



# HIRA – Healthcare Interoperability Reference Architecture

(former HSRA Healthcare Service Reference Architecture)

## Current Status

Stefano Lotti



# Current status and Objectives

- Due to my unprecedented dayjob workload, HIRA project has been paused since last meeting
- Now the work has been restarted
- The objective is to ballot HIRA in the next cycle with some change:
  - The model will include some relevant IHE profiles (e.g. XD\* family, identification)
  - The model will be revised with use of NAF 4.0 Framework

# HIRA MODEL RECAP

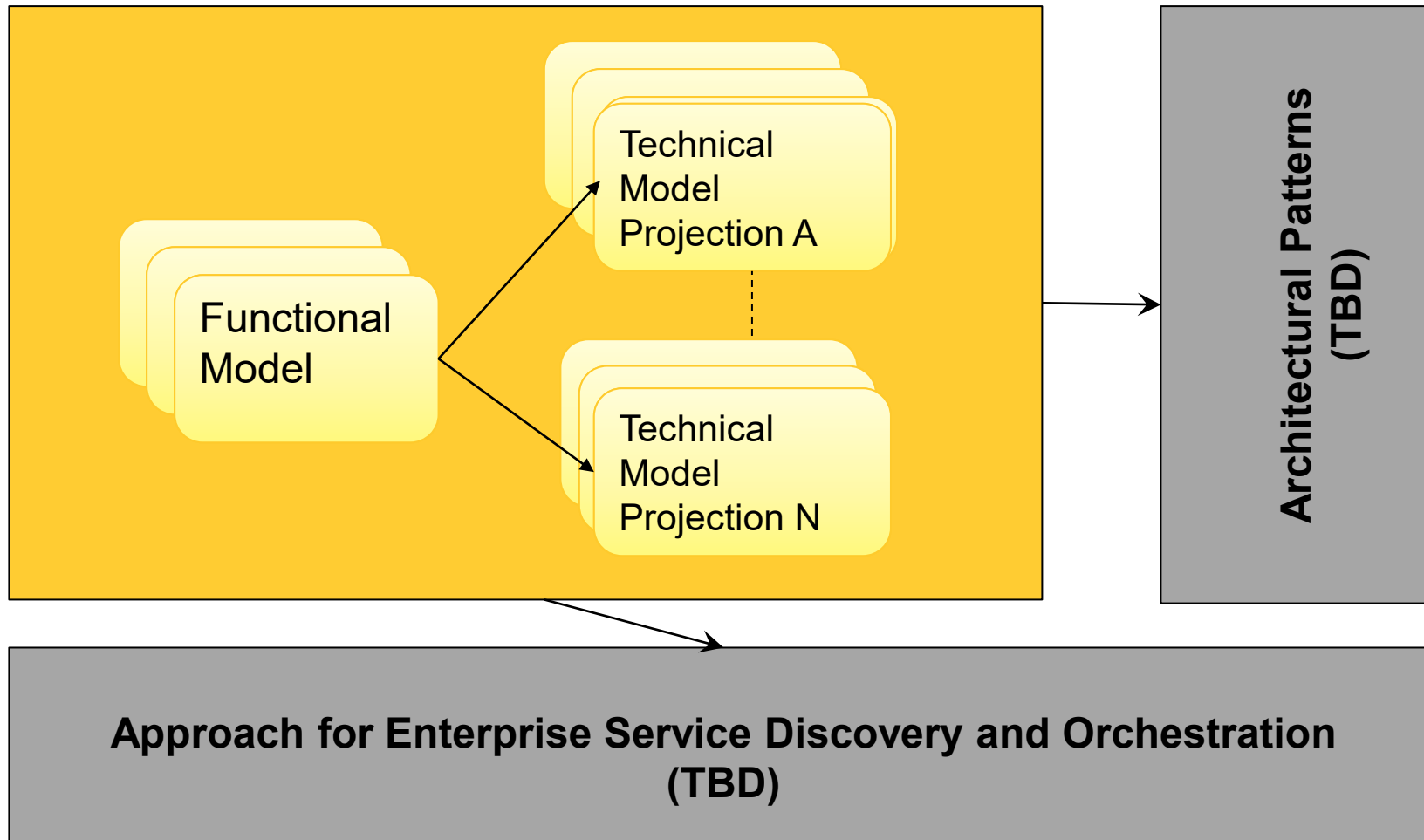
# Healthcare Interoperability Reference Architecture

