HL7 "EHR SD RM" Project
"EHR System Design Reference Model"

The Practical Guide to SOA in Healthcare Volume II:

Immunization Management Case Study

Lessons Learned

HL7-OMG SOA in Healthcare Conference,
The Role of SOA on the Path to Meaningful Use
12 July 2010, Functional Track, 1615-1700

Practical Guide: http://hssp.wikispaces.com/PracticalGuide
EHR SD RM info: http://hssp.wikispaces.com/Reference+Architecture

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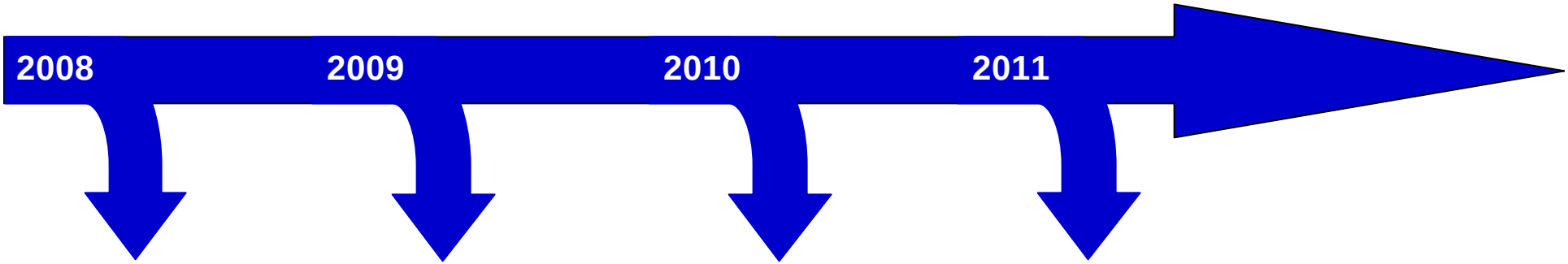
EHR SD RM Milestones



Healthcare SOA Reference Architecture

(H-SOA-RA)

EHR SD RM Immunization & Response Management (IRM) Prototype

Oct

HSSP Practical Guide for SOA in Healthcare Volume II: Immunization Case Study

Informative Reference

Jan

EHR SD RM DSTU

Oct

Normative Standard

Universal Immunization Tracking System Pilot

DSTU is Draft Standard for Trial Use (ANSI standards development)

Immunization Project Documentation Plan

The Practical Guide For SOA in Healthcare Volume II

- ✓ Version A, dated 26 Mar 2010, Table of Contents
- ✓ Version B, dated 02 Apr 2010, Background Section (1st Draft)
- ✓ Version C, dated 09 Apr 2010, Executive Summary, TOGAF ADM and SAIF Sections (1st Draft)
- ✓ Version D, dated 16 Apr 2010, Executive Summary and TOGAF ADM (2nd Draft)
- ✓ Version E, dated 30 Apr 2010, SAIF-ECCF Appendix (2nd Draft)
- ✓ Version F, dated 30 Apr 2010, IHE, TOGAF ADM and SAIF Sections (3th Draft)
- ✓ Version G, dated 07 May 2010, Full document edit, cleanup, review and gap identification
- ✓ Version H, dated 14 May 2010, Document & Slides for HL7 WG meeting in Rio de Janeiro.

TODO ...

- ❑ Version ?, dated summer 2010, ECCF architectural artifact ontology & glossary
- ❑ Version ?, dated summer 2010, Add FHIM to IMC specification
- ❑ Version ?, dated summer 2010, Add NIEM IEPDs to IMC specification
- ❑ Version ?, dated summer 2010, Add CCHIT certification criteria to IMC
- ❑ Version ?, dated summer 2010, Integrate NHIN Connect & Direct Services into ECCF PIM
- ❑ Version ?, dated summer 2010, Add UITS IMC Platform Specific specifications
- ❑ Version ?, dated summer 2010, Enhance the TOGAF & ECCF discussions linking views together
- ❑ Version ?, dated summer 2010, Refine ECCF Conformance Statements
- ❑ Version 1.0, dated 01-Oct-2010, for HL7 24th Annual Plenary & Working Group Meeting

Immunization Management Case Study Documentation Approach

The Practical Guide for SOA in Healthcare Volume II presents the case study, which adds an

- Immunization Management Capability (**IMC**) to Volume I's
- SampleHealth's Service Oriented Architecture (**SOA**). We used the
- TOGAF Architecture Development Method (**ADM**) and
- HL7 Service Aware Interoperability Framework (**SAIF**)
  - Enterprise Conformance and Compliance Framework (**ECCF**).

Volume II demonstrates HL7's EHR System Design Reference Model (**EHR-SD RM**)

  - Linking EHR System Functional Model, FHIM, HITSP, HITECH, HSSP, IHE, NIEM

- To provide an Exchange Architecture baseline suitable for an EHR related
  - SOA acquisition, development or certification project.

