HL7 and Service-oriented Architecture (SOA)
Ambassador Briefing

February 2011
Topics

- Understanding Service-oriented Architecture (SOA)
- The case for Healthcare SOA Standards
- Introducing HSSP
- Status of Standards Work
- Summary
First, A Few Terms...

- DSTU = Draft Standard for Trial Use
- HL7 = Health Level Seven
- HSSP = Healthcare Services Specification Project
- OMG = Object Management Group
- OHT = Open Health Tools
- SOA = Service-oriented Architecture
Understanding SOA
A Twenty-Second Interoperability Quiz...

Are you interoperable...

- … if you and your business partners “speak” different languages
- … if gender = “01” means “male” in your business and “female” for your business partner?
- … if the primary context for information sharing is e-mail or fax?
- … if electronic data is exchanged via CD-ROM, or DVD-ROM?
- … if you use XML?
- … if you use Web Services?
The 20 Second Agility Quiz

How well does your organization’s IT adapt to…

- … address the new business rules that resulted from a legislated policy?
- … deployment changes resulting from adding a data center?
- … integrating clinical information with a new business partner?
- … integrating with “the new <place clinical specialty here> system”
- … emerging public interest in personal health records?
Wouldn’t it be nice if...

- …your organization could use any MPI you chose without re-integrating?
- …you could painlessly integrate data from new clinical systems into a patient’s health summary / cover sheet?
- …heterogeneous systems could be accessed consistently from your installed application base?
- …standards supported your ability to redeploy or distribute hardware and software without breaking things?
## SOA ≠ Web Services

<table>
<thead>
<tr>
<th></th>
<th>SOA</th>
<th>Web Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is a technology platform?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Is a transport protocol?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Primary ownership is business-line owned?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Affects workflow and business processes?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Is an enabler for business and IT transformation?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Is an industry standard?</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
How *is* SOA different from messaging?

- A common practice in healthcare, just not yet in healthcare IT
- Many key products use them but do not expose interfaces
- Ensures functional consistency across applications
- Accepted industry best practice
- Furthers authoritative sources of data
- Minimizes duplication across applications, provides reuse
- Messages can be either payloads in or infrastructure beneath services
- Service-oriented architecture provides the framework for automation of common services
- Still, SOA has to be done well. It is cheaper and easier than ever to create badly designed applications and spaghetti integration
Interoperability Realized

- Context
- Requirements
- Constraints

Model

- Services
- Documents
- Messages
Why SOA Healthcare Standards?
Why develop healthcare SOA standards?

- Healthcare organizations are being driven to interoperate
- “Messaging” is not the ideal approach for every interoperability challenge
- SOA has demonstrated viability and benefits for many organizations and in many vertical-markets
Understanding Interoperability

- High
- Low

Information & Semantics
- Standardized Vocabulary/Ontology
- Standardized Data Types
- Proprietary or Local Semantics
- Reference Information Model
- Archetypes (Knowledge & Structure)
- Templates (Model Fragments)

Design & Technology
- Standardized Domain Services
- Custom "Vertical" Domain Services
- Enterprise Service Bus
- Web Services/Middleware
- Message Routing
- Messaging Specifications (H7, others)
- Point-to-point Infrastructure

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Introducing HSSP
The Healthcare Services Specification Project (HSSP)

- An effort to create common “service interface specifications” tractable within Health IT
- A joint standards development project involving Health Level 7 (HL7) and the Object Management Group (OMG)
- Its objectives are:
  - To create useful, usable healthcare standards that address functions, semantics and technologies
  - To complement existing work and leverage existing standards
  - To focus on practical needs and not perfection
  - To capitalize on industry talent through open community participation
What is the Healthcare Service Specification Project?

A joint standards development activity occurring in multiple organizations, including Health Level 7 (HL7), the Object Management Group (OMG), IHE, Open Health Tools, and others.

An effort to create common “service interface specifications” tractable within Health IT.

Its objectives are:

- To create useful, usable healthcare standards that address business functions, semantics and technologies.
- To complement existing work and leverage existing standards.
- To focus on practical needs and not perfection.
- To capitalize on industry talent through open community participation.
The Benefits of HSSP Standards...