- The objective of the HL7 Healthcare Service Reference Architecture (HL7-HIRA) is to support the design of medium/large scale eHealth architectures based on HL7 services and standards.
- The project organizes adopted HL7 Service Functional Models, Functional Profiles and Domain Models as a basis for:
  - a formalized Enterprise Service Inventory (Normative)
  - an Architectural Patterns Catalog (Normative)
  - guidelines for enterprise Service Discovery and Orchestration (Informative)

# HIRA as a tool

- HIRA represent a tool for architects and CIOs
- The Reference Architecture it's useful to navigate and select Health Standards and can be used also in combination with an Enterprise Architecture Frameworks (e.g. TOGAF)
- HIRA is centered on standard health business capabilities and shown how these capabilities are realized with different technical standards (Technical Model Projections).

# Functional models and technical projections



# Modeling language for HIRA

- The Modeling language used for HIRA is the OMG UAF (Unified Architecture Framework)
- The model will be revised for the use of NAF 4.0 (UAF based).
- UAF is a modeling language based on UML/SysML and it's also integrated with BPMN2 and SoaML.

# Reasons for using it


	Taxonomy		Structure		Behaviour				Information	Constraints	Roadmap		
Concepts	C1 Capability Taxonomy NAV-2, NCV-2	C2 Enterprise Vision NCV-1	C3 Capability Dependencies NCV-4	C4 Standard Processes NCV-6	C5 Effects			C7 Performance Parameters NCV-1	C8 Planning Assumptions	Cr Capability Roadmap NCV-3			
Service Specifications	C1-S1 (NSOV-3)		S3 Service Interfaces NSOV-2	S4 Service Functions NSOV-3	S5 Service States NSOV-4b	S6 Service Interactions NSOV-4c	S7 Service I/F Parameters NSOV-2	S8 Service Policy NSOV-4a	Sr Service Roadmap				
Logical Specifications	L1 Node Types NOV-2	L2 Logical Scenario NOV-2	L2-L3 (NOV-1)	L3 Node Interactions NOV-2, NOV-3	L4 Logical Activities NOV-5	L5 Logical States NOV-6b	L6 Logical Sequence NOV-6c	L7 Information Model NOV-7	L8 Logical Constraints NOV-6a	Lr Lines of Development NPV-2			
Physical Resource Specifications	P1 Resource Types NAV-2, NCV-3, NSV-2a,7,9,12	P2 Resource Structure NOV-4, NSV-1	L4-P4 (NSV-5)				P3 Resource Connectivity NSV-2, NSV-6	P4 Resource Functions NSV-4	P5 Resource States NSV-10b	P6 Resource Sequence NSV-10c	P7 Data Model NSV-11a,b	P8 Resource Constraints NSV-10a	Pr Configuration Management NSV-8
Architecture Foundation	A1 Meta-Data Definitions NAV-2	A2 Architecture Products NAV-1	A3 Architecture Correspondence ISO42010	A4 Methodology Used NAF Ch2	A5 Architecture Status NAV-1	A6 Architecture Versions NAV-1	A7 Architecture Compliance NAV-3a	A8 Standards NTV-1/2	Ar Architecture Roadmap				

- Based on UAF (already used in the model, no big change)
- It covers, explicitly, business domain and is aligned with standard (ISO, IEEE, OpenGroup, OMG/UAF).
- More clearly service oriented
- More simple automatic generation of document with tool.
- It will be tailored for HIRA/HSRA of course

[https://www.nato.int/cps/en/natohq/topics\\_157575.htm](https://www.nato.int/cps/en/natohq/topics_157575.htm)

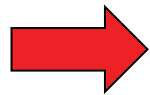


# A single artifact approach

- We use UAF/NAF modeling language/framework, to support a “single artifact” approach with the objective to support the maintainability and the navigability of HIRA
- We’ll have a single artifact (the model) that can be easily published as a web site and with a traditional documents.
- *The UAF/NAF editor used is  Magic because the HL7/Sparx EA license agreement do not include an UAF/NAF plugin.*
- The model will be released as document and web site shortly (immediately after the NAF update)

# HIRA MODEL UPDATE

**NO UPDATE**



[HIRA \(old\) model navigation](#)

