

WHAT IS IHE?

IHE is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information. IHE promotes the coordinated use of established standards such as DICOM and HL7 to address specific clinical needs in support of optimal patient care. Systems developed in accordance with IHE communicate with one another better, are easier to implement, and enable care providers to use information more effectively. Physicians, medical

specialists, nurses, administrators and other care providers envision a day when vital information can be passed seamlessly from system to system within and across departments and made readily available at the point of care. IHE is designed to make their vision a reality by improving the state of systems integration and removing barriers to optimal patient care.

WHY IS IHE NEEDED?

Optimal patient care requires efficient access to all relevant information. Despite the advanced state of technology, however, healthcare enterprises have not yet begun to realize the full potential of computer systems to reduce medical errors, improve the efficiency of care providers and enhance the overall quality of clinical care. To do so requires a framework for information sharing that meets the needs of care providers as well as patients—and gains acceptance among the companies that build the systems they rely on.

Standards provide the basis for such a framework, but alone do not solve the problem. In any standard there are gaps, options, room for conflicting interpretations. No standard maps perfectly to the complex and ever-changing information domain of a healthcare enterprise. Filling the gap between standards and systems integration has, until now, required expensive, site-specific interface development. To close that gap a process for building a detailed framework for the implementation of standards is needed. IHE provides that process.

WHAT CAN IHE DO FOR ME?

Clinicians

Care providers are hampered by systems that do not share information effectively. Vital patient information may be missing or difficult to access. Redundant entry of information, aside from being inefficient, leads to errors and mismatches that must be corrected or reconciled. Care decisions frequently must be made without a comprehensive view of current patient information.

IHE offers a framework for information sharing designed to optimize clinical workflow. Systems implemented in accordance with IHE can streamline the flow of clinical information, reduce errors and improve efficiency. IHE strengthens the information link between different departments—for example, between referring physicians and consulting physicians—to enable the enterprise to function as a single unit in providing optimal clinical care.

Information Technology Professionals

Interfacing systems is one of the key challenges faced by any healthcare institution's IT staff. Understanding the differing implementations of standards in various vendor systems and trying to find ways to reconcile them is an expensive, labor-intensive and often painful process.

IHE offers a common framework for vendors, IT departments, clinical users and consultants to understand and address clinical integration needs. The IHE Technical Framework allows flexibility while ensuring that key integration needs are met.

Healthcare Administrators

Administrators must balance technical, fiscal, clinical and personnel constraints in making operational and purchasing decisions. Inadequate systems integration impacts many aspects of a clinical department of concern to administrators: financial performance, cost of information technology, efficiency of personnel and, most importantly, the quality of care.

IHE eases this burden by offering a clear path toward acquiring integrated systems. Referring to IHE Integration Profiles in RFPs

IHE 2003 – 2004 RADIOLOGY PARTICIPANTS

AGFA HEALTHCARE
ALGOTEC SYSTEMS, LTD.
CEDARA SOFTWARE CORPORATION
CERNER CORPORATION
CSIST
DR SYSTEMS, INC.
EASTMAN KODAK COMPANY
EMAGEON
FUJIFILM MEDICAL SYSTEMS USA
GE MEDICAL SYSTEMS
HEARTLAB
HITACHI MEDICAL CORPORATION
HOLOGIC, INC
IDX SYSTEMS CORPORATION
INFINITT
INSITEONE, INC.
INSTRUMENTARIUM IMAGING
KONICA MINOLTA MEDICAL IMAGING USA, INC.

MAROTECH, INC.
MCKESSON INFORMATION SOLUTIONS
MEDCON
MERGE eFILM
PHILIPS MEDICAL SYSTEMS
PROCOM TECHNOLOGY
RASNA IMAGING SYSTEMS
SECTRA
SIEMENS MEDICAL SOLUTIONS
SOFTMEDICAL
STENTOR, INC
STORCOMM, INC
SWISSRAY INTERNATIONAL, INC
TIANI MEDGRAPH AG
TOSHIBA AMERICA MEDICAL SYSTEMS
VITAL IMAGES, INC.
WEBMD PRACTICE SERVICES

and purchasing agreements allows purchasers and vendors to agree on the interoperability of systems being acquired or upgraded, making multi-vendor, best-of-breed solutions more feasible. It enables information technology specialists to concentrate on improving the core functionality of systems, rather than developing and maintaining redundant, point-to-point interfaces. Finally, it makes it possible to implement a streamlined workflow so that care providers can make more efficient use of their time.

→ HOW DOES IHE WORK?

IHE involves an intensive, ongoing process of collaboration and communication among key parties, which can be divided into four phases:

Problem Identification:

Clinicians and IT experts identify common integration problems in access to information, clinical workflow, administration and underlying infrastructure.

Integration Profile Specification:

Stakeholders select standards that address each identified integration need. The technical specifications for implementing these standards are documented in the IHE Technical Framework.