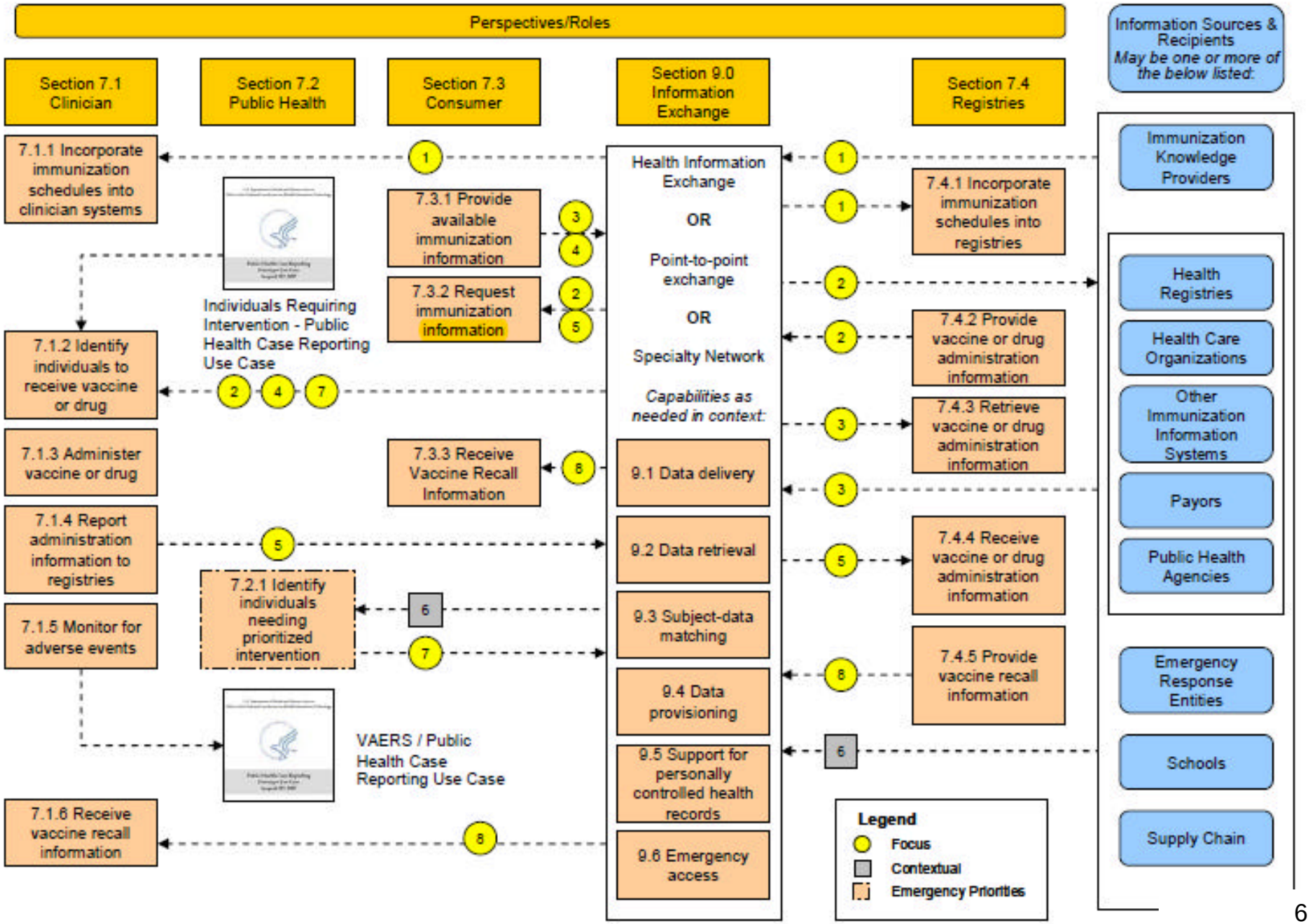
Immunization Management Case Study
Technical Approach

- Two use cases from the Health and Human Services (**HHS**) American Health Information Community (**AHIC**) were used. The Immunization Response Management (**IRM**) use case and its Vaccine and Drug Administration and Reporting scenario and the Public Health Case Reporting **(PHER)** use case were used to develop the business architecture, Information Exchange Requirements (**IERs**), data requirements, interoperability specifications and conformance statements for the IMC's Services.
- EHR System Functional Model defined requirements
- HITSP Defined Interoperability Specifications
- IHE Defined Implementation Profiles

EHR-SD RM Prototype [2008 AHIC Use Cases]
Immunization and Response Management (IRM)

- The IRM AHIC Use Case and HITSP Interoperability Specification are intended to support current interoperability approaches between EHRs and Immunization Information Systems while allowing for a migration toward emerging interoperability implementations and document sharing environments where PHRs are able to be included in the information flow
- The Interoperability Specification also allows for basic electronic information exchanges to enable requirement communications and alerting mechanisms and to lay the foundation for future clinical support capabilities
  - Scenario 1: Vaccine and Drug Administration and Reporting and
  - Scenario 2: Vaccine and Drug Inventory Reporting

EXAMPLE ARTIFACT: Vaccine and Drug Administration and Reporting Information Exchanges



HL7 EHR System Functional Model (EHR-S)

> 160 System Functions in 4 level categorization
(separate spreadsheet available for full enumeration)