- HSRA
    - Strategic Capability
    - Services
    - Personnel
    - Resources
    - Standards
    - Actual Resources
    - Dictionary
    - Summary & Overview
    - Requirements
    - Operational
    - Utils
      - Pattern
      - Service Inventory
        - Composite Services (coordinating)
          - Enabling Service
            - Identification
            - Record Management
            - Service and Provider Directory
            - Identification
            - Record Management
            - Services and Provider Directories
            - Terminology Services
          - Supporting Functionality and Services
- HIRA
  - Capability Legend

# HIRA

HIRA

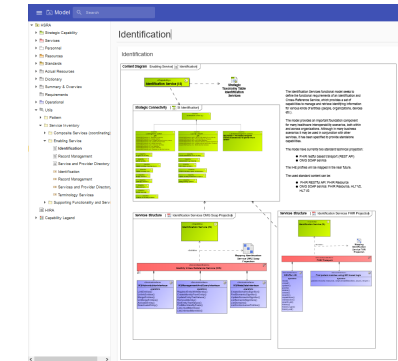
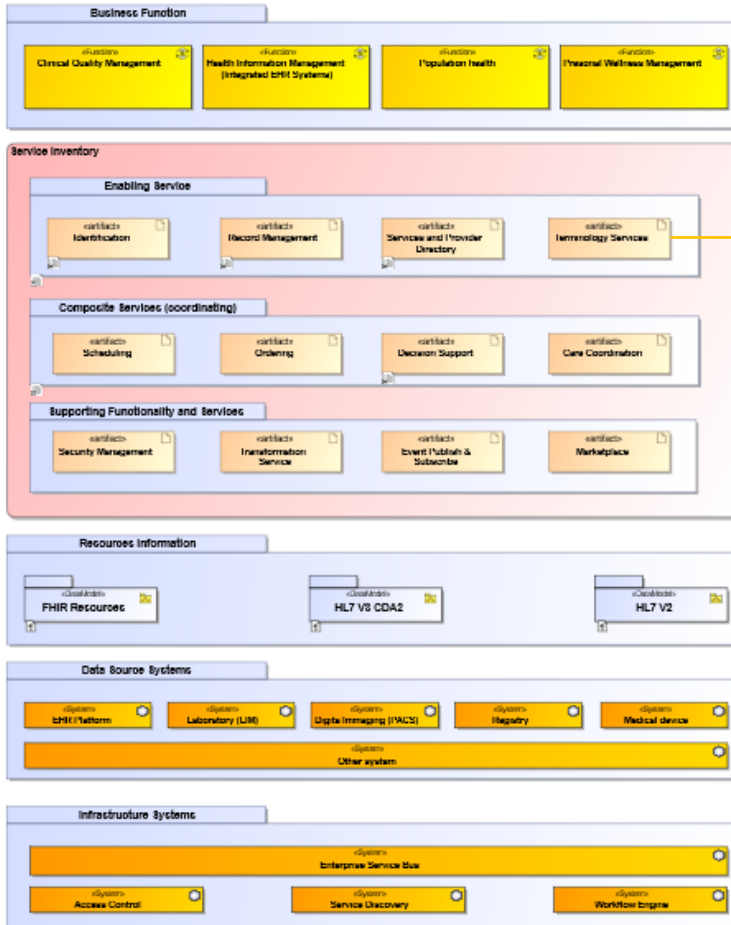
Content Diagram: HIRA | HIRA

## Healthcare Interoperability Reference Architecture

The objective of the HL7 Health Interoperability Reference Architecture (HL7-HIRA) is to support the design of multi-actor systems and architectures based on HL7 services and standards. The objective is to:

This project organizes adopted HL7 Service Functional Mode's, Functional Profiles and Domain Mode's as a basis for:

