, timely access to information and support services for a massive number of users. Faced with these complex operational requirements, Hitachi Data Systems suggested that the system design project should be summed up as "simplify, optimize and automate."

Simplify: By simplifying crucial areas such as deployment, management and maintenance, system failure detection and system expansion, the new system not only delivers a best-of-breed storage solution, but also perfectly addresses Zhongda's needs. This simplification was achieved through the maturity, manageability and compatibility of Hitachi storage products and solutions.

Optimize: In simple terms, Zhongda needed to improve the performance of its applications. As a dynamic platform for data storage, retrieval and archiving, the Hitachi Content Platform provides transparent, application-based flexibility and enables high optimization for data configuration and application performance.

Automate: Automation has always been a major focus of IT developers. The Hitachi Content Platform provides advanced and intelligent system consolidation, including built-in virtualization technology to address the problems of heterogeneous storage automation. Its dynamic detection technology likewise solves the challenge of alarm automation, while its sophisticated management technology enables automation for storage configuration and administration.

Smooth Implementation of Hospital Digitalization

The dynamic Hitachi content archiving solution is designed to address both economic and operational issues. By delivering unprecedented automated management capabilities, this enterprise-class archive solution frees up the workload of Zhongda's staff and reduces the cost and risk of maintenance.

Unparalleled Functionalities

Hitachi Content Platform also provides unparalleled functionalities and other benefits, including:

- Excellent stability and reliability that can simultaneously prevent both logical errors and physical breakdown, providing users with an archiving system that enjoys maximum data protection
- Ten times more scalability than traditional archive systems, including more than 20PB capacity, 80 nodes for expansion and an ultra 32 billion data objects
- Best-of-its-kind "write once, read many" (WORM) technology that enables the creation of revisable attributes for time-based retention and chain of custody, and allows the establishment of a unique archive platform protected by fingerprint authentication

- Support of dynamic content searches, in addition to basic data searches; this important function adds enormous value to the whole archiving system
- High-level data encryption that enables users to keep a security key in Hitachi Content Platform and securely share the key across different storage nodes
- Innovative duplicate data elimination to maximize storage capacity and resources
- Open standards-based interfaces and supporting protocols, such as NFS, CIFS, HTTP and SMI-S, that minimize the cost of customization

Protection for the Hospital

Hitachi Content Platform also protects Zhongda by:

- Effectively controlling the data growth of application systems, significantly enhancing application performance and successfully establishing information lifecycle management
- Enabling the hospital's unstructured information to be easily accessed in a highly transparent environment
- Eliminating the need for unsecure, manual or semi-automatic data archiving solutions
- Ensuring the hospital's information security complies with all legal requirements
- Reducing the hardware consumption of current applications and minimizing the cost of hardware investments in the long run
- Reducing the workload of the storage system, resulting in significant savings in terms of data backup, as well as faster recovery times and lower management costs

Deployment and Implementation

To ensure no disruption to its daily operations, Zhongda Hospital implemented its new archiving system in a phased and progressive way. This cautious approach to such large scale system integration was appropriate, especially since the final system would be required to constantly

capture data from the hospital's daily operations, while also improving the accessibility and reliability of captured data to enable service oriented search and retrieval functions. Naturally, the success of the deployment required impeccable project management and technical expertise, so Zhongda Hospital created a meticulous implementation plan with a daily and even hourly timeline for the integration of every single application.

In the first phase of system integration, the objective was to create an initial 9TB capacity for the archiving system, which would later be extended to 30TB with RAID-6 protection. The system platform included redundant load balancing, content processing nodes and search nodes. By utilizing network aggregate bandwidth, archived content could be accessed dynamically on the entire operational system.

In the second phase, Zhongda Hospital wanted to support its data archiving needs for at least two years, perhaps even three years. According to the estimated data and application growth for the coming two years, the storage capacity needed to double (to around 18TB of available capacity). Thankfully, Hitachi Content Platform can quickly and easily be expanded to 18TB of

storage capacity after configuring RAID-6. Zhongda can also enhance performance by simply expanding the number of front end processing nodes (servers) and access nodes, or can separately expand the back end storage capacity and functionality. This unsurpassed flexibility and scalability perfectly protects Zhongda's investment and meets its business needs

After establishing a content archiving system, the hospital turned its attention to its mission critical picture archiving and communications system (PACS) archive data. Not only is this data essential to the hospital's daily operations, any instability or problems with reliability can affect the entire operational system. Therefore, in the third phase, the hospital implemented data protection for the archiving system. At this stage, Hitachi Content Platform was also required to provide remote replication by building a mirroring function with load balancing capacity.

Cutting Edge, Dynamic Search Engine

In addition to Hitachi Content Platform, Zhongda Hospital also implemented the Hitachi Content Platform Search engine, enabling it to retrieve data from many

different applications, such as PACS data, and even perform full text positioning searches in EHRs. Similar to search engines such as Google, almost all search results and content can be revealed on one interface. This function is extremely important for healthcare personnel and management to accurately review patients' health history, and it is useful and significant in assisting the hospital's research and academic work.

"All the hospital's information systems, including its Electronic Health Records and Diagnostic Imaging System, have now been integrated with our data recovery architecture," said Hospital Information Center Director, Ms. Beihua Wu.

"Now, with this integrated content archiving platform, all health records and diagnostic imaging content have been properly stored and documented, greatly enhancing the security of the central system. In future, if we need to expand, we only need to increase the storage capacity, which is a simple, fast and flexible process. I believe even more benefits will become apparent once we are familiar with the system's incredible functionalities. I am confident this will equip our medical information service to perform even better in the future," she concluded.

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