System Functions

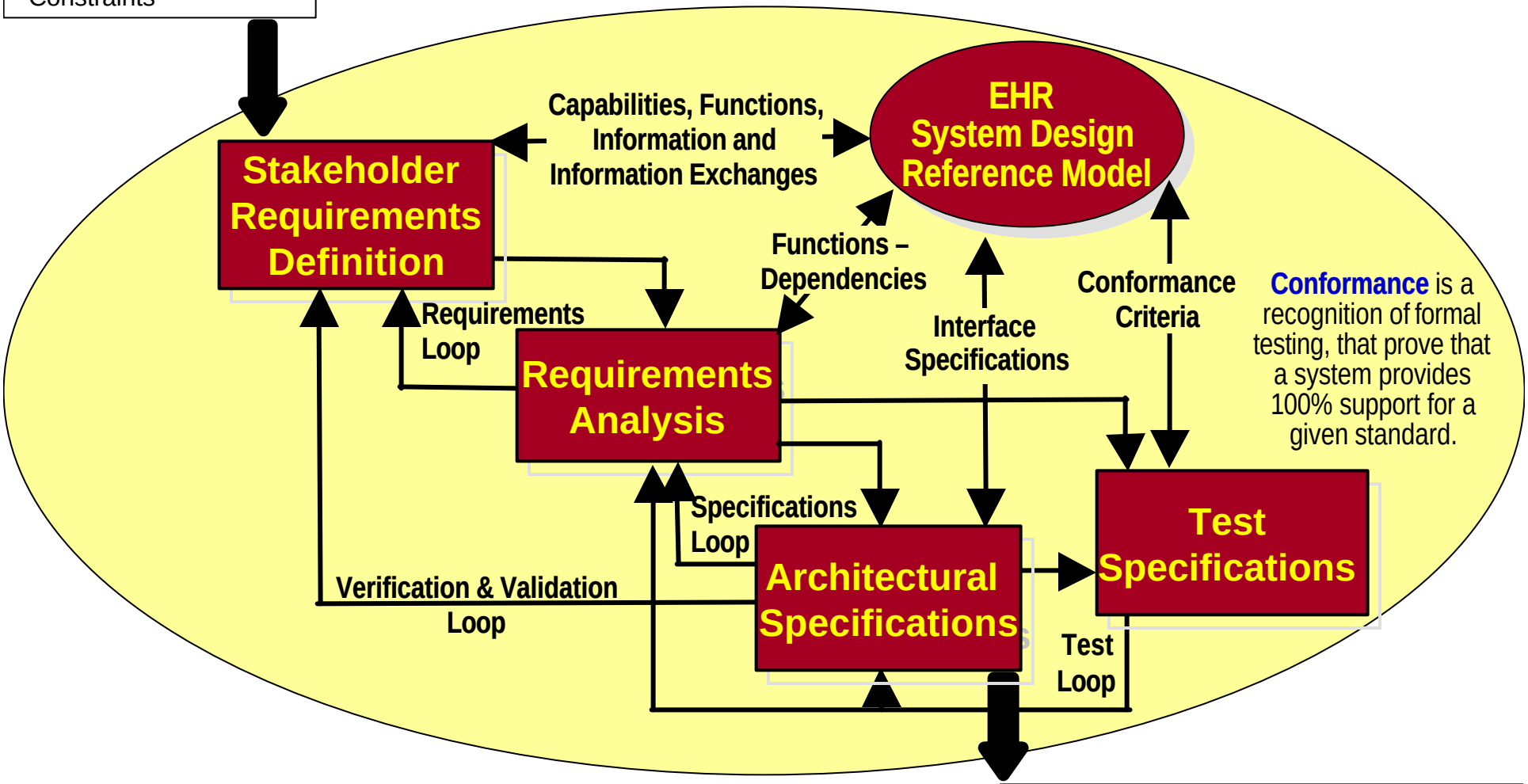
Direct Care	DC.1	Care Management
	DC.2	Clinical Decision Support
	DC.3	Operations Management and Communication
Supportive	S.1	Clinical Support
	S.2	Measurement, Analysis, Research and Reports
	S.3	Administrative and Financial
Information Infrastructure	IN.1	Security
	IN.2	Health Record Information and Management
	IN.3	Registry and Directory Services
	IN.4	Standard Terminologies & Terminology Services
	IN.5	Standards-based Interoperability
	IN.6	Business Rules Management
	IN.7	Workflow Management
Other	O-1	Electronic Resource Planning (ERP)
	O-2	Finances
	O-3	Other

EHR-S FM functions can be grouped into Service Components … aka Capabilities (e.g., Lab Order Capability, which does eligibility and authorization function as well as lab order function).

NOTE: **"Other" Category** - The EHR-S model does NOT include Electronic Resource Planning (ERP) / Logistics and Financial components, which are needed for completeness of a Health IT Enterprise.

EHR System Design Reference Model (EHR SD RM) Supporting Requirements/ Architecture Development Cycle

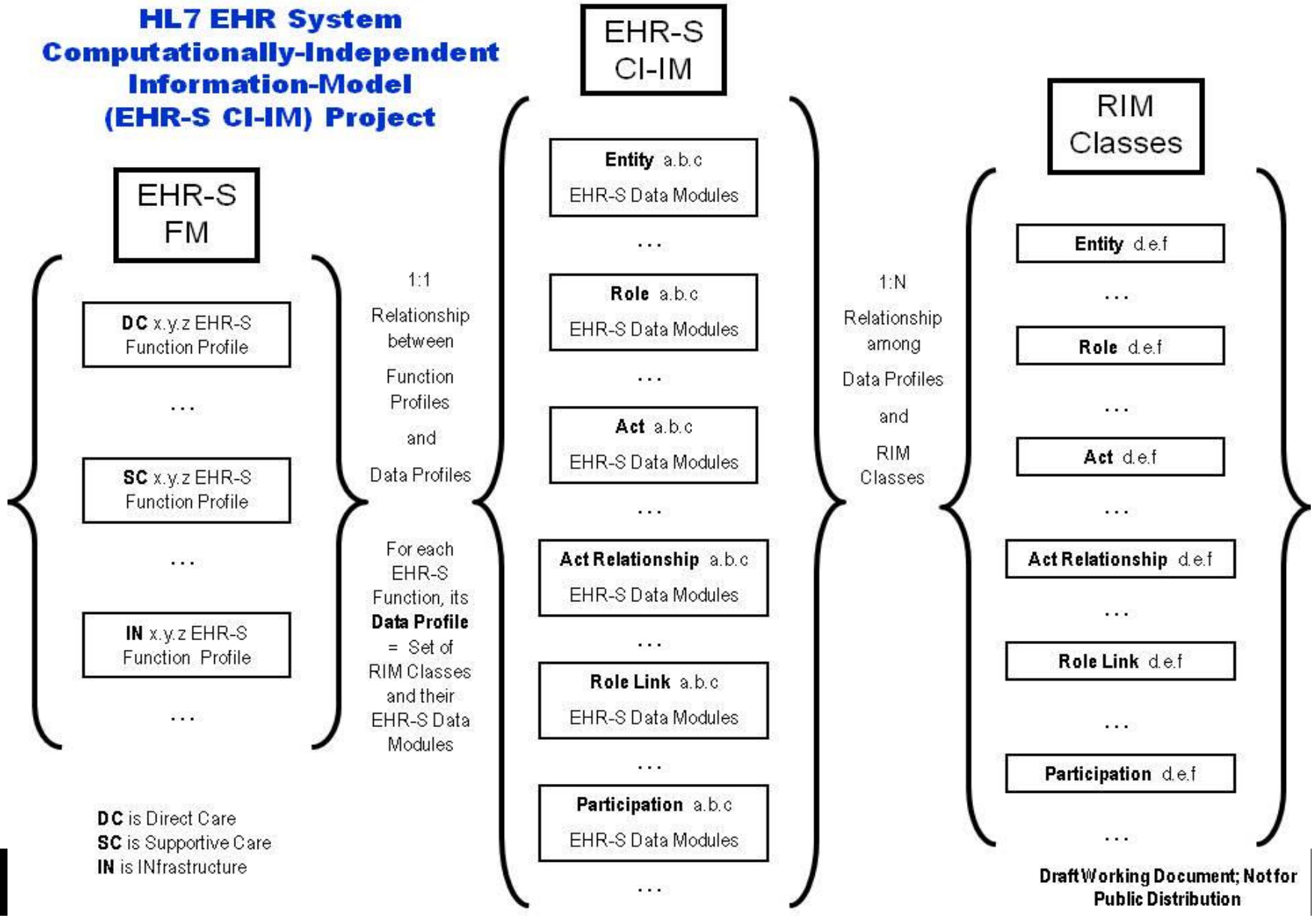
PROCESS INPUTS
-Required Capabilities
-Environments
-Constraints



Conformance is a recognition of formal testing, that prove that a system provides 100% support for a given standard.

PROCESS OUTPUTS
-System Architecture,
-Test Specifications
-Configuration Management Baselines

Lesson Learned: EHR-S FM needs a Companion EHR-S Information Model



Immunization Management ECCF Specification Stack

Subject Specification	Enterprise Viewpoint "Why" *Policy*	Information Viewpoint "What" *Content*	Computational Viewpoint "How" *Behavior*	Engineering Viewpoint "Where" *Implementation*
CIM (Conceptual)	✓ Inventory of o Use Cases o Capabilities-Services o Requirements o Contracts o Stakeholders ✓ Business Scope ✓ Business Vision ✓ Business Objectives ✓ Policy & Regulations	✓ Inventory of o Domain Entities o Roles, o Activities, o Associations. ✓ Information Models o Conceptual o Domain	✓ Inventories of o Capabilities-Components, o Functions-Services. ✓ Requirements o Accountability, Roles o Behaviors, Interactions o Functional Profiles, o Interfaces, Contracts ✓ Conceptual Functional Service Specifications	✓ Inventory of Platforms/ Environments.
PIM (Logical)	✓ Applicable Rules ✓ Use Case Specs ✓ Governance. ✓ Technology Neutral Standards ✓ Wireframes of o architectural layers o Components and o Associations	✓ Information Models o Localized o Constrained o Project ✓ Message Content Specifications	✓ Use Case Specs ✓ Component. specs ✓ Interface Specs ✓ Interaction Specs ✓ Collaboration Participations ✓ Collaboration Types ✓ Function Types ✓ Interface Types ✓ Collaboration Scripts ✓ Service Contracts	✓ Existing Platform models, Capabilities, Libraries and Versions.
PSM (Implementable)	✓ Business Nodes ✓ Business Rules ✓ Business Procedures ✓ Business Workflow ✓ Technology Specific Standards	✓ Database Schemas ✓ Message Schemas ✓ Transformation Schemas (e.g., XSD)	✓ Automation Unit ✓ Technical Interfaces ✓ Technical Operations ✓ Orchestration Scripts	✓ Application Specs. ✓ GUI Specifications ✓ Component Designs ✓ Deployment Topology ✓ Platform Bindings

HITSP, HL7, HITEC, FHIMS, NIEM and NHIN Within HL7 SAIF ECCF Specification Stack

Topic Specification	Enterprise / Business View "WHY" Policy	Information View "WHAT" Content	Computational View "HOW" Behavior	Engineering View "WHERE" Implementation
Conceptual	HITEC MU HL7 EHR–S FM HITSP Security Framework	HL7 RIM FHA FHIMS HITSP DA HITSP Capability	HL7 EHR-S FM Harmonization-Requests/ Use Case HITSP Capability	Tomcat, JBoss, J2SE, Eclipse, GlassFish ESB, OpenSSO
Platform-Independent	HITSP Interoperability Specification (IS)	HITSP Component NIEM Information Exchange Package	NIEM, HITSP Transaction, Transaction Package and Service Collaboration	HSSP and NHIN-Connect *Services*
Platform-Specific	Rules, Procedures	Localized Information Model, Transforms, Schema	Collaboration scripts, Orchestrations, Realized	Execution Context, Platform Bindings, Deployment Model

Traceable

EHR-S FM is EHR System Functional Model
EHR SD RM is EHR System Design Reference Model
HITEC MU is 2009 HITEC Act Meaningful Use Objectives/ Criteria
NIEM is National Information Exchange Model
RIM is Reference Information Model
FHIMS is Federal Health Information Model & Standards
DA is Data Architecture

