CