HIMSS Analytics Asia Pacific

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OVERVIEW

Medical Content Management Blueprint for HIMSS EMRAM

HIMSS Asia Pacific EMR Adoption Model (EMRAM)

Health organizations around the world are now using many different kinds of health IT applications to enhance care quality and efficiency. In particular, the adoption of electronic medical records (EMR) applications has grown at a noteworthy rate, and the majority of health organizations now prioritize this as the most important of all their IT initiatives.

Asia Pacific EMR Adoption Model[sm]	
Stage	**Cumulative Capabilities**
Stage 7	Complete EMR; CCD transactions to share data; Data warehousing; Data continuity with ED, ambulatory, OP
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), closed loop medication administration
Stage 5	Full R-PACS
Stage 4	CPOE, Clinical Decision Support (clinical protocols)
Stage 3	Nursing/clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology
Stage 2	CDR, Controlled Medical Vocabulary, CDS, may have Document Imaging; HIE capable
Stage 1	Ancillaries - Lab, Rad, Pharmacy - All Installed
Stage 0	All Three Ancillaries Not Installed

To support and guide organizations of all sizes, the Healthcare Information and Management Systems Society (HIMSS), a global, not-for-profit organization, offers an eight-stage Asia Pacific EMR Adoption Model (EMRAM) which helps healthcare professionals understand their EMR needs and shape an effective strategy for full EMR adoption.

EMRAM identifies every stage of EMR adoption, ranging from limited ancillary department systems through to a paperless EMR environment. This maturity model is applicable to all types of acute/inpatient and ambulatory/outpatient care. The eight-stage (0-7) model measures a hospital's implementation and utilization of information technology applications, providing logical and progressively sophisticated steps to track the storage and flow of clinical information for accessibility within an EMR environment. It provides practical assistance to help health organizations strategize their path to a complete EMR.

The Lifeblood of Health Organizations - Medical Content

All healthcare applications produce medical content. For example, in stage 2 of EMRAM, a hospital only operates major ancillary clinical systems, but still these systems can be connected to a clinical data repository (CDR) to enable physicians to quickly and easily review all orders and results. In an integrated environment like stage 7, where all patient care and management processes are automated with a mixture of discrete content, document images, and medical content, the adoption of EMR leads the organization into a totally paperless environment. This is when medical content become the lifeblood of a health organization, creating a strong foundation for success.

To ensure this lifeblood runs smoothly and healthily, health organizations need a robust system to manage and control its storage, operation, security and efficiency. However, many physicians and managers find it challenging to identify the appropriate solutions for achieving seamless interoperation between the healthcare applications of different EMRAM levels.

Medical Content Management Requirements for EMRAM

Drawing on its wealth of experience and technology know-how, Hitachi Data Systems is honored to support HIMSS in the study and development of the industry's first medical content management trends and requirements for EMRAM.

This study has developed a clear understanding of the specific content management requirements that are suitable for each stage of EMR adoption, helping health organizations confidently optimize their IT investments on the journey to full EMR adoption. The details are shown in Table 1.1.

Table 1.1

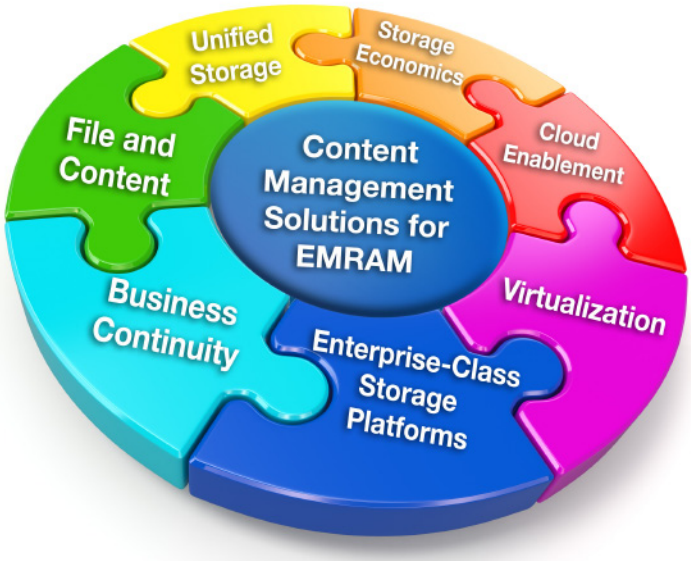
Medical Content Management Requirements for EMRAM