Consistency

Subject Specification	Enterprise Viewpoint "Why" - *Policy*	Information Viewpoint "What" - *Content*	Computational Viewpoint "How" - *Behavior*	Engineering Viewpoint "Where" - *Implementation*
Computational Independent Model - CIM (Conceptual)	✓ CV-1: Vision ✓ CV-2: Capability Taxonomy ✓ CV-3: Capability Phasing ✓ CV-4: Capability Dependencies ✓ CV-5: Capability to Organizational Development Mapping ✓ CV-6: Capability to Operational Activities Mapping ✓ CV-7: Capability to Services Mapping ✓ PV-1: Project Portfolio Relationships ✓ PV-2: Project Timelines ✓ PV-3: Project to Capability Mapping ✓ **StdV-2 Standards Forecast**	✓ DIV-1: Conceptual Data Model	✓ SV-8 Systems Evolution Description ✓ SV-9 Systems Technology Skills Forecast ✓ **SV-4 Systems Functionality Description**	✓ SvcV-7 Services Measures Matrix ✓ SvcV-8 Services Evolution Description ✓ SvcV-9 Services Technology & Skills Forecast ✓ **SvcV-4 Services Functionality Description**
Platform Independent Model - PIM (Logical)	✓ **OV-1: High Level Operational Concept Graphic** ✓ **OV-2: Operational Resource Flow Description** ✓ **OV-3: Operational Resource Flow Matrix** ✓ **OV-4: Organizational Relationships Chart** ✓ **OV-5a: Operational Activity Decomposition Tree** ✓ **OV-5b : Operational Activity Model** ✓ OV-6a: Operational Rules Model ✓ OV-6b: State Transition Description ✓ **OV-6c: Event-Trace Description**	✓ **DIV-2: Logical Data Model**	✓ **SV-1 Systems Interface Description** ✓ **SV-2 Systems Resource Flow Description** ✓ SV-3 Systems-Systems Matrix ✓ **SV-5a Operational Activity to Systems Function Traceability Matrix** ✓ **SV-5b Operational Activity to Systems Traceability Matrix**	✓ SvcV-1 Services Context Description ✓ **SvcV-2 Services Resource Flow Description** ✓ SvcV-3a Systems-Services Matrix ✓ SvcV-3b Services-Services Matrix ✓ SvcV-5 Operational Activity to Services Traceability Matrix
Platform Specific Model - PSM (Implementable)	✓ **StdV-1 Standards Profile**	✓ DIV-3: Physical Data Model	✓ **SV-6 Systems Resource Flow Matrix** ✓ SV-10a Systems Rules Model ✓ SV-10b Sys. State Transition Description ✓ **SV-10c Systems Event-Trace Description**	✓ **SvcV-6 Services Resource Flow Matrix** ✓ SvcV-10a Services Rules Model ✓ SvcV-10b Services State Transition Description ✓ SvcV-10c Services Event-Trace Description

Lesson Learned: Services can be presented as Engineering "Infrastructure" Viewpoint

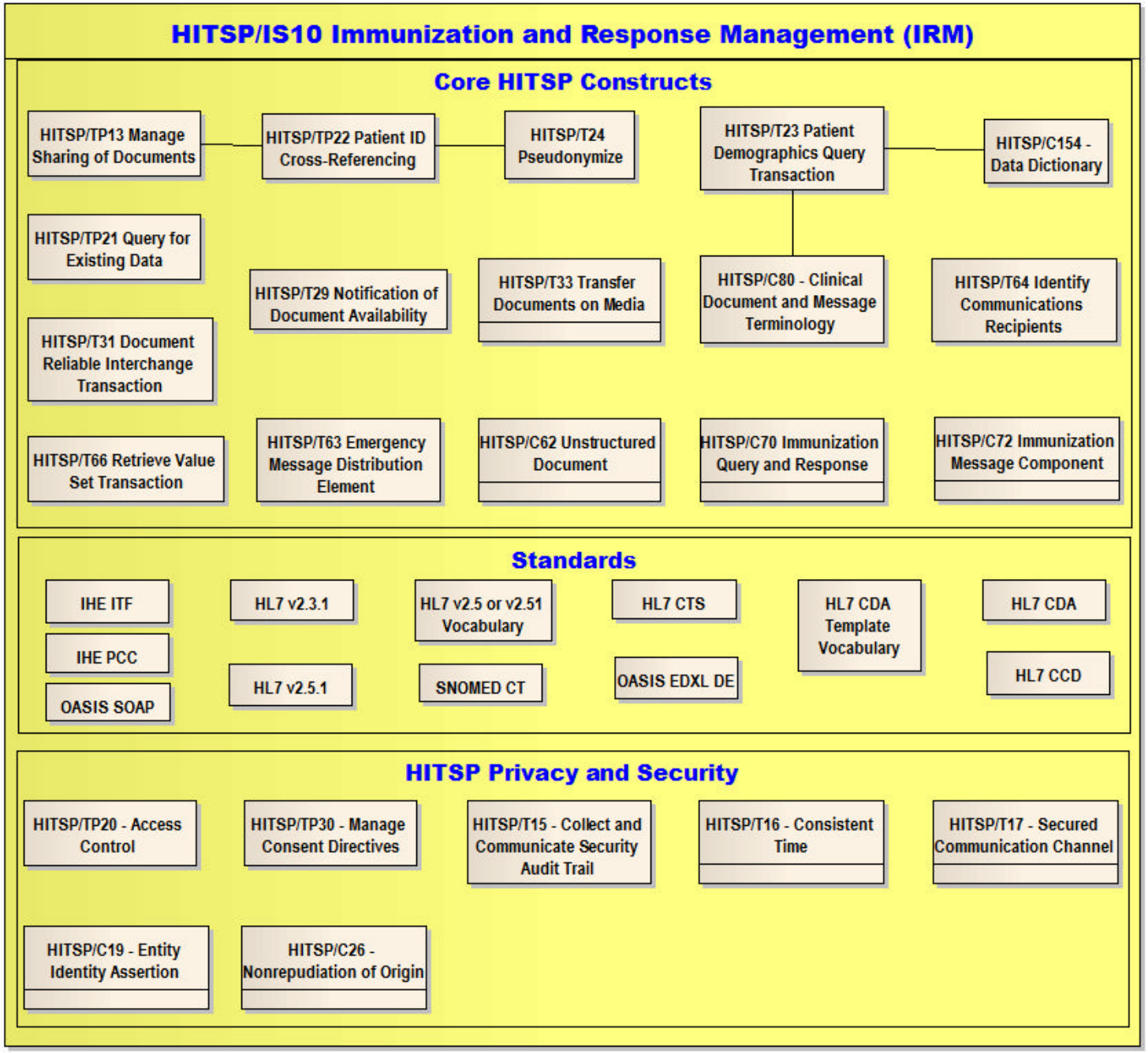
Bolded Blue views are generally mandated

