Reduce the risk of compliance, increase productivity and decrease cycle time with a portal solution that combines people, processes and information with application integration, workflow modeling, collaboration and data management.

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Innovation Matters – IBM Global CEO Study

Connecting people and information in re-usable processes transforms business models, operations, products, services, and markets.
Transformational Innovations

- Improve quality and balances costs versus outcomes by aggregating views, delivering information and decision support in the context of clinical treatment – **enabling providers and payers to interact to deliver improved levels of care.**

- Innovative treatment protocols assembled from re-usable best practices, managed in conjunction with privacy and accountability, to **leverage advances in scientific knowledge and medical practice.**

- Improve quality of care, reduce risk and manage costs with **trusted information and decision support delivered in-line and in-context** for authorized roles and purposes.

- **Flexibility in composition of information, people and business processes** to address both disparate and common services across ecosystem of consumers, employers, payers, providers and governments.

- **Reuse components, processes and knowledge** from existing best practices, clinical care, biomedical research, healthcare financials and pharmaceutical development and monitoring to reduce innovation cycle time.
What is a Service Oriented Architecture?

... a service?
A repeatable task – e.g., patient id, record location, enroll a new member in a plan

... service orientation?
A way of integrating your Healthcare customer’s environment as linked services and the outcomes that result

... service oriented architecture (SOA)?
An IT architectural framework that supports service orientation

... a composite application?
A set of related & integrated services supporting a business process built on an SOA (e.g. IHE)
Healthcare & Life Sciences Ecosystem

ID/Valid  LI / LO  Clinical  Diagnosis  Delivery  Payor
Discovery  Development  Delivery

Manufacturing  Marketing  Operations Billing & Admin

Influencers & Regulators
Target ID Val.  LI / LO  Clinical

Payment

Research  Diagnosis  Delivery

Patient

IBM Healthcare and Life Sciences

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HCLS Ecosystem Imperatives

• Privacy and accountability
  - Provider & Payer – Health Information Privacy & Accountability Act (HIPAA)
  - Academic & Government – Institutional review boards, informed consent & regulatory compliance

• Interoperability and information exchange
  - Payer – Claims transaction, identification and processing; Provider and patient identification
  - Provider – Patient identification; Clinical data, terminology and imaging
  - Pharmaceutical – Electronic submissions, adverse event detection and disease biomarkers
  - Academic – Cohort selection, patient de-identification and disease biomarkers
  - Government – Bio-surveillance, public health and cost & quality

• Integration, Access and Action
  - Open, standards-based, information service models
    • Integration across heterogeneous legacy infrastructure
    • Aggregated longitudinal patient health record (PHR)
  - Process models for critical business functions
    • Admit, diagnose, treat, discharge
    • Repair & reject claims processing
  - Authentication, authorization and audit
    • Cross-enterprise certificate exchange
    • Public Key Infrastructure & digital signature
Joining People, Process & Information Together

Innovation

Accountability

HSA, PHR, EHR, RHIO ...

HIPAA, 21CFR11, ...

Process

People

Information
Standard SOA Reference Architecture
HIF Components

- Business Innovation & Optimization Services
  - ProLink™ and ProMap™

- Development Services
  - Eclipse Open Health Framework
  - HCLS Specific Models & Simulations

- IT Service Management
  - Administrative Console
  - ATNA
  - XUA
  - Federated ID Mgmt

- Infrastructure Services
  - Storage & Compute Grids

- Interaction Services
  - Clinical Information System Portlets
  - CCOW
  - SAFE

- Process Services
  - Transformation
  - Notification
  - Terminology
  - Workflows
  - Discovery
  - GxP R21CFR11

- Information Services
  - e-MPI
    - PIX, PDQ, Anonymous
  - XDS
    - File-system, DB2/CM, SCORE
  - Health Information Warehouse
    - Payer, Provider
    - UIMA (chemicals, biomarkers)

- Partner Services
  - XDS (client run-time)

- Business App Services
  - Document Scanning
  - Summarization
  - Reporting
  - Patient Informed Consent
  - e-Signature
  - Audit

- Access Services
  - HL7
  - DICOM
  - HL7 CDA
  - Lab (MES)
  - X12 (HIPAA transaction)
  - HCLS wrappers

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HIF Reference Platform – SCORE

• **SCORE** – Solution for Compliance in a Regulated Environment
  - IBM Software Product
    • Application Integration, Business Process Management, Collaboration, Data/Content Management
    • Full compliance tracking and management (21 CFR 11, GxP, HIPAA, Sarbanes-Oxley)
  - Open Standards Platform
    • J2EE, XML, BPEL, WSDL (enterprise services)
    • JSR 168 (collaboration portal)
    • JSR170 (content repository)

• Extensions for Discovery, Development, Provider and Payer
  - Implementation accelerator built specifically for the needs of each community
    • Acquisition / Provisioning Conversion / Transformation
    • Messaging / Auditing Imaging / Clinical
    • Metadata / Models Version / Hierarchy
    • Authentication / e-Signature Search / Personalization
HIF Models – Integration Across Architecture

- Component, Foundation, Information & Process Models provide integration across the architecture
  - Aligned with industry models
    - IAA, IFW
  - Aligned with industry fabrics
    - Webify SOBA