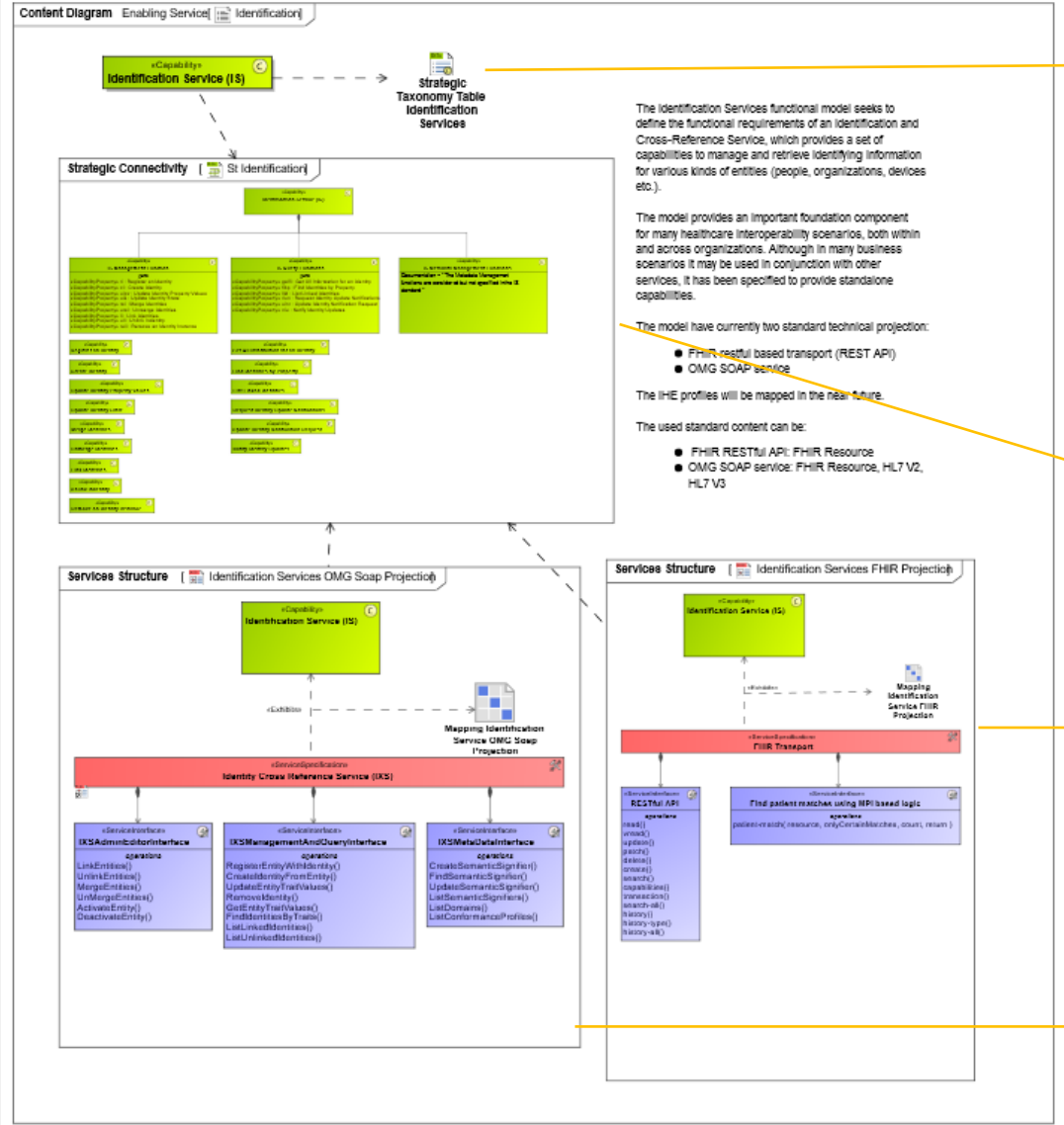
- a formalized Strategic Service Inventory (Normative)
- an Architectural Relation Catalog (Normative)
- methods for Strategic Service Discovery and Orchestration (Implementation guidance)



- HSRA
  - Strategic Capability
  - Services
  - Personnel
  - Resources
  - Standards
  - Actual Resources
  - Dictionary
  - Summary & Overview
  - Requirements
  - Operational
  - Utils
    - Pattern
    - Service Inventory
      - Composite Services (coordinating)
      - Enabling Service
        - Identification
        - Record Management
        - Service and Provider Directory
        - Identification
        - Record Management
        - Services and Provider Directory
        - Terminology Services
      - Supporting Functionality and Services
    - HIRA
    - Capability Legend

# Identification

## Identification



The Identification Services functional model seeks to define the functional requirements of an Identification and Cross-Reference Service, which provides a set of capabilities to manage and retrieve identifying information for various kinds of entities (people, organizations, devices etc.).

The model provides an important foundation component for many healthcare interoperability scenarios, both within and across organizations. Although in many business scenarios it may be used in conjunction with other services, it has been specified to provide standalone capabilities.