Others are optional

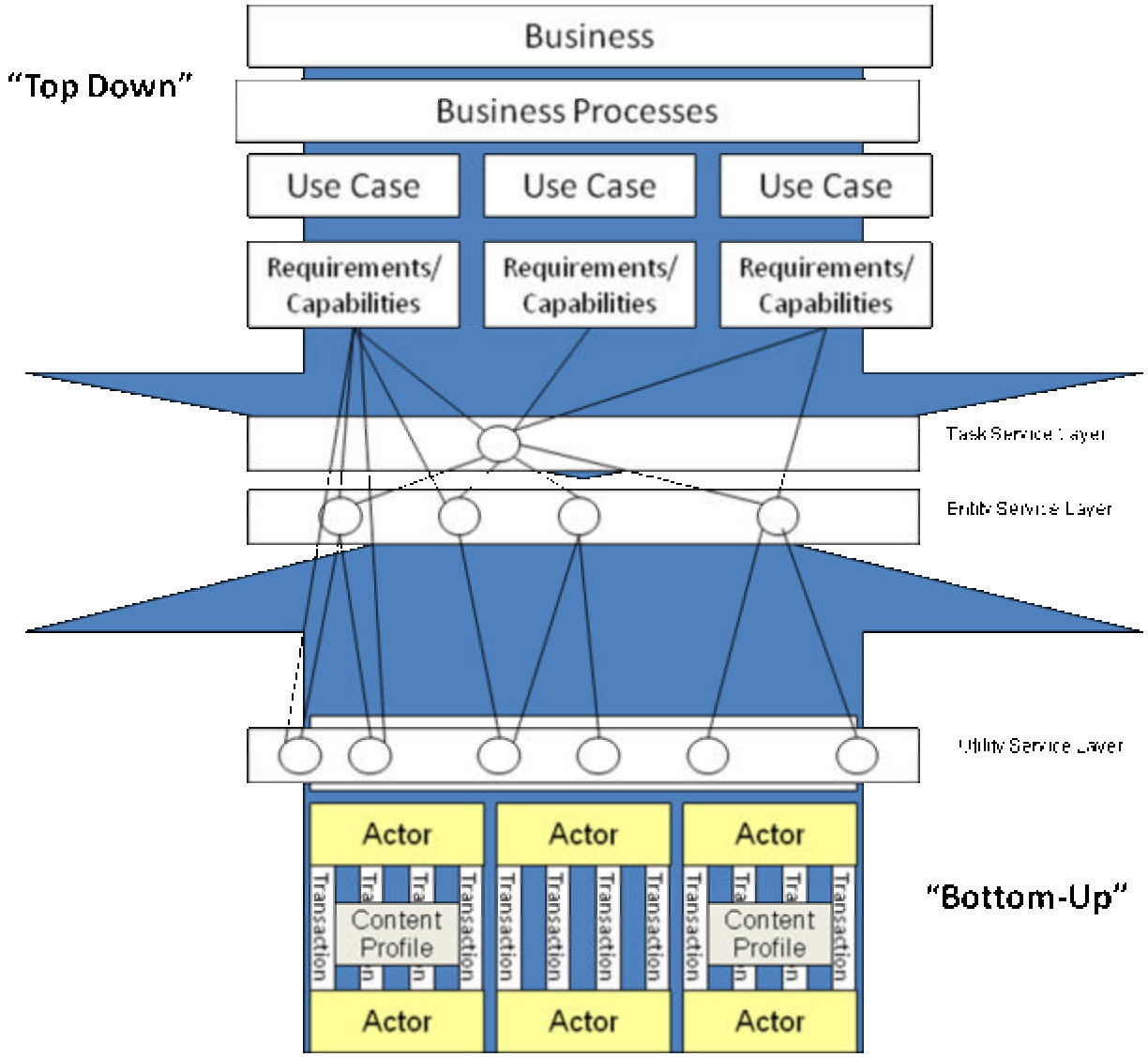
Lesson Learned: Need Harmonization Framework & Exchange Architecture

- The *first objective* of this HL7 Harmonization Framework and Exchange Architecture (**HF&EA**) project is to define a notional set of architectural artifacts for HL7 projects and EHR System (**EHR-S**) development or acquisition projects.
- The *second objective* is to define the relationships among HL7 architectural artifacts and how they relate to other healthcare related standards and architectural artifacts, which can support a Model Driven Architecture (**MDA**) waterfall, spiral, agile or other development methodology.
- The *third objective* is to be an implementation guide for the use of the HL7 Development Framework (**HDF**) process and HL7 Service Aware Interoperability Framework Enterprise Compliance and Conformance Framework (**SAIF ECCF**) structure by which architectural work products are reused or developed, are organized into an Interoperability Specification and used throughout an architecture development project, the governance that should be enacted on these work products, and the scope of the standardization effort itself.
- The *fourth objective* is to define a Healthcare Information Exchange Model (**HIEM**) for model-driven Healthcare Information Exchange Package Documentation (**H-IEPD**) and exchange architecture.

IS10 IRM HITSP Constructs Mapped to Standards



Meet in the Middle



Deployment Example

1. PHR

A parent is preparing to go to a Primary Care Provider for a well-child visit . The parent views the child's current immunizations using a Personal Health Record

2. Primary Care Provider

The 5-year-old child and the parent visit the provider, who uses an EHR system that retrieves the child's immunizations and recommendations from the HIE. The provider sees the same immunization data the parent saw via the PHR. He administers vaccines, and enters them into his EHR. The EHR updates the HIE and simultaneously, the Immunization Information System (IIS).