- Define industry standard behaviors for healthcare-oriented service functions
- Eliminate “different flavors” of web services from occurring in different organizations
- Rapid-pace stds development: ~18-24 months
- Methodology embracing cross-group standards development
Cross-Organizational Standards Development

HL7

Service Functional Model
HL7 Draft Stds for Trial Use
ANSI Standard

OMG

OMG Request for Proposal (RFP)
Technical Specification

RFP Responders

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<table>
<thead>
<tr>
<th>Asset</th>
<th>Purpose</th>
<th>Functional Spec-DSTU</th>
<th>Technical Spec</th>
<th>Functional Spec-Norm</th>
<th>Implementation Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entity Cross-Reference Service (IXS)</td>
<td>To manage and correlate identities and identifying traits (e.g., MPI)</td>
<td>Complete</td>
<td>Complete</td>
<td>Complete</td>
<td>Commercially Available</td>
</tr>
<tr>
<td>Retrieve Locate Update Service (RLUS)</td>
<td>To manage location and retrieval of healthcare content</td>
<td>Complete</td>
<td>Complete</td>
<td>Expected 5/2011</td>
<td>In Development</td>
</tr>
<tr>
<td>Decision Support Service (DSS)</td>
<td>To analyze patient data and assess against knowledge rules.</td>
<td>Complete</td>
<td>Complete</td>
<td>Complete</td>
<td>Open Source Expected ~May 2011</td>
</tr>
<tr>
<td>PASS [Healthcare] Access Control Service</td>
<td>Manages security policy as pertaining to access to health information</td>
<td>Complete</td>
<td>Complete (Beta)</td>
<td>TBD</td>
<td>In Development</td>
</tr>
<tr>
<td>PASS [Healthcare] Audit Service</td>
<td>Security-oriented service to manage audit record</td>
<td>Complete</td>
<td>Complete (Beta)</td>
<td>TBD</td>
<td>In Development</td>
</tr>
<tr>
<td>Healthcare and Community Services Provider Directory (HCSPD)</td>
<td>To find providers &amp; services in allocated areas, e.g., referrals.</td>
<td>N/A</td>
<td>In process, Expected</td>
<td>Complete</td>
<td>TBD</td>
</tr>
</tbody>
</table>
Entity Cross-Reference Service (IXS)

- provides a business level (or conceptual specification) of a set of capabilities that should be provided by an MPI-type capability
- copes with different entity types (people, patients, providers, devices etc) and multiple domains (national, regional, inter and intra organization) of use.
- provides a flexible approach to metadata that allows dynamic definition of a set of traits that can be used to identify entities
- Formerly known as the Entity Identification Service
SOA In Action... An Identity Management Example

Scenarios
1. Query local domain: entity found locally
2. Query local domain: entity not found locally, retrieve from master domain
3. Query master domain: retrieve linked entities from master domain
4. External System Query: Retrieve from master domain

Local/Regional Domain 1

“Local” Identity Service

Implementation

Interface

Local/Regional Domain 2

Regional Identity Service (EIS)

Implementation

Interface

National/Master Domain

National Identity Service

Implementation

Interface

External organization’s system

1. Query local domain: entity found locally
2. Query local domain: entity not found locally, retrieve from master domain
3. Query master domain: retrieve linked entities from master domain
4. External System Query: Retrieve from master domain

1.1
2.1
2.2
2.3
2.4
2.5
2.6
3.1
3.2
3.3
3.4
4.1
Common Terminology Service II (CTS II)

- information and functional model for relationships and use of terminology
  - how data elements are constrained to ranges of possible codes
  - how selection lists are built and queried
  - how terminological information is validated
- interactions between terminology providers and consumers
  - submit requests for corrections and extensions
  - identification, distributions, integration of revisions to content into running systems.
- mapping between terminologies and data models
- queries for logic-based terminologies about subsumption and inferred relationships
Decision Support Service (DSS)

- uses patient data to draw conclusions regarding patients
- “guardian” of one or more modules of medical knowledge
- each DSS knowledge module is capable of utilizing coded patient data to arrive at machine-interpretable conclusions regarding the patient, examples
  - Medication ID, age, gender, weight, serum creatinine level -> Recommended maximum and minimum doses given patient's estimated renal function
  - age, gender, past health maintenance procedures -> list of health maintenance procedures due or almost due
- DSS semantic profiles for immunization forecasting
Retrieve Locate and Update Service (RLUS)

