TSC Presentation

EHR System Function and Information Model (EHR-S FIM) Release 3.0 Preparation

(ISO/HL7 10781 r3:2017 EHR-S FIM)

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Executive Summary

EHR-S FM Release-2 is being finalized and HL7 PSS #688 is for EHR-S Function-and-Information Model (EHR-S FIM) Release-3

The EHR Interoperability WG current focus is on the '2017 EHR-S FIM Release-3 roadmap to make EHR-S FM r2 clear, complete, concise, correct, consistent, traceable, easy-to-use functions and conformance criteria using HL7 Service Aware Interoperability Framework (**SAIF**), HL7 Fast Healthcare Interoperability Resources (**FHIR**), US-realm Federal Health Information Model (**FHIM**) and Meaningful Use criteria (**MU2**) and other, as needed, SAIF Implementation Guide artifacts within an UML-tool based knowledge and expert-system platform; where, analysts and implementers can efficiently profile domain, realm and enterprise EHR functional use-cases, conformance-criteria scenarios and information-exchange interoperability-specifications for message, document and services' exchange-architecture implementations, tests and certifications.

Key Features
ISO/HL7 10781 r3:2017 EHR-S FIM

EHR-S FIM R-3 UML tool-based knowledge-and-expert system-platform

1. Make r2 clear, complete, concise, correct, consistent, traceable, easy-to-use
2. Use HL7 Service Aware Interoperability Framework (**SAIF**),
3. Include, as needed, SAIF Implementation Guide (**SAIF IG**) artifacts
   - Include HL7 Fast Healthcare Interoperability Resources (**FHIR**),
   - Include US-realm Federal Health Information Model (**FHIM**)
   - Include US-realm Meaningful Use Stage-2 (**MU2**) criteria
4. where, users can efficiently profile domain, realm and enterprise
   - EHR functional use-cases, their conformance-criteria scenarios linked-to
   - information-exchange interoperability-Specifications for message, document and services' exchange-architecture implementations, tests and certifications.

HL7 Product-Line Unification Opportunity Using '2017 EHR-S FIM Release-3

APPROACH: Exchange Architecture Specifications including:

- Domain Analysis Models and RIM integration
- implementation-paradigm profile-additions
  - V2, V3 and CDA messages and documents,
  - FHIR, web-services, interface behavioral-specifications and
  - realm-specific data-models with terminology-bindings

PRODUCT: User-Customizable EA tool populated with HL7 Products, capable of

- Being adapted and extended to specific domains, realms and enterprises.
- generating fully-qualified semantically-interoperable HL7-SAIF exchange-architectures of system Information-Exchanges (**IEs**) and implementable, testable and certifiable Interoperability-Specifications (**ISs**).

Recommended
'2017 EHR-S FIM Release-3 Vision

1. **EHR-S FIM R3 be the HL7 Unification Umbrella**
   - Management of EHR Interoperability Complexity
   - Organization of domains, realm and enterprise specializations
   - HL7 SAIF Implementation Guides
   - HL7 Conformance Project
   - Release 3 built within overarching (SAIF) framework to ensure use case functionality, data and information traceability.
2. **EHR "Product-Line" Framework** within the FIM Umbrella
   - Such as EHR-S, PHR-S, LIS, Imaging, Pharmacy
   - Led by other workgroups, such as OO Lab
3. **HL7 Governance harmonize components within Framework**
   - FHA FHIM define HL7 US-Realm FHIR-profile
   - EHR-S FIM EA-Platform be foundation of HL7 Conformance Test Project
   - Sparx EA be the delivery platform to provide HL7 Requirements-Specifications to Users/Implementers

Benefit of HL7 Product-Line Unification Around '2017 EHR-S FIM Release-3

1. Users can start with EHR-S FIM use-cases and scenarios
2. EHR-S FIM R3 provides SAIF IG clinical context and requirements
3. EHR-S FIM functions can be linked to specific domain, realm and enterprise Information Exchange (**IE**) Interoperability Specifications (**ISs**)
4. FHIR provides baseline for implementation paradigm profiles
5. EHR-S FIM FHIR-profiles can be domain, realm and enterprise specific
6. Example: FHA FHIM can be adapted to-be the US Realm FHIR Profile.
7. Other implementation paradigms for message, service and document .
8. SAIF Implementation guides, can be generated, tested and certified.
9. Sparx EA becomes HL7 Knowledge-Base platform

Thank you for your help and Consideration!

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2013 Immunization Management Prototype is at

http://wiki.hl7.org/images/3/39/HL7_EHR-S_FIM_R3_Prototype_Immunization_Management_Report.pdf

PSS #688: EHR-S FIM R3 Approach

1. Add **Conceptual Information Model & Logical Data Model** to EHR-S Functions
2. Demonstrate **SAIF methodology** to Populate Interoperability Specification with HL7 artifacts and EHR System Function and Information Model (EHR-S FIM)
3. Incorporate **S&I Framework simplification methodology**
   - EHR-S function descriptions correspond to Use Case (**UC**) scenarios events.
     - New scenarios composed from common actors, actions/activities and their inputs & outputs
     - EHR-S FM should list inputs and outputs to functions (e.g. standard IO nouns and verbs)
4. UC simplification implies that EHR-S FM should **harmonize & manage**:
   - Common actors/entities/concepts, their definitions, their data elements
   - Common Actions/Activities and their input and output entities.
   - Common requirements.
   - Domain specific profile context defined by assertions
5. Maintain **domain profile traceability** as HL7 Work Groups (WGs) define
   - Domain Analysis Models (DAMS), Domain Information Models (DIMS),
   - Detailed Clinical Models (DCLs), etc.