Stage	Medical Content Management Requirements
Stage 7	Stage 7 is a complete EMR, paperless environment. Medical content have become the core of the business. Content management should deliver 100% availability and total reliability to ensure the non-stop running of hospital operations. It should also be highly flexible with enormous scalability to support the future development of medical technologies and applications, as well as the relentless growth of information volumes and varieties.
Stage 6	Hospitals achieving Stage 6 are considered to be in the top league, which is why the system must be able to deliver a timely and instantly response when clinicians retrieve content, regardless of which clinical system it's stored in. The enterprise platform suggested in Stage 5 must be scalable and strong enough to support growth throughout this stage and in Stage 7 as well. To meet increasingly stringent business recovery requirements, solutions like real-time replication, snapshots and cloning are also recommended for these three stages.
Stage 5	Hospitals achieving Stage 5 are considered to be fairly advanced. A full complement of radiology PACS systems are implemented to provide digital images for both electronic and film-based images. The content management platform is also upgraded to an enterprise-class scale in order to support content-intensive workloads, real-time access and fast retrieval of medical information. This enterprise platform also fortifies disaster recovery efficiency and content reliability, as well as complements the enhancement of private cloud, storage virtualization and unified content storage.
Stage 4	To ensure higher levels of information sharing and collaboration, content security and availability, as well as to optimize application service management and performance, Cloud adoption is realized at this stage. The deployment and integration of healthcare applications continue to increase the many types of applications and workloads for content management. Storage virtualization is recommended to reduce application silos. The business continuity plan likewise needs to be further improved to meet the growth of IT-enabled operation.
Stage 3	More advanced applications such as electronic medication administration record (EMAR) and picture archiving and communication system (PACS) become available to the radiology department. The volume and varieties of content are largely and constantly increasing. Issues like scalability, compatibility and the cost-saving of content management solutions are crucial to ensure smooth operation and support future stages of EMR adoption. As more clinical information becomes accessible and is stored for protection, long-term information archiving with better RTO and ROP is required. The intention to adopt Cloud becomes apparent at this stage.
Stage 2	Similar to Stage 2, medical content is mainly generated from ancillary clinical systems, but the purpose of this content is now extended to enable more sharing and reviews, and to support clinical decisions via integration with a Clinical Data Repository (CDR). Other document imaging systems and a health information exchange (HIE) may also link the CDR. Unified content management and business continuity are now equally important. At this stage, the organization also becomes more interested in adopting Cloud to enhance efficiency, reduce costs and enable greater mobility in the future.
Stage 1	As the focus of Stage 1 is on ancillary clinical applications (Lab, Rad, Pharmacy), which consist of mostly textual content, this stage focuses on the unified management of all types of content, including files and images, to simplify daily running and ensure application efficiency. Content protection is also a must because regulatory requirements demand that adult patients' content is kept for 10 years and pediatrics' content for life, as well as for disaster recovery plans.

Hitachi Data Systems Content Management Solutions for Each EMRAM Stage

Based on the study by HIMSS, we can formulate a solution algorithm to architect the best medical content management solution to meet the specific EMRAM requirements of each stage. This solution algorithm comprises all essential components to not only meet the needs of that individual EMRAM stage, but also to integrate with the solutions implemented at later stages, thus creating the perfect content management architecture for complete EMR adoption. It provides a practical and transparent blueprint that can effectively help health organizations of all sizes to lay a solid foundation in content management for their operational needs both today and tomorrow – and all while protecting their investment and guaranteeing sustainability.

Hitachi Data Systems content management solutions for EMRAM include seven elements, namely Business Continuity, File and Content, Unified Storage, Storage Economics, Cloud Enablement, Virtualization, and Enterprise-Class Storage Platforms. Health organizations can implement each of these elements separately according to their adoption stages or deploy an integrated infrastructure with multiple solutions to support their specific environment and growth plan. All Hitachi Data Systems content management solutions are fully compatible and scalable for perfect interoperation.



Hitachi Data Systems Content Management Solutions for EMRAM

1-7 Stage	EMRAM Cumulative Capabilities	Business Continuity	File and Content	Unified Storage	Storage Economics	Cloud Enablement	Virtualization	Enterprise-Class Storage Platforms
Stage 7	Complete EMR; CCD transactions to share data; data warehousing; data continuity with ED, ambulatory, OP	✓	✓	✓	✓	✓	✓	✓
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), closed loop medication administration	✓	✓	✓	✓	✓	✓	✓
Stage 5	Full R-PACS	✓	✓	✓	✓	✓	✓	✓
Stage 4	CPOE, Clinical Decision Support (clinical protocols)	✓	✓	✓	✓	✓	✓	
Stage 3	Nursing/clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	✓	✓	✓	✓			
Stage 2	CDR, Controlled Medical Vocabulary, CDS, may have Document Imaging: HIE capable	✓	✓	✓	✓			
Stage 1	Ancillaries – Lad, Rad, Pharmacy – All installed	✓	✓	✓				