The model have currently two standard technical projection:

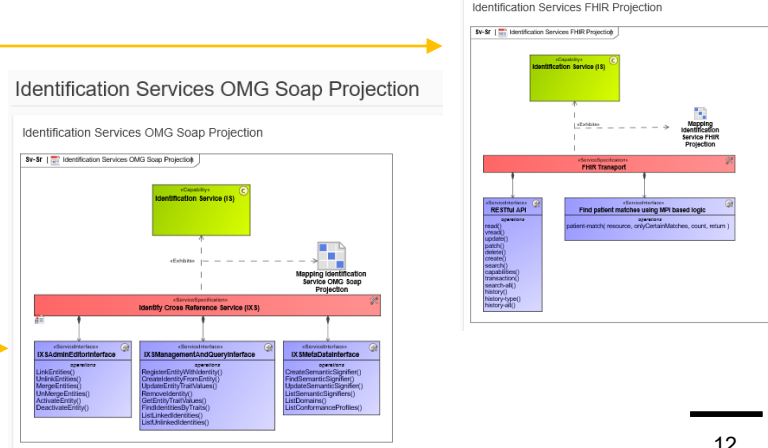
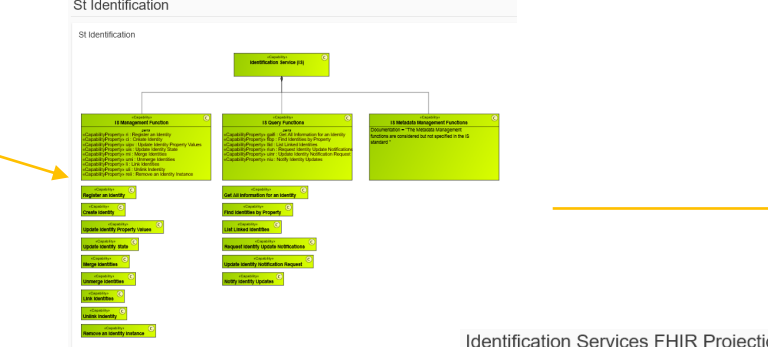
- FHIR RESTful based transport (REST API)
- OMG SOAP service

The IHE profiles will be mapped in the near future.

The used standard content can be:

- FHIR RESTful API: FHIR Resource
- OMG SOAP service: FHIR Resource, HL7 V2, HL7 V3

Strategic Taxonomy Table Identification Services	Strategic Taxonomy Table Identification Services
1. Identification Service (IS)	The Identification and Cross-Reference Service (IXS) Functional Specification is designed to define the functional requirements of an Identification and Cross-Reference Service. The service is intended to be used in conjunction with other services, such as a patient matching service, to provide a set of capabilities to manage and retrieve identifying information for various kinds of entities (people, organizations, devices etc.).
2. Identification Management Function	Although it does not directly support the description of the function, it is important to note that the Identification and Cross-Reference Service (IXS) Functional Specification is designed to provide a set of capabilities to manage and retrieve identifying information for various kinds of entities (people, organizations, devices etc.).
3. Record Management	Although it does not directly support the description of the function, it is important to note that the Identification and Cross-Reference Service (IXS) Functional Specification is designed to provide a set of capabilities to manage and retrieve identifying information for various kinds of entities (people, organizations, devices etc.).