- Composite SOA applications & solutions exploit models to consume, supply and transform information and execute processes
  - Collaboration across people
  - Event-driven
  - Policy constrained
Information & Process Integration

- **Business Intelligence & MDM best practices, technology and methods**
  - Standards-based collection of clinical, prescription, laboratory, imaging and genetic data
    - Health Information Exchange (HIE)
    - Enterprise MPI and National Provider ID
  - Enterprise models of entities, relationships, terminologies, processes and semantics.
    - Payer & Provider data models
    - Imaging content management
    - Intellectual property, chemical and genomic analyses

- **Standardization on IBM SOA Reference Architecture**
  - Enterprise Services Bus
  - BPEL, WSDL
  - Service Data Objects
Privacy and Accountability

- Role Based Access Controls (RBAC) standard across industry
  - Provider, Payer, Pharma, Govt
  - HIPAA content restrictions
  - Informed consent
  - Clinical trials

- Process-driven and secure method for approval
  - Authentication and authorization
  - Directory integration
  - Signature and audit trail
In addition to direct contributions to these groups, IBM has pledged royalty free access to our patents to Healthcare development in support of selected HL7 standards that will also utilize technology standards: X-forms, open documents and web services.
Health Information Exchange

IHII
High Level Architecture

Clinical Affinity Domain (RHIO)

Healthcare Enterprise
Enterprise Service Bus

Document Consumer
Document Source
Document Repository

Portal
MPI
WADO Server
Transformation
De-identification
Terminology
Workflow
Indexer

RIS
HIS

Portal
MPI
Proc Assurance
WADO Server
Transformation
De-identification
Annotation
Workflow
Indexer

RIS
HIS

NIHIN Bus

Healthcare enterprise
IBM Extensions
IBM Implemented IHE XDS Components
NHIN level components

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IHE Connectathon / HIMSS Showcase

- **Project Objectives**
  - Validate and demonstrate use of open standards to accelerate cross vendor and cross enterprise healthcare data exchange and interoperability.
  - Cross-vendor test event to validate and tune standards-based healthcare IT solutions
  - Public demonstration of clinical scenarios spanning multiple vendor solutions across multiple provider settings

- **IBM Solution**
  - Standards-based, healthcare data exchange infrastructure based on proven IBM software and hardware technology.
  - Patient identity management services, healthcare data repository, healthcare data registry

- **Customer Benefits**
  - Improved time to market and reduced cost to implement healthcare information exchange network solutions.

- **Partner Benefits**
  - Validation of individual vendor components within broader healthcare network solution. IBM provided reference infrastructure platform to validate healthcare solutions from 28 vendors: Allscripts, Blueware, CapMed, Compasscare, Dictaphone, Ellipsys, Epic, GE, HIPAAIT, HXTI, Infinit, Intersystems, JohnChardin, Kodak, Kryptiq, McKesson, Medinotes, MieWeb, Misys, NextGen, Phillips, Quovadix, Siemens, Soft Medical, Sovera, St. Jude Medical, Tiani-Spirit, VA

![Diagram of healthcare network system](image-url)

### Table: IHE Domain and Integration Profile

<table>
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<tr>
<th>Problem</th>
<th>IHE Domain</th>
<th>IHE Integration Profile</th>
<th>Transaction</th>
<th>Actors</th>
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<td>Patient Identity and PIX</td>
<td>Patient Identity</td>
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<td>Managing image acquisition and storage</td>
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<td>Worklist Provided</td>
<td>Worklist Provided</td>
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<td>Retrieve ECG Document for Eligibility</td>
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<tr>
<td>Viewing high quality ECGs from any access point</td>
<td>Document Consumer</td>
<td>Document Repository</td>
<td>Document Registry</td>
<td>Document Registry</td>
</tr>
</tbody>
</table>

![Diagram of healthcare network system](image-url)

- **Document Source**
- **Document Repository**
- **Document Consumer**
- **Patient Identity Source (PIX)**
- **Document Registry**
- **Query Registry**

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PCN Elements

### Identify
- Need for integrated identity (patient, member, provider)
  - eMPI
- Health Plan Data Model
- National Provider Identifier

### Exchange
- Need for information exchange (security, privacy, archival)
  - HCN
  - IHII
  - DataPower
  - SCOR

### Integrate
- Need for integrated information (operational, longitudinal)
  - WebSphere Customer Care

### Exploit
- Need for actionable services (adjudication)

### Discover

---

Levels of Maturity
Why IBM’s Health Information Framework?

IBM understands service orientation and HCLS

Expertise in aligning business and IT processes
- Healthcare and Pharma domain expertise and consultants
- World-class enterprise tooling and methodologies
- Multiple SOA-enabled methods for clinical information
- Leadership in open source community

Extensive Industry experience and best practices
- Over 250 Healthcare customers worldwide

Growing ecosystem of Healthcare partners
- 25 partners in the Healthcare community worked with IBM at the HIMSS IHE Showcase

Unmatched breadth and depth of products
- Over $1B/yr invested in SOA
- IBM leads over 50 standards bodies
- Over 300 SOA-related patents