- expose healthcare assets and resources within an organization that are needed to meet business or medical needs
- interfaces to locate, retrieve, and update resources among and between healthcare organizations
- not intended to replace existing systems or implementations - transparent means of locating and accessing health data
  - regardless of underlying data structures, security concerns, or delivery mechanisms
- semantic profiles (e.g. HL7 message information models, CEN 13606 archetypes) define the payload
Privacy Access and Security Services (PASS) – Access Control

- Effort to bring consistency to access control (security) enforcement within a SOA architecture for health settings
- Service is policy-driven and context-aware
- Access decision service capability with extensions for the healthcare environment
- Service capabilities for secure collection of healthcare-specific access decision information
Privacy Access and Security Services (PASS) – Audit

- Service capability to provide for the generation of Healthcare Audit Event Records
- Provides for the secure submission of Audit Records for processing and storage
- Provides a service capability to support healthcare disclosure Audit Reporting
Healthcare and Community Services Provider Directory (HCSPD)

- Intended to fill a void that exists when it comes to the discovery and scheduling of [healthcare] services
- Defines key functionality such as Relate a Resource to a Location, Establish a Service Location, and Relate a Provider to a Provider Organization.
- SOA service to assist in the management and discovery of health and human services functions within or across Enterprises
- Can be used to “discover a provider”, “find a provider in plan”, “find a service capability with capacity”, etc.
- Its usage is not limited to direct care functions (e.g., can support community-based needs, such as “meals on wheels”)
SOA and Enterprise Architecture in HL7

- HL7 has produced a Services-Aware Interoperability Framework (SAIF) which embraces services, messages and documents
- Includes SOA-based behavioral framework and conformance framework for HL7 standards (including HL7 v2 and v3 messages, CDA documents and services)
- Utilizes SOA and Model-Driven Architecture principles for explicit expression of policy, governance and traceability
- Service standards rely on SOA WG and HSSP work
- Framework development in progress, will influence future development of standards within HL7
“Practical Guide for SOA in Healthcare”

- Targeted to help those interested in SOA to do SOA
- *Is one* approach for SOA-enabling healthcare organizations
- Brings together practical experience with recommended best-practices
- Is not (nor is it intended to be) an industry standard
- Is not (nor is it intended to be) officially sanctioned by HL7
- Three volumes to suit different audiences
  - Volume One to “Get Started”
  - Volume Two presents an Immunization Case Study
  - Volume Three ties the body of work to SAIF and HITSP

Available at [http://hssp.wikispaces.com/PracticalGuide](http://hssp.wikispaces.com/PracticalGuide)
Find out more about HL7 on our website...

Visit [www.hl7.org](http://www.hl7.org) for…
- …all of our published specifications
- …details about upcoming educational forums
- …current work-in-progress and ballot information
- …international affiliates
- …membership information

Visit [www.healthinterop.org](http://www.healthinterop.org) for…
- …all of the details, work in progress, and specifications that are part of the HSSP collaboration…
SOA In Healthcare Conference 2011
SOA Road-map to Integration: Architecting Interoperability in Healthcare

- Three-day event featuring lessons-learned, best-practices, and experience sharing
- Featured keynotes from globally-recognized healthcare and technology leaders
- Event designed to foster interaction and knowledge sharing with your peers
- Representation from provider, payer, and public health communities
- Call for Abstracts just extended to March 4
For More Information....

■ Contact us!
   - ken.rubin@hp.com (co-chair, ambassador)
   - galen.mulrooney@va.gov (co-chair)
   - djorgenson@inpriva.com (co-chair)
   - Ann.Wrightson@wales.nhs.uk (co-chair)

■ Events...
   - SOA in Healthcare, Washington DC, July 2010
     visit http://www.omg.org/soa-in-healthcare

■ Visit our project wiki....
   - http://healthinterop.org
Summary

“How do you know that the [web-] services you’re building are not just the next generation of stovepipes?”

Janet Martino, LTC, USAF (Retired) to a panel of Healthcare IT Leaders