Implementation and Testing:

Vendors implement these profiles and test their systems with software tools and at a face-to-face “Connectathon, where they test interoperability with other vendors’ systems.

Integration Statements and RFPs:

Vendors publish IHE Integration Statements to document the integration profiles supported by their products. Users can reference integration profiles in requests for proposals, simplifying the systems acquisition process.

→ WHO IS IHE?

IHE is sponsored by associations of healthcare professionals around the world and has welcomed participation by many of the leading manufacturers of imaging and information systems. Volunteer members of these associations, including radiologists and other clinicians, healthcare executives and information technology experts, play a key role in guiding the development of IHE and determining priorities for integration. They collaborate with vendor representatives to identify obstacles to integration and optimal care and remove them by developing and implementing standards-based solutions for information sharing.

IHE facilitates vendor adoption of these solutions by providing test tools and a detailed testing process. In the five years since the initiative began, numerous companies representing an overwhelming share of the marketplace in imaging and information systems have completed the IHE testing process.

→ HOW DID IHE GET STARTED?

IHE began in 1997 with the mutual realization by HIMSS and RSNA that through cooperative efforts they could promote a higher level of interoperability among imaging and information systems. Both organizations were aware that public events could help drive the integration process by encouraging the participation of vendors and raising the awareness of users and purchasers. They convened a working group of their key members, industry representatives, standards experts and others. This group outlined an approach that led, a year later, to the formation of the IHE Planning and Technical committees. These committees have worked continuously and intensively since that time.

➔ IS IHE ONLY CONCERNED WITH RADIOLOGY?

IHE promotes integration within and across all units of the healthcare enterprise. The initial successes of IHE were achieved in radiology, and the IHE initiative in radiology remains very active. The IHE process has since been adopted in other domains, as well: IT Infrastructure, Cardiology, Laboratory, and Medication Management. Working in coordination with the others, each of these domains will develop its own Technical Framework and Integration Profiles, and implement its own testing and demonstration process. The first IT Infrastructure integration profiles will be used in the HL7-IHE Joint demonstration at the HIMSS 2004 annual conference (Feb. 22-26 in Orlando, FL).

➔ WHAT IS THE IHE TECHNICAL FRAMEWORK?

The IHE Technical Framework is a detailed, rigorously organized document that provides a comprehensive guide to implementing the defined integration capabilities. The Technical Framework delineates standards-based transactions among systems (generically defined as IHE Actors) required to support specific workflow and integration capabilities. (See Figure 1).

IHE Actors:

Information systems or applications that produce, manage or act on information are represented as functional units called IHE Actors. Each actor supports a specific set of IHE transactions. A given information system may support one or more IHE actors.

Transactions:

Transactions are exchanges of information between actors using messages based on established standards (such as HL7, DICOM and W3C). Each transaction is defined with reference to a specific standard and additional detailed information, including use cases. This is done to add greater specificity and ensure a higher level of interoperability between systems.

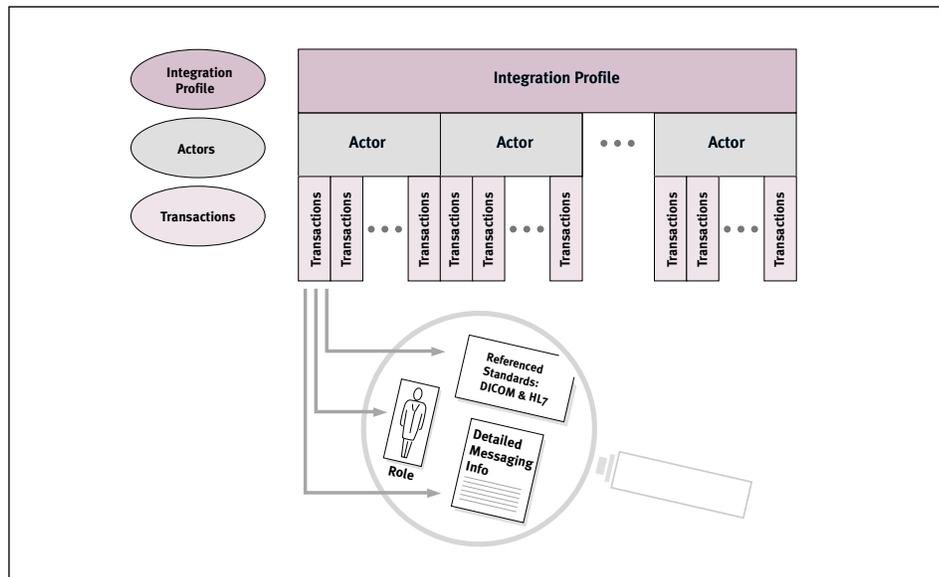


FIGURE 1: THE ORGANIZATION OF INFORMATION IN THE IHE TECHNICAL FRAMEWORK

➔ WHAT ARE IHE INTEGRATION PROFILES?

IHE Integration Profiles organize sets of IHE actors and transactions in order to address specific patient care needs. Integration Profiles offer a convenient way for vendors and users to reference the functionality defined in the IHE Technical Framework without having to restate all of the detail regarding IHE actors and transactions. They describe clinical information and workflow needs and specify the actors and transactions required to address them.

IHE has thus far defined Integration Profiles for the following clinical needs in Radiology:

- **Scheduled Workflow** defines the flow of information for the key steps in a typical patient imaging encounter (registration, ordering, scheduling, acquisition, distribution and storage).
- **Patient Information Reconciliation** defines an efficient method to handle the reconciliation of information for cases where procedures are performed on unidentified or mistakenly identified patients.

- **Consistent Presentation of Images** makes it possible to ensure a consistent view of images and annotations across different displays and media.
- **Presentation of Grouped Procedures** enables management of cases where images for multiple procedures are acquired in a single acquisition step (for example spiral CT of the chest and abdomen).
- **Post-processing Workflow** extends the scheduled workflow profile to support workflow steps such as Computer-Aided Detection, Image Processing, and Image Reconstruction.
- **Reporting Workflow** addresses the need to schedule, distribute and track the status of key reporting tasks such as interpretation, transcription and verification.
- **Evidence Documents** allows non-image information such as observations, measurements, CAD results and other procedure details to be stored, managed and made available as input to the reporting process.
- **Key Image Note** allows the addition of textual notes and pointers to key images in a series.

- **Simple Image and Numeric Reports** implement a standard way of creating, managing, storing and viewing reports that include images, text and numerical values.
- **Charge Posting** makes detailed information about procedures performed available to billing systems to allow consistently and timely billing of technical and professional charges.
- **Basic Security** establishes the first level of enterprise-wide security infrastructure for meeting privacy requirements (such as HIPAA) by managing cross-node security and consolidation of audit trails.
- **Access to Radiology Information** establishes a mechanism for sharing radiological images and information across department boundaries.

In addition, the following four Integration Profiles have been defined in the IT Infrastructure Domain:

- **Patient Identifier Cross-referencing** allows an institution to maintain in a single location all the identifiers for a patient used by its various information systems.
- **Retrieve Information For Display** provides a simple mechanism for obtaining and displaying documents and key patient-centric information.
- **Enterprise User Authentication** allows for a single user sign on across multiple systems.
- **Patient Synchronized Applications** allows for maintaining patient context across multiple applications.

➔ WHAT ARE IHE INTEGRATION STATEMENTS?

IHE Integration Statements are documents prepared and published by vendors to describe the intended conformance of their products with the IHE Technical Framework. They identify the specific integration capabilities a product is designed to support in terms of the key concepts of IHE: Actors and Integration Profiles.

➔ HOW DO I USE IHE?

How you use IHE depends on your specific role and your specific needs.

Clinicians and administrators should be aware of the clinical and operational benefits that can be realized through IHE Integration Profiles and encourage their departments to demand those capabilities when acquiring or upgrading systems.

Information technology professionals should know how to use IHE Integration Profiles in RFPs and purchasing agreements and should familiarize themselves with sections of the Technical Framework that describe interfaces between systems under their supervision.

Developers and systems integrators should have a detailed knowledge of the sections of the Technical Framework relevant to their systems.

If IHE is about achieving a common language for integration, then an analogy can be made to how one uses various resources to understand a foreign language. Standards such as DICOM and HL7 provide the vocabulary and basic grammar for the language of integration. The Technical Framework organizes these elements somewhat like a language textbook, fitting together the most relevant pieces and eliminating confusion and ambiguity. Integration Profiles are like a phrase book for essential communications. They further organize the language to enable vendors and purchasers to communicate about systems integration—even if DICOM or HL7 is not their native language.

IHE can make systems integration faster, more efficient, less expensive and more successful. Standards-based integration solutions like those defined in IHE are flexible, durable, easier to implement and less expensive to maintain than proprietary methods. Achieving systems integration through IHE is a dramatic step toward providing optimal patient care.

➔ HOW CAN I FIND OUT MORE ABOUT IHE?

You can learn more about IHE by attending demonstrations and presentations at the annual meetings of HIMSS and RSNA and other major medical gatherings. Further information about IHE can be found at www.rsna.org/IHE.

- The *IHE Primer* contains reprints of several articles from RadioGraphics that provide insights on the benefits of IHE integration and tips on implementing integrated systems.
- The brochure *IHE Radiology Integration Profiles: The Key to Integrated Systems* offers greater detail on the integration capabilities provided by each of the IHE Integration Profiles.
- The brochure *IHE Connectathon Results* provides information about the IHE Integration Profiles implemented and tested by vendors participating in IHE.
- Finally, the *IHE Technical Framework* offers a detailed guide to implementing HL7 and DICOM transactions to achieve effective interoperability.