Business Continuity

Hitachi Data Systems provides a comprehensive suite of business continuity solutions. The range of options is wide and diverse, from local backup to replicating data over long distances, and establishing best-practice methodologies that expedite recovery while minimizing data loss. All of these solutions are designed to help health organizations meet their recovery time objective (RTO) and recovery point objective (RPO) regardless of which EMRAM stage they are implementing. In broad terms, Hitachi business continuity solutions cover two functional areas: data replication and data protection. Various Hitachi data replication solutions, such as Hitachi Business Continuity Manager, Hitachi Universal Replicator, Hitachi Replication Manager and Hitachi TrueCopy remote replication, ensure high data availability and fast recovery in any environment, whether simple or complex. For data protection, Hitachi Data Protection Suite, powered by CommVault, is a unified platform that helps ensure outstanding data protection, high availability and rapid access to information through the integration of backup and recovery, migration, archiving and replication under a single point of control.

File and Content

Health organizations can leverage Hitachi file and content solutions to streamline the management of ever-increasing, content-intensive medical images and files with reduced costs and risks. Hitachi file and content solutions include Hitachi Content Platform, Hitachi Data Discovery Suite, Hitachi Data Ingestor and Hitachi NAS Platform. Hitachi Content Platform provides a high-density, high-efficiency and multi-tenancy content management platform, allowing users to store, share, and retrieve files and images from a single system that can be scalable from a few terabytes to tens of petabytes. It enables backup-free storage with active data protection and utility-grade architecture. All Hitachi NAS Platform solutions provide highly efficient, highly scalable, and high-performance network attached storage with 99.999% availability.

Unified Storage

Hitachi Unified Storage (HUS) provides a single storage platform for managing all clinical database and unstructured data. It simplifies operations for all data types – files, images and block data – with highly scalable, converged infrastructure components, which give you the flexibility you need to meet current requirements and prepare for future needs. HUS automates data management with dynamic provisioning, dynamic load balancing, and auto-tiering. Moreover, it also provides pervasive data protection and replication tools to support SLAs, data integrity and reliability, as well as to ensure all medical information remains available to medical staff 24/7.

Storage Economics

Storage Economics from Hitachi Data Systems attempts to align the operational and technical dimensions of storage infrastructure with a corresponding financial viewpoint. This enables health organizations to identify the true cost of content storage and management, and optimize their overall storage investment strategy both in the short- and long-run. Our unique Storage Economics principles use sophisticated methodologies and draw on our extensive experience to help health organizations effectively align their storage technology and economics.

Cloud Enablement

With Hitachi cloud solutions, health organizations can reap the benefits of private cloud solutions, with predictable performance, fast deployment and less risk. Hitachi Data Systems virtualized private cloud solutions are designed to efficiently utilize storage resources and provide tiered storage and data protection with 99.999% and even 100% availability. To support distributed users or cloud consumers, Hitachi Content Platform Anywhere and Hitachi Data Ingestor can also provide secure file synchronization, sharing and remote access for other medical centers and hospitals.

Virtualization

Hitachi virtualization solutions comprise Hitachi Unified Storage VM and Hitachi Virtual Storage Platform (VSP), both of which can manage all of your existing storage and consolidate all of your data in a single, virtualized platform to ease the management of information. The cutting-edge VSP even enables the consolidation of multi-vendor storage resources in a single storage pool of enterprise-class capacity. Built with trusted Hitachi reliability for unsurpassed application availability, performance and reliability, both solutions provide guaranteed 100% availability.

Enterprise-Class Storage Platforms

Hitachi VSP and HUS VM are the world's most intelligent, powerful storage platforms. They are designed to provide dynamic scalability and functionalities to support progressive EMRAM adoption or top-of-the-line, complete EMR operation. Health organizations can choose high-end HUS VM or top-tier VSP solutions to meet all of their EMR adoption needs. HUS VM provides flash-accelerated application performance and unprecedented storage virtualization. VSP provides industry-leading 3D scaling capabilities and dynamic tiering for managing ever-increasing volumes of medical data and maximizing ROI of storage investment. With Hitachi enterprise-class storage platforms, overall content management costs can be profitably capitalized with minimized manpower, floor space and power and cooling costs, which significantly reduces storage CAPEX and OPEX.

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