

Health Information Exchange Solutions based in IHE deliver a standard method for managing document sharing among healthcare enterprises, ranging from private physicians to clinics to public health organizations and research facilities.



## A model for Health Information Exchange



The ability to share clinical, financial, research and public health information among different organizations is one of the main challenges facing healthcare today. Standards-based solutions are a crucial factor in answering this challenge. Integrating the Healthcare Enterprise (IHE) defines a technical framework that implements established messaging standards to achieve specific objectives for sharing critical medical information.

### What is IHE?

Integrating the Healthcare Enterprise is an initiative designed to advocate integration of information systems that support modern healthcare institutions. IHE focuses on ensuring that patients receive the best care possible, so that all necessary information for medical decisions is correct and available to healthcare professionals. The IHE initiative is both a process and a forum for encouraging integration efforts.

IHE includes a rigorous testing process for the implementation of its framework. IHE researchers organize educational sessions, workshops, and demonstrations for leading medical professionals and industry players to showcase the benefits of this framework and encourage its widespread adoption in the healthcare sector.

### Why Adopt IHE Initiatives?

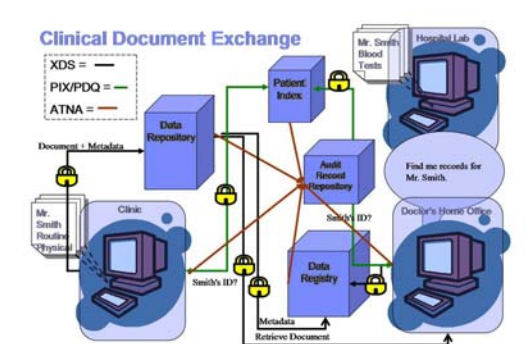
IHE is based on the understanding that system interoperability requires global collaboration and implementation.

In February 2009, hundreds of participants from over 70 companies and 12 countries gathered in Chicago, Illinois for the IHE North American Connectathon to confirm system interoperability. IHE holds similar annual testing events in Europe and Japan.

### Health Information Exchange

Health Information Exchange (HIE) software implements the IHE specifications to manage the sharing of documents among healthcare enterprises. This sharing can take place among healthcare enterprises, ranging from private physicians to clinics to public health and research facilities.

HIE is based on a flexible architecture that can adapt to any requirements (centralized, distributed or hybrid). The registry stores metadata that contains location information of databases that can be centralized or distributed. The IHE specifications allow for a solution which is hardware and software agnostic.



### Why Leverage Open Source?

New evolving standards can present a significant impediment to interoperable systems by inducing ongoing maintenance in each individual vendor product. Consumers should not have to choose between innovation and interoperability. An open source community can share the

overhead of maintaining standards as they evolve.

Open Health Tools is an open-source community devoted to expediting the adoption of healthcare informatics technology. Current members include the US Veterans Administration, Canada Health Infoway, HL7, ITSDO, and IBM among many others. The OHT IHE Profiles Project provides client-side implementations of the XDS.a and XDS.b Document Source and XDS.a and XDS.b Document Consumer, as well as implementations of several IHE actors from other integration profiles that are necessary complements to the HIE Solution.

OHT IHE Profiles software was used successfully to achieve interoperability in ten vendor systems at the 2009 North American Connectathon. Over the past three years, this technology has helped over 30 different systems interoperate. For more information see <http://iheprofiles.projects.openhealthtools.org/>

## US Nationwide Health Information Network (NHIN)

Health Information Exchange software forms the backbone of IBM's solution for the Nationwide Health Information Exchange (NHIN) Trial Implementations project, which started in September, 2007. For the NHIN project, the North Carolina Health Information and Communications Alliance (NCHICA) has built a health information exchange for North Carolina based on the key IHE profiles: XDS, ATNA, and PIX/PDQ. As its contribution to the NHIN project IBM has built a robust hosted offering around these profiles, augmented by additional capabilities for Access Consent management, online enrollment of healthcare providers, and Clinical Terminology management, to form a complete HIE ecosystem.