2013 EHRS FIM R3 Prototype Purpose

http://wiki.hl7.org/images/3/39/HL7_EHR-S_FIM_R3_Prototype_Immunization_Management_Report.pdf

- Demonstrate Information Model approach. For each EHR-S FM Function:
  - "Sequence" of actions/activities which may have information exchanges (inputs and outputs)
  - Assertions (e.g., requirements predicates)
  - Requirements (aka conformance criteria)
  - Business Rules
  - Conceptual Information Model based on function statement, description & criteria
  - Logical Data Model
    - **ISSUE**: *As this becomes a standard*, what should be the basis to define the data elements for each logical data module/class or should we NOT define the data elements?
      - HL7 RIM, DAMS, DIMS, DCLs, etc.
      - US Federal Heath Information Model (FHIM)
      - Other information models (Canada, New Zealand, GB, Singapore)
  - Dependencies among functions ("see also")
  - Assertions and Common Actors, Actions, Data Element Set, data dictionary (UC Simplification)
  - Service, Message or Document Profiles: content & transport interoperable standards-specifications

Notional Set of HL7 Artifacts within an Enterprise Compliance and Conformance Framework (ECCF)

ECCF	Enterprise Dimension "Why" - Policy	Information Dimension "What" - Content	Computational Dimension "Who/How" - Behavior	Engineering Dimension "Where" - Implementation	Technical Dimension "Where" - Deployments
Conceptual Perspective	✓ Business • Mission, • Vision, • Scope, ✓ Inventory of • Contracts - PSSs • Capabilities - RIM • Policies • Procedures	✓ Inventory of • Domain Entities • Activities • Associations • Information Requirements ✓ Information Models ○ Conceptual	✓ Inventory of • Reusable Scenarios • Business Activities • System Functions ✓ Requirements • Accountability, Roles • Functional Requirements, Profiles, Behaviors, Interactions • Interfaces, Contracts	✓ Inventory of • SW Platforms, Layers • SW Environments • SW Components • SW Services • Technical Requirements • Enterprise Service Bus ✓ Key Performance Parameters	✓ Inventory of • HW Platforms • HW Environments • Network Devices • Communication Devices ✓ Technical Requirements
Logical Perspective	✓ Business Policies ✓ Governance ✓ Implementation Guides ✓ Design Constraints ✓ Organization Contracts	✓ Information Models ○ Domain IM ○ Detailed Clinical ✓ Terminologies ✓ Value Sets ✓ Content Specifications ○ CCD ○ RMIM	✓ Specifications • Scenario Events • Use Cases • Workflow Use Cases • Components, Interfaces ✓ Collaboration Actors • Collaboration Types • Collaboration Roles ✓ Function Types ✓ Interface Types ✓ Service Contracts	✓ Models, Capabilities, Features and Versions for • SW Environments • SW Capabilities • SW Libraries • SW Services • SW Transports	✓ Models, Capabilities, Features and Versions for • HW Platforms • HW Environments • Network Devices • Communication Devices
Implementable Perspective	✓ Business Nodes ✓ Business Rules ✓ Business Procedures ✓ Business Workflows ✓ Technology Specific Standards	✓ Schemas for • Databases • Messages • Documents • Services • Transformations	✓ Automation Units ✓ Technical Interfaces ✓ Technical Operations ✓ Orchestration Scripts	✓ SW Specifications for • Applications • GUIs • Components ✓ SW Deployment Topologies	✓ HW Deployment Specifications ✓ HW Execution Context ✓ HW Application Bindings ✓ HW Deployment Topology ✓ HW Platform Bindings

Responsibility: HL7 | EHR-S FIM | Projects | Development Organization

2013 EHR-S & PHR-S Reference Concept-of-Operation

Name: EHR-S & PHR-S Reference CONOPS Model
Author: EHR Interoperability WG
Version: 2013 Release-3 Prototype
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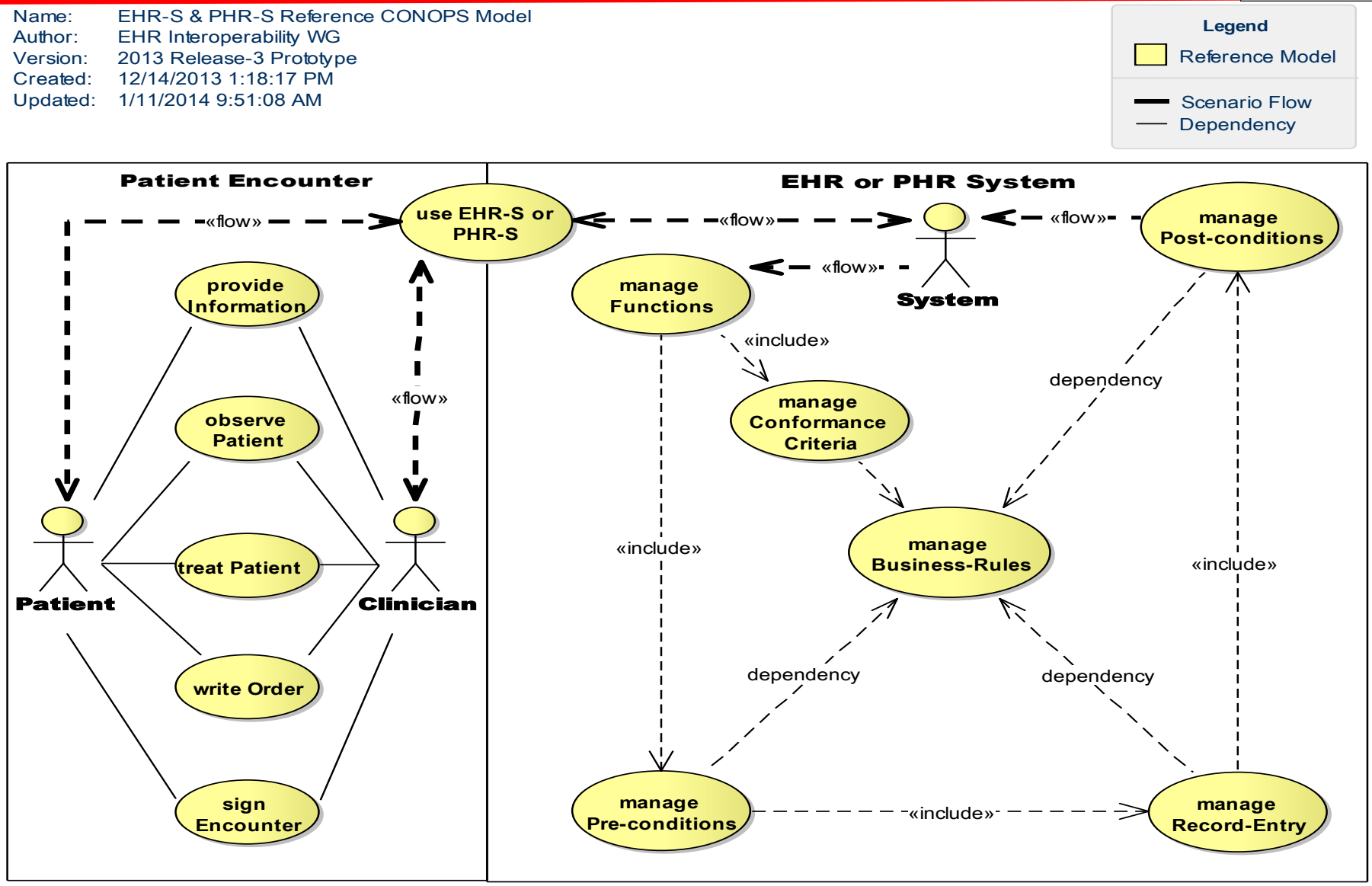
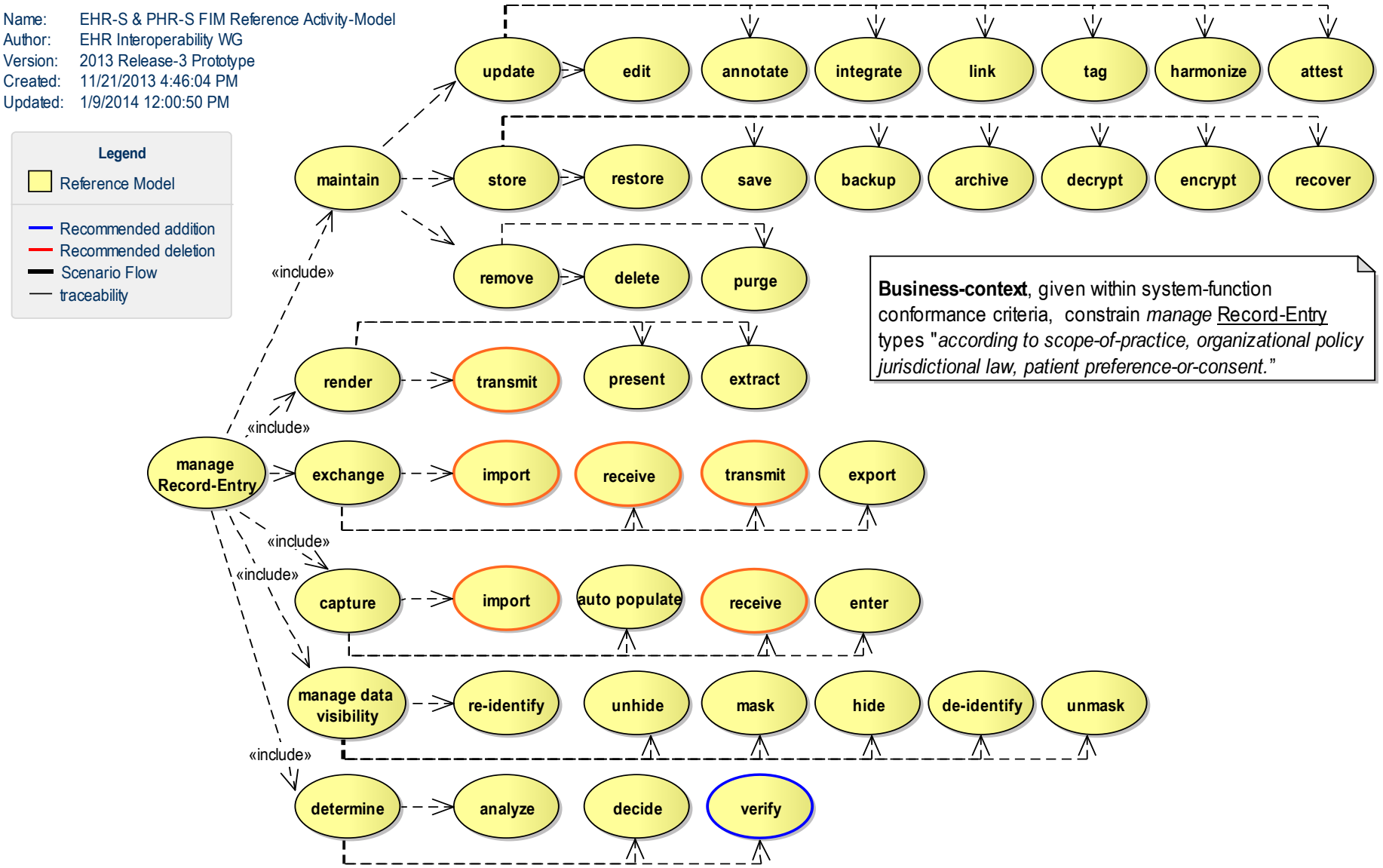
Updated: 1/11/2014 9:51:08 AM

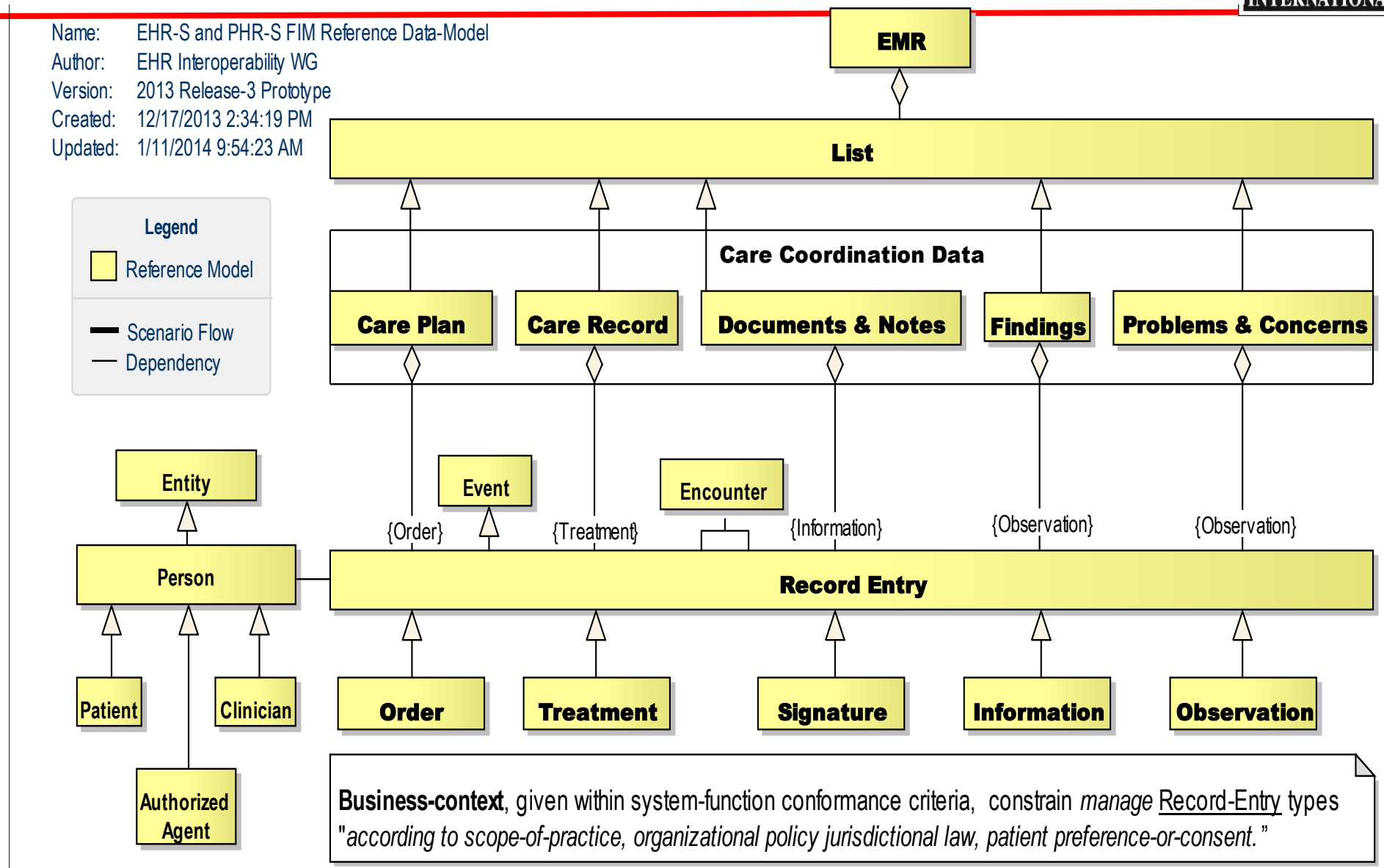


2013 EHR-S & PHR-S Reference Activity Model

Name: EHR-S & PHR-S FIM Reference Activity-Model
Author: EHR Interoperability WG
Version: 2013 Release-3 Prototype
Created: 11/21/2013 4:46:04 PM
Updated: 1/9/2014 12:00:50 PM



2013 EHR-S & PHR-S Reference Data Model



2013 EHR-S & PHR-S Reference Constraint Model

Name: EHR-S and PHR-S Reference Constraint-Model
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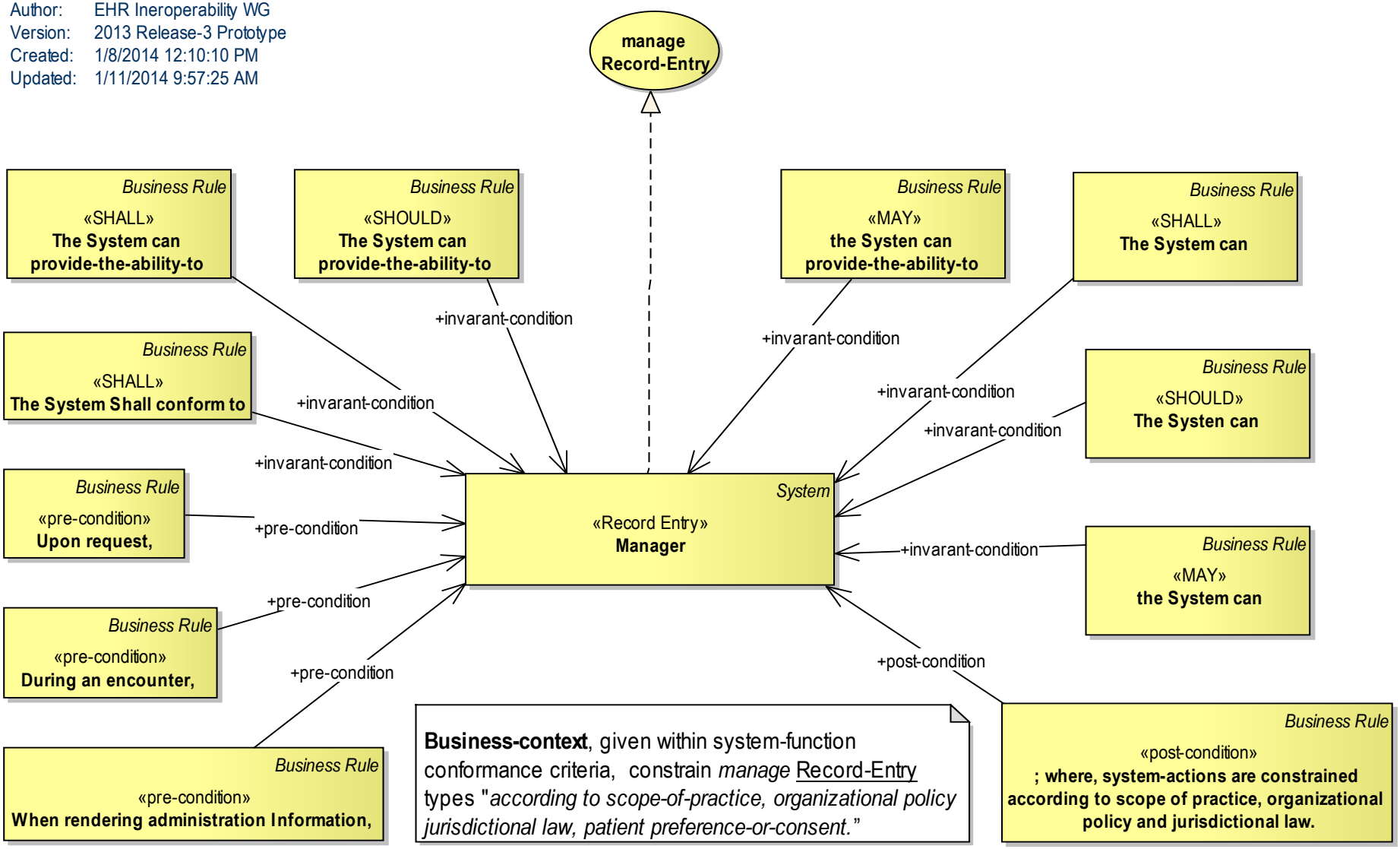
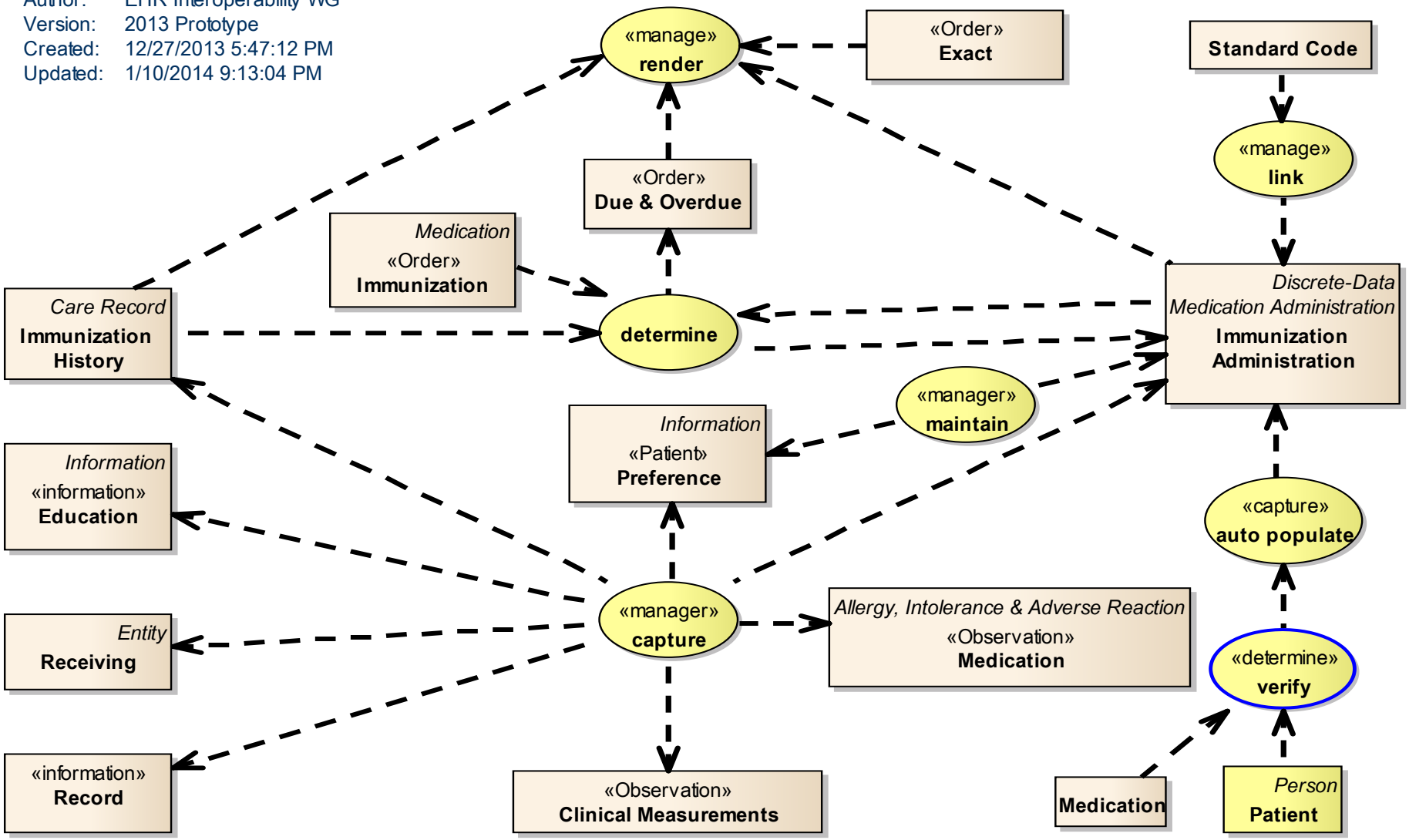


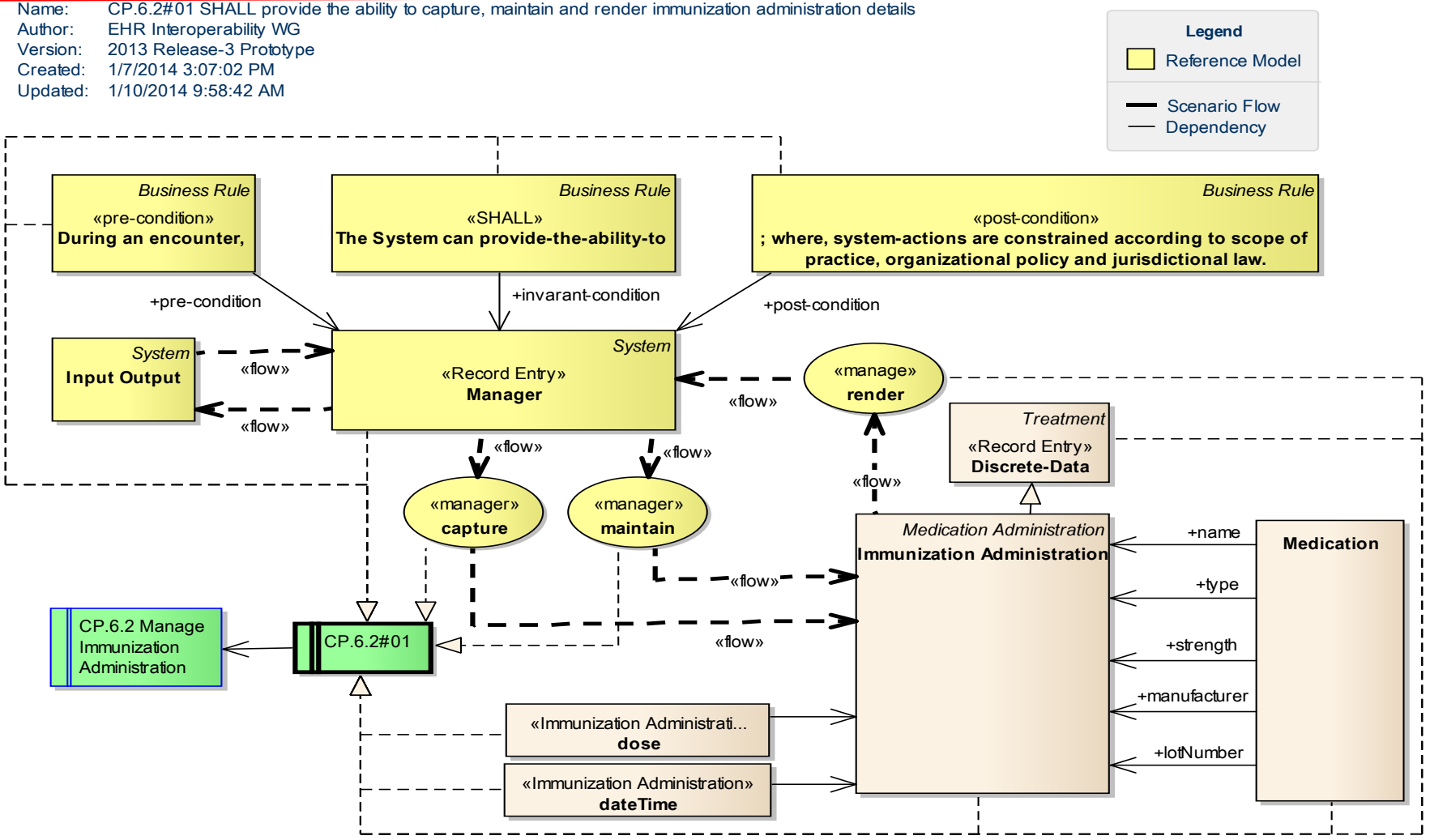
2013 EXAMPLE: CP.6.2 Immunization Management Function Use-Case

Name: CP.6.2 Immunization-Management Administration-and-Histories Use-Case
Author: EHR Interoperability WG
Version: 2013 Prototype
Created: 12/27/2013 5:47:12 PM
Updated: 1/10/2014 9:13:04 PM



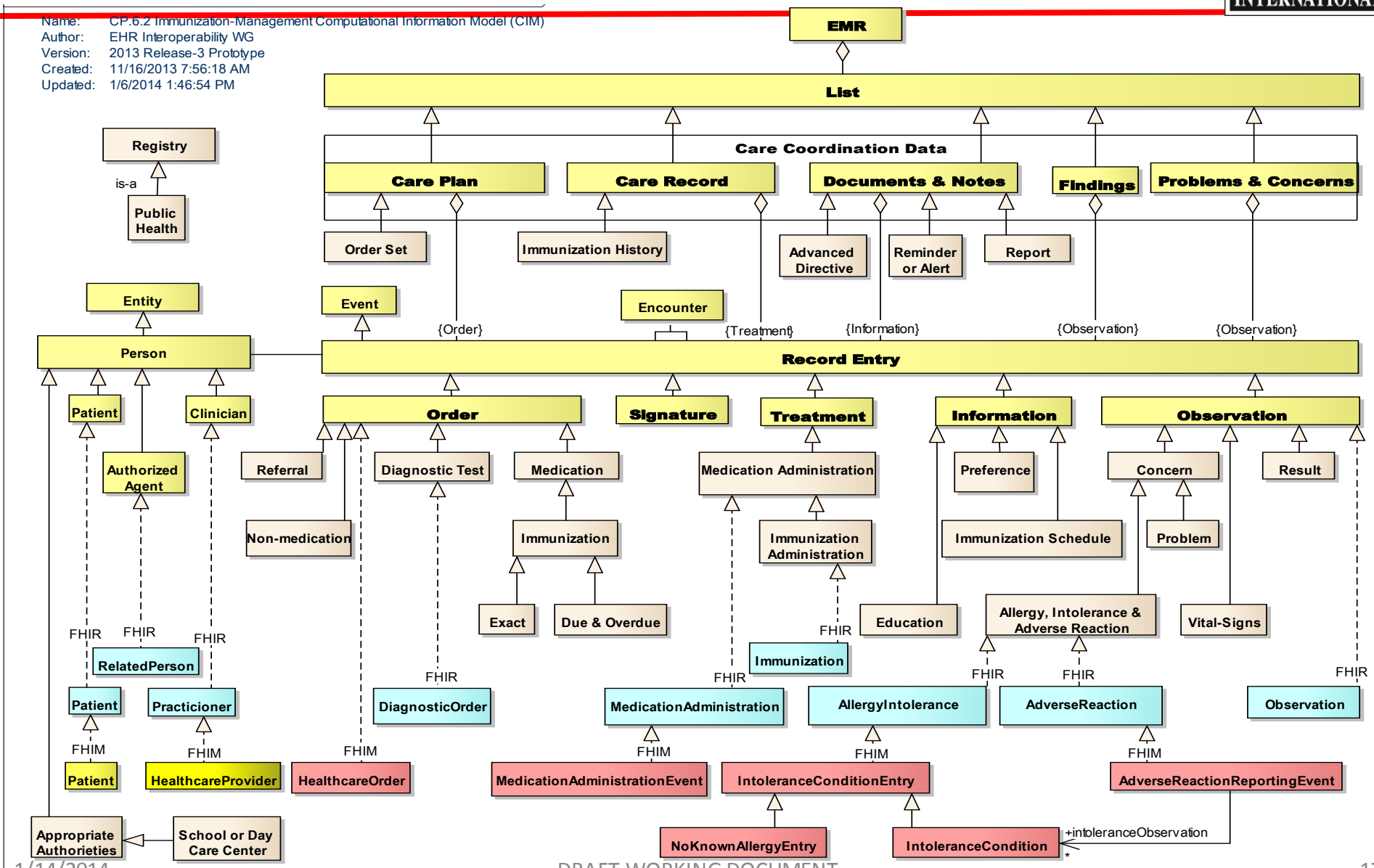
2013 EXAMPLE: CP.6.2#01 Immunization Management Conformance Criteria Scenario

Name: CP.6.2#01 SHALL provide the ability to capture, maintain and render immunization administration details
Author: EHR Interoperability WG
Version: 2013 Release-3 Prototype
Created: 1/7/2014 3:07:02 PM
Updated: 1/10/2014 9:58:42 AM



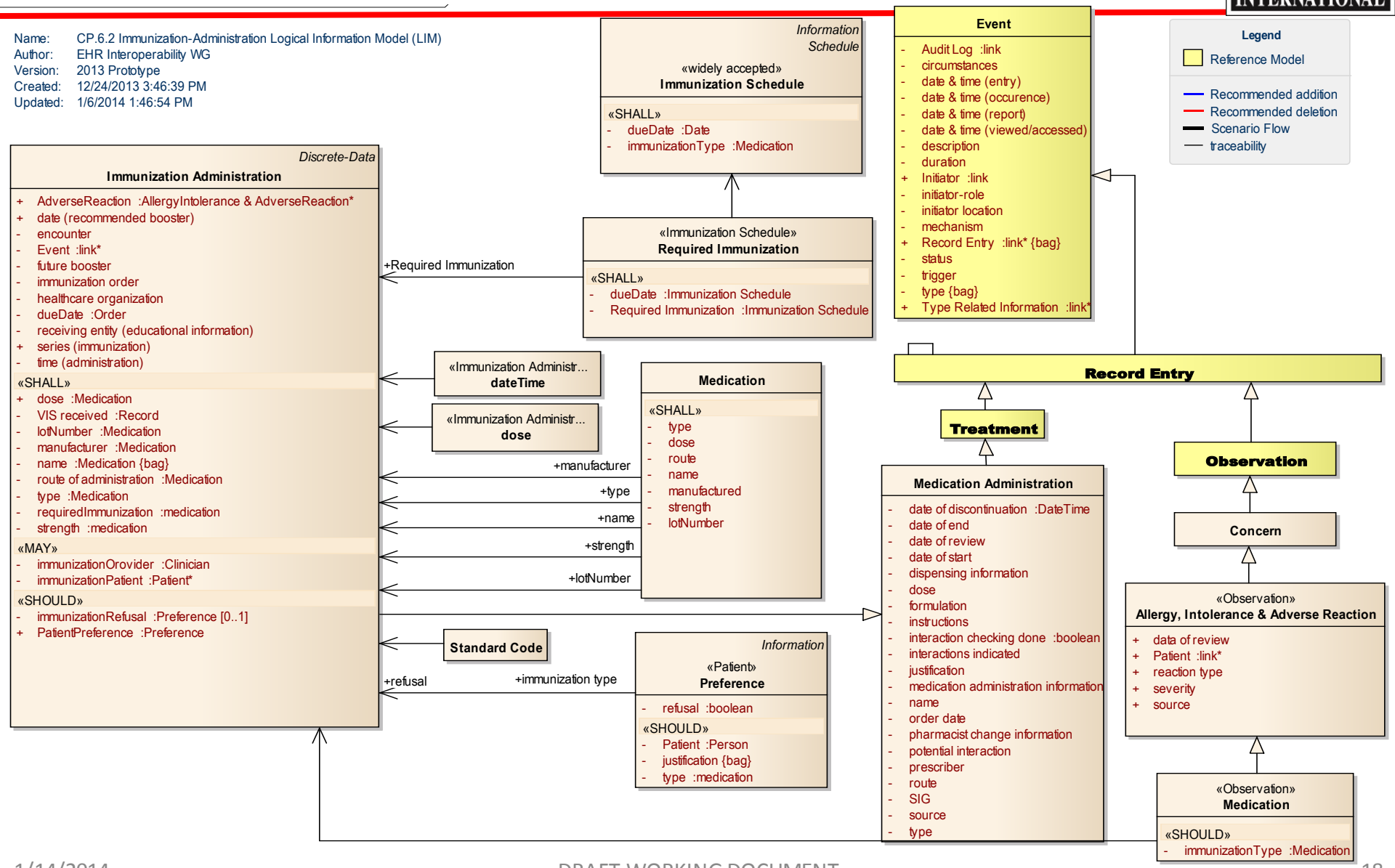
Release-3 CP.6.2#01 During an encounter, the system SHALL *capture*, *maintain* and *render* Immunization Administration including Immunization Administration (dose, date and time) and Medication (name, type, strength, manufacturer, lot number) as Discrete Data.

2013 EXAMPLE: CP.6.2 Immunization Management Conceptual Information Model



2013 EXAMPLE: CP.6.2 Immunization Management Logical Information Model

Name: CP.6.2 Immunization-Administration Logical Information Model (LIM)
Author: EHR Interoperability WG
Version: 2013 Prototype
Created: 12/24/2013 3:46:39 PM
Updated: 1/6/2014 1:46:54 PM



2013 Prototype Conclusions

- EHR-S FIM can populate portions of SAIF for HL7 WGs
  - Information and Computational Dimensions
  - Conceptual and Logical Perspectives
- EHR-S FIM can be composed into higher level capabilities by functional analysts and system engineers
  - Encourage reuse
  - Avoid duplication
- EHR-S FM can be the basis for Interoperability Specifications
  - Messages, Documents. Services
  - FHIR domain, realm and enterprise profiles
- Using Sparx EA as HL7 EHR-S FIM Requirements-Specifications platform can support HL7 Conformance Test and Certification Project