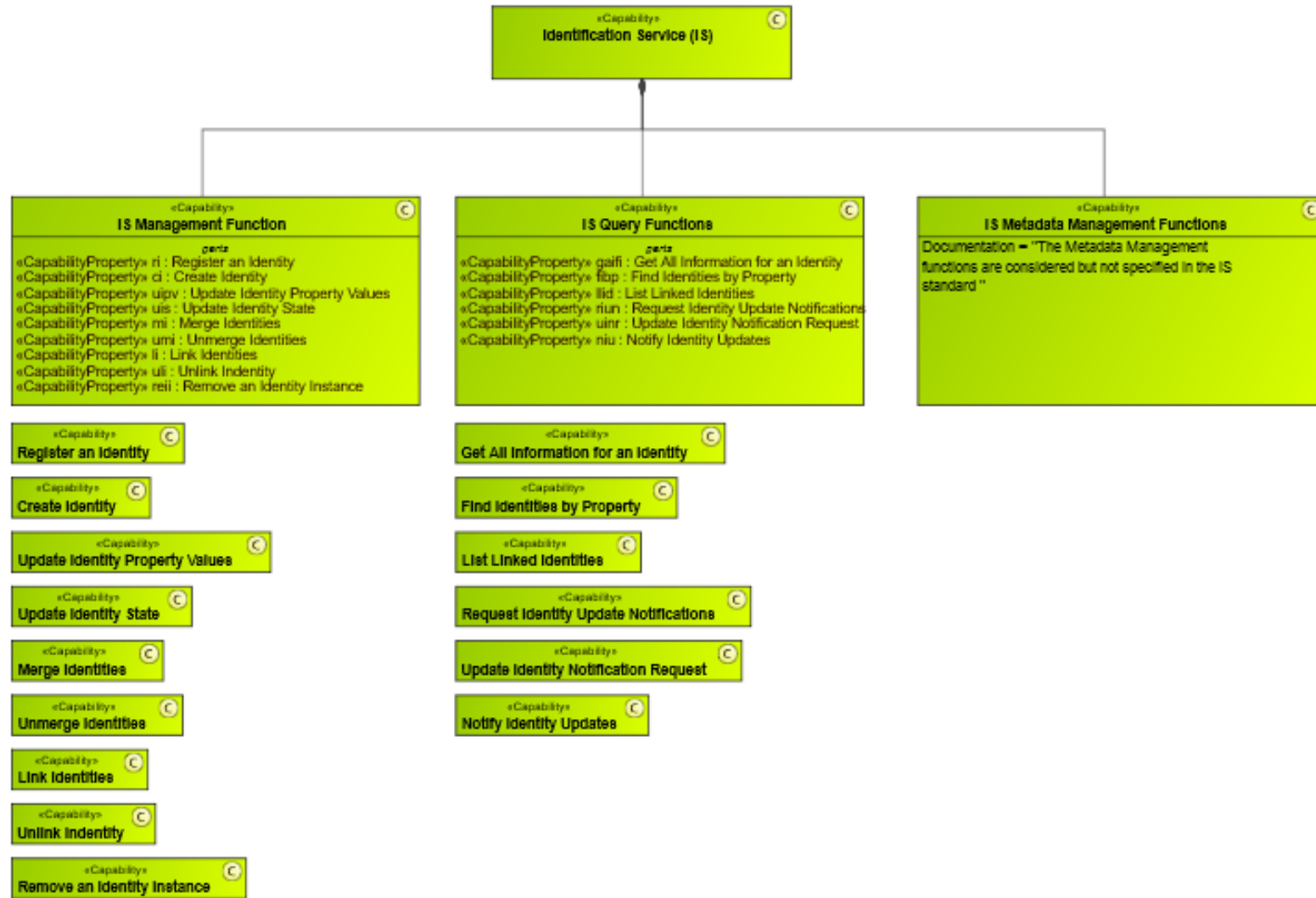
- HSRA
  - Strategic Capability
    - Strategic Taxonomy
      - St Composite Services (coord)
        - St Enabling Service
          - St Data Mapping and Transf
            - St Identification Service
              - St Identification
                - Strategic Taxonomy Table Identification Services
                  - Create Identity
                  - Find Identities by Proper
                  - Get All Information for a
                  - Identification Service (IS)
                  - IS Management Function
                  - IS Metadata Managemen
                  - IS Query Functions
                  - Link Identities
                  - List Linked Identities
                  - Merge Identities
                  - Notify Identity Updates
                  - Register an Identity
                  - Remove an Identity Inst
                  - Request Identity Update
                  - Unlink Identity
                  - Unmerge Identities
                  - Update Identity Notificat
                  - Update Identity Property
                  - Update Identity State
                  - St Retrieve, Locate, and U
                  - St Service and Provider Dir
                  - St Terminology Service
                  - St Unified Communication M
                  - St Supporting Functionality
                  - Strategic Structure
                  - Strategic Connectivity
                  - Strategic Traceability
                  - Strategic Capability
                - Services
                - Personnel
                - Resources
                - Standards
                - Actual Resources
                - Dictionary

## Strategic Taxonomy Table Identification Services

| # | Name                        | Definition   | URI   |
|---|-----------------------------|--|---|
| 1 | Identification Service (IS) | The Identification and Cross-Reference Service (IXS) Functional Specification is charged with defining the functional specifications of a set of service interfaces to uniquely identify various kinds of entities (e.g. people, patients, providers, devices and so on) within disparate systems within a single enterprise and/or across a set of collaborating enterprises.<br><br>This service is intended to allow for the resolution of demographics and other identifying characteristics (aka properties aka traits) to a unique identifier. This allows any clinical system that uses the service to maintain a common description for each entity and to manage the entities. Having a standard interface for accessing and maintaining entity identification information allows systems and applications to have a consistent means of indexing data related to an entity.  | <a href="https://www.hl7.org/implement/standards/product_brief.cfm?product_id=87">https://www.hl7.org/implement/standards/product_brief.cfm?product_id=87</a> |
| 2 | IS Management Function      | Core identity management functions<br><br>Allows for creation of an identity with a supplied set of property values. Uses an identifier supplied by the service consumer which is unique within the Domain for the EntityType.   |   |
| 3 | Register an Identity        | Although it does not directly impact the description of the interface or parameters other than the potential output message, it is expected that IXS implementations will typically provide some level of automated implicit linking capabilities. This could be policy driven, or be handled manually using the explicit linking operations described in this specification. This functionality is similar to that described by the IHE PIX profile. This would be triggered when a new entity is created or the properties of an entity updated. The triggered behavior should be as described for the Link Identities operation.<br><br>Actually "merging" entities based on automated logic is not encouraged. Note that the actual policies are handled through "out of band" agreements.<br><br>Allows for creation of an Identity Instance with a list of property values, where the Identifier is generated and passed back to the service consumer. Would only be used where the consumer cannot generate and supply its own "local identifiers", although this is an implementation and technical specification choice. This identifier is different from IXS Id.<br><br>IXS Id is an identifier for a Real World Entity that is guaranteed to be unique across an instance of an IXS (i.e. across all Policy Domains covered by the instance). This may be generated by the IXS implementation and is only used internally by the Service, although this is an implementation and technical specification choice. |   |