3. Patient Empowerment

The child is now getting ready to enter school. The parent double checks the immunization record to make sure the child is up-to-date on all of the immunizations required for school entry. He sees that one shot is missing.

4. Primary Care Provider

In a rush, the parent makes an appointment for the child at a different clinic. The provider's EHR retrieves the child's immunization data from the HIE. He administers the missing vaccine, and enters it into his EHR. The EHR updates the HIE and simultaneously, the IIS.

5. Schools and Public Health

Predictions of an especially severe flu season cause the child's school to implement a school-located vaccination program . The school nurse logs on to IIS and accesses the child's record and recommendations, which have been kept current with other sources. School nurse administers H1N1 vaccine and updates the IIS, which forwards the new record to the HIE using immunization services. Epidemiologist views individual or population-level immunization data.

Immunization Services

Personal Health Record (PHR)

Health Information Exchange

Immunization Information System (IIS)

Immunization Decision Support Service

Immunization Use Case - Simplified

#	Capability	Patient Identification		Data Retrieval and Update			Decision Support
1	**Standards Org**	**HL7**					
2	Service Specification	Identification Service Functional Model		Retrieve, Locate, Update SFM			Decision Support SFM
3	**Standards Org**	**OMG**					
4	Service Specification	Identification Service Specification		Retrieve, Locate, Update Spec			Decision Support Service Spec
5	**Profile Org**	**IHE**					
6	SOA Profile	SOA White Paper					
7	**Profile Org**	**IHE/American Immunization Registry Association/CDC**					
8	Immunization Profile	PIX/PDQ **SC110**	PIX/PDQ **SC110**	Future Draft: 2.5 Impl Guide	Query for Existing Data (QED) **CAP123** **SC113**	Immunization Content (IC) **CAP119** **CAP133** **SC112**	Request for Clinical Guidance **CAP133** (IC payload)
12	**Standards Org**	**HL7**					
13	Original Standard	V2	V3 Patient Admin messaging	V2	V3 Care Record messaging	V3 Care Record CDA	V3 Care Record messaging

Immunization Use Case Within HL7 SAEAF ECCF Specification Stack

#	Patient Identification		Data Retrieval and Update			Decision Support
1	**Enterprise View (Service Functional Models)**					
2	Identification Service Functional Model		Retrieve, Locate, Update SFM			Decision Support SFM
3	**Computational View (Service Definitions)**					
4	Identification Service Specification		Retrieve, Locate, Update Spec			Decision Support Service Spec
5	**Information View (Payloads)**					
6	PIX/PDQ **SC110**	PIX/PDQ **SC110**	Future Draft: 2.5 Impl Guide	Query for Existing Data (QED) **CAP123** **SC113**	Immunization Content (IC) **CAP119** **CAP133** **SC112**	Request for Clinical Guidance **CAP133** (IC payload)
7	**Implementation View (Vendor Implementations)**					
8	**Base Standard**					
9	V2	V3 Patient Admin msg	V2	V3 Care Record msg	V3 Care Record CDA	V3 Care Record mesg

HITSP and Immunization Use Case

#	Capability	Patient Identification		Data Retrieval and Update			Decision Support	
1	**Standards Org**	**HL7**						
2	Service Specification	Identification Service Functional Model		Retrieve, Locate, Update SFM			Decision Support SFM	
3	**Standards Org**	**OMG**						
4	Service Specification	Identification Service Specification		Retrieve, Locate, Update Spec			Decision Support Service Spec	
5	**Profile Org**	**IHE**						
6	SOA Profile	SOA White Paper						
7	**Profile Org**	**IHE**						
8	Immunization Profile	PIX/PDQ **SC110**	PIX/PDQ **SC110**		Query for Existing Data (QED) **CAP123** **SC113**		Immunization Content (IC) **CAP119** **CAP133** **SC112**	Request for Clinical Guidance **CAP133** (IC payload)
9	**Profile Org**	**American Immunization Registry Association/CDC**						
10	Immunization Profile	Draft: 2.5 Impl Guide		Draft: 2.5 Impl Guide				
11	Immunization Profile	2.3.1 Impl Guide **CAP131** **CAP132** **SC115**		2.3.1 Impl Guide **CAP131** **CAP132** **SCII5**				
12	**Standards Org**	**HL7**						
13	Original Standard	V2	V3 Patient Admin messaging	V2	V3 Care Record messaging	V3 (POIZ) Immunization messaging	V3 Care Record CDA	V3 Care Record messaging	V3 POIZ messaging

Meaningful Use Rules and Regs

#	Capability	Patient Identification		Data Retrieval and Update				Decision Support	
1	**Standards Org**	**HL7**							
2	Service Specification	Identification Service Functional Model		Retrieve, Locate, Update SFM				Decision Support SFM	
3	**Standards Org**	**OMG**							
4	Service Specification	Identification Service Specification		Retrieve, Locate, Update Spec				Decision Support Service Spec	
5	**Profile Org**	**IHE**							
6	SOA Profile	SOA White Paper							
7	**Profile Org**	**IHE**							
8	Immunization Profile	PIX/PDQ **SC110**	PIX/PDQ **SC110**		Query for Existing Data (QED) **CAP123** **SC113**		Immunization Content (IC) **CAP119** **CAP133** **SC112**	Request for Clinical Guidance CAP133 (IC payload)	
9	**Profile Org**	**American Immunization Registry Association/CDC**							
10	Immunization Profile	Draft: 2.5 Impl Guide		Draft: 2.5 Impl Guide					
11	Immunization Profile	2.3.1 Impl Guide **CAP131** **CAP132** **SC115**		2.3.1 Impl Guide **CAP131** **CAP132** **SC115**					
12	**Standards Org**	**HL7**							
13	Original Standard	V2	V3 Patient Admin msg	V2	V3 Care Record msg	V3 (POIZ) Immunization msg	V3 Care Record CDA	V3 Care Record messaging	V3 POIZ messaging