Through the NHIN project, IBM has worked alongside other HIEs and their technology vendors to create standards for information exchange among Health Information Exchanges. Following the IHE philosophy, the NHIN participants leveraged existing IHE work as much as possible, and profiled IHE standards for Cross-Community Patient Discovery and Cross-Community Document Exchange. The NHIN participants continue to work cooperatively with IHE technical committees to develop specifications for areas such as Document metadata and Subscription and Notification.

NCHICA and IBM chose to focus on a Personal Health Record scenario for the NHIN Trial Implementations demonstration that took place in December, 2008. NCHICA and its partners, including IBM, three EMR vendors, and two PHR vendors, leveraged IHE profiles to demonstrate the real-time exchange of summary patient records and personal health records among

three ambulatory EMR systems, a web-based portal, and two personal health record applications.

## Public Health Interoperability

Regional and national public health organizations are significant consumers of clinical data as well as producers of important population reports. By leveraging the same technical infrastructure and standards being created and actively adopted worldwide within the clinical domain, public health organizations can analyze data of interest like never before. IBM Almaden and Haifa Research Labs built the Public Health Information Affinity Domain (PHIAD) to connect private and public organizations working under a common set of policies and infrastructure to collaboratively share data via the IHE Cross-Enterprise Document Sharing (XDS) integration profile. PHIAD supports hierarchical data flow across different domains, paralleling the nature of public health reporting. PHIAD leverages open source tooling including the Open Health Tools (OHT) IHE Profiles project, Eclipse Business Intelligence Reporting Tools (BIRT), and Eclipse Open Healthcare Framework (OHF) Spatiotemporal Epidemiological Modeler (STEM).

## Continua Health Alliance

The Continua Health Alliance mission is to establish an ecosystem of interoperable personal health systems that empower people and organizations to better manage their health and wellness. Continua was founded in 2006 and now has over 175 member companies and organizations. IBM joined Continua at its inception in 2006 and has been an active participant in the development of the Continua guidelines, which define the Continua architecture based on standards including IHE, HL7 and IEEE. IBM has developed an SOA-based reference architecture and open source implementation of a personal health system based on our work at Continua. IBM's WebSphere Sensor Event platform is a proven, open, SOA based middleware platform. This platform has been tuned for remote patient monitoring by integrating our Continua components and our IHE infrastructure assets for EHR and PHR integration. We are partnering with

application vendors and medical device vendors to provide end to end personal health solutions.

## IBM Health Information Exchange

The IBM Health Information Exchange solution (HIE) implements the IHE specifications atop IBM's high performance, robust, highly scalable IBM middleware products to manage the sharing of documents among healthcare enterprises.

IBM HIE Solution features the following components:

- XDS.a/XDS.b Document Registry
- XDS.a/XDS.b Document Repository
- ATNA Audit Record Repository
- XUA Identity Provider Service
- XDS-I Imaging Source
- XCA Initiating and Responding Gateway

## Industry Events

- The HIE Solution and OHT have been a part of the last six Connectathon events (North America 2006, 2007, 2008, 2009 and Europe 2007, 2008) and have tested successfully with over different 70 vendor systems.
- The IBM HIE Solution has been demonstrated as a part of the following events: HIMSS IHE Interoperability Showcase (2006, 2007, 2008, 2009), RSNA IHE Demonstration (2006), ACC IHE Interoperability Showcase (2007), Zorg and ICT 2007 (Netherlands) IHE Demonstration (2007), Canada eHealth Conference Interoperability Showcase (2007), World of Health IT(Austria) Interoperability Showcase (2007) , eHealth Connecticut Demonstration (2007), Public Health Information Network (PHIN) Interoperability Showcase (2007, 2008)
- HIE provides internet-accessible reference implementation of IHE infrastructure profiles for vendor partner testing/demonstration during 2006, 2007, 2008 and 2009. See <http://xds-ibm.lgs.com:9080/info/>

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