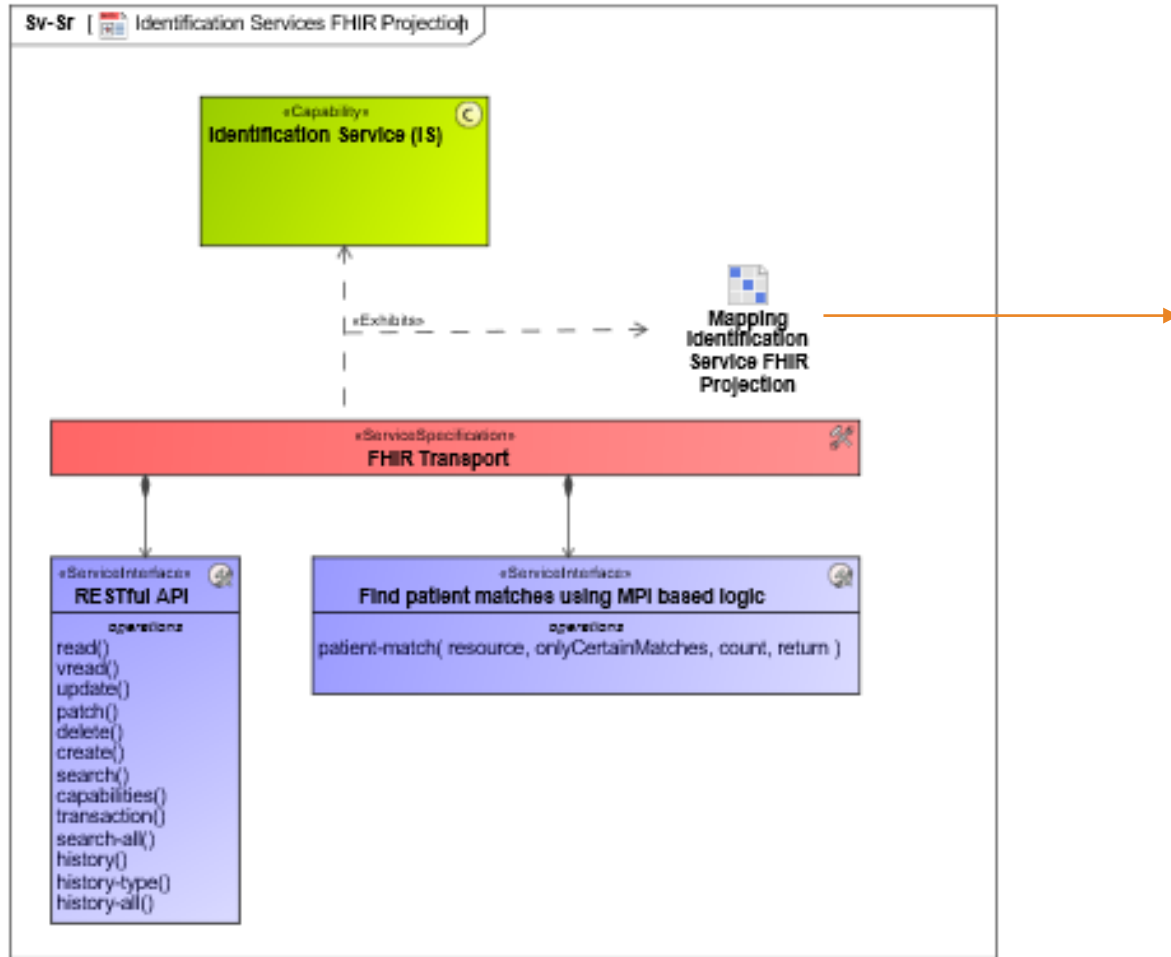
# St Identification

## St Identification



# Identification Services FHIR Projection

## Identification Services FHIR Projection



# Mapping Identification Service FHIR Projection

## Mapping Identification Service FHIR Projection

Legend  
 Dependency

|  | find patient matches | patient-match resource | capabilities | create | delete | history-all | history-type | list | read | search-all | search | transaction | update | read |
|--|----------------------|------------------------|--------------|--------|--------|-------------|--------------|------|------|------------|--------|-------------|--------|------|
| IS Management Function                       | 1                    | 1                      | 2            | 1      | 1      | 1           | 1            | 2    | 1    | 1          | 5      | 3           | 2      |      |
| : Identification Service (IS)                |                      |                        |              |        |        |             |              |      |      |            |        |             |        |      |
| ci : Create Identity                         |                      |                        | 2            | ✓      |        |             |              |      |      |            |        |             | ✓      |      |
| li : Link Identities                         |                      | 1                      |              |        |        |             |              |      |      |            |        |             |        | ✓    |
| mi : Merge Identities                        |                      |                        |              |        |        |             |              |      |      |            |        |             |        |      |
| rei : Remove an Identity Instance            |                      |                        | 2            | ✓      |        |             |              |      |      |            |        |             | ✓      |      |
| ri : Register an Identity                    |                      |                        | 2            | ✓      |        |             |              |      |      |            |        |             | ✓      | ✓    |
| uipv : Update Identity Property Values       |                      |                        | 3            |        |        |             |              |      | ✓    |            |        |             | ✓      | ✓    |
| uis : Update Identity State                  |                      |                        | 3            |        |        |             |              |      | ✓    |            |        |             | ✓      | ✓    |
| ui : Unlink Identity                         |                      |                        |              |        |        |             |              |      |      |            |        |             |        |      |
| umi : Unmerge Identities                     |                      |                        |              |        |        |             |              |      |      |            |        |             |        |      |
| IS Metadata Management Functions             |                      |                        | 1            | ✓      |        |             |              |      |      |            |        |             |        |      |
| IS Query Functions                           | 1                    | ✓                      |              |        |        |             |              |      |      |            |        |             |        |      |
| filp : Find Identities by Property           |                      |                        |              |        |        |             |              |      |      |            |        |             |        |      |
| gafi : Get All Information for an Identity   |                      |                        | 7            |        |        | ✓           | ✓            | ✓    | ✓    | ✓          | ✓      | ✓           | ✓      | ✓    |
| liid : List Linked Identities                |                      |                        | 2            |        |        |             |              |      |      |            |        |             |        | ✓    |
| niu : Notify Identity Updates                |                      |                        |              |        |        |             |              |      |      |            |        |             |        |      |
| niun : Request Identity Update Notifications |                      |                        |              |        |        |             |              |      |      |            |        |             |        |      |
| uinr : Update Identity Notification Request  |                      |                        |              |        |        |             |              |      |      |            |        |             |        |      |

# Q&A

**HIRA HL7 Confluence Page:**  
<https://confluence.hl7.org/x/Ag0hAg>

Thank  
You