Standards Overlap For Services

#	Service	Identification		Retrieve, Locate and Update			Decision Support	
1	Standards Org	HL7						
2	**Capability**	Identification Service Functional Mode		Retrieve, Locate, Update SFM			Decision Support SFM	
3	Standards Org	OMG						
4	**Service Definition**	Identification Service Specification		Retrieve, Locate, Update Spec			Decision Support Service Spec	
5	Profile Org	IHE						
6	**Interoperability Layer**	PIX/PDQ				Immunization Content (IC)	Immunization Content	Request for Clinical Guidance
7	Profile Org	AIRA/CDC						
8	**Interoperability Layer**	Draft: 2.5 Implemen-tation Guide		Draft: 2.5 Implemen-tation Guide				
9	**Interoperability Layer**	2.3.1 Implemen-tation Guide		2.3.1 Implemen-tation Guide				
10	Standards Org	HL7						
11	**Base Standard**	Version 2	Version 3 Patient Admin messaging	Version 2	Version 3 Immunization (POIZ) messaging	Version 3 Care Record CDA	Version 3 Care Record CDA	Version 3 Care Record messaging

Overlap Removed – Transform into Taxonomy

Task Service	**GetPatientIZStatus**				
Mediating Service	**Identification**	**Retrieve, Locate, Update**			**Decision Support**
Utility Service	PIX/PDQ transactions	HL7 Version 2.5 Imple-mentation Guide VXU, RIH	Version 3 Immuni-zation (POIZ) messaging	XDS.b, Immuni-zation Content (IC)	Request for Clinical Guidance, Immunization Content

Immunization Management Case Study Conclusions

- **Updating Legacy System Standards** - The HITSP selected Immunization message is HL7 v2.5. Most existing immunization repositories are using HL7 v2.31. It is difficult to justify the expense to bring legacy system to current standards.
- **Social Issues Trump Technical Issues** - The Case Study shows an Immunization Management Capability technical solution; it does not address the more socially challenging Service Contract needed among stakeholders (e.g., agencies, states, hospitals).
- There is an implicit common information model across immunization standards, which require a explicit common information model. .
- SOA changes the cost equation from N squared to a linear cost per interface
- Reuse has been shown to increase quality and reduce cost.

Immunization Management Case Study Conclusions

- The TOGAF ADM is a rigorous process, which efficiently led us to produce a set of clear, complete, concise, correct and consistent interoperability specifications and conformance statements.
- The SAIF-ECCF is an architectural "Exchange Architecture;" we used it as an architectural executive summary to effectively present the IMC interoperability specifications and conformance statements.
- Other architecture development methods or other architectural frameworks, such as the Rational Unified Process, the Zachman or the DOD Architectural Framework can complement and benefit-from HL7's EHR-SD-RM and SAIF-ECCF to build and present an exchange architecture, interoperability specifications and conformance statements.

Immunization Management Case Study Conclusions

- Effective SOA programs involve cooperation and coordination among a wide variety of business, technical and functional participants from across an organization, including senior management sponsorship, business community ownership, program management, governance, architecture, project level execution, test and certification and sustainment teams. The HL7 EHR-SD-RM helps bring these communities together throughout a Business Capability Lifecycle. It maps capabilities and business Information Exchange Requirements (IERs) to the
  - HL7 EHR System Functional Model (**EHR-S FM**), to
  - Healthcare Information Technology Standards Panel (**HITSP**)
    Data Architecture,
    Security and Privacy Architecture,
    Harmonization Framework,
    Interoperability Specifications, Constructs and their referenced standards;
  - Federal Health Information Model (**FHIM**);
  - National Information Exchange Model (**NIEM**)
    Information Exchange Package Documents (**IEPDs**);
  - Integrating the Healthcare Enterprise (**IHE**) profiles;
  - Certification Commission for Health Information Technology (**CCHIT**) criteria and
  - 2009 Health Information Technology for Economic and Clinical Health (**HITECH**) Act selected standards for interoperability and meaningful use objectives and criteria.

SOA Value Proposition

One of the most difficult challenges facing healthcare organizations making IT investments today comes from deciding whether to go all-in with a particular vendor, or whether to self-integrate components from multiple vendors.

The appeal of the single-vendor solution is strong – no finger-pointing, out-of-the-box integration, [US-based] EHR certification via the Certification Commission for Healthcare IT (**CCHIT**), and so on.

This is contrasted with seemingly increased risk and work involved in a multi-vendor solution involving integration.

A multi-vendor SOA solution can offer compelling best-of-breed options; where, a SOA promotes an easier integration and alignment across suppliers into a cohesive, testable and certifiable architecture.

We demonstrated an approach that can build and present consistent Interoperability Specifications (**IS**) and conformance criteria for both best-of-suite and best-of-breed components and their exchange architecture.

Having these ISs, exchange architectures, certification criteria and associated business cases is the appropriate due diligence needed to help justify a best-of-suite vs. best-of-breed decision.

Value Proposition of Standards Based Approach

- Analysis Pre-Done: Analysts from throughout industry have vetted and contributed to the development of thorough specifications
- Less Customization: COTS vendors are already building applications to meet these specifications.
- Comprehensive View: Standards provide a way to ensure that requirements and design address all of the necessary issues
- Lack of unexpected dependencies late in project: All functions and specifications have been pre-analyzed and defined
- Better Interoperability: Standards based approaches will ensure development between all stakeholders are able to communicate at the project and technical level
- Across Project Visibility: Normalized requirements and design would allow for “apples to apples” comparison across the portfolio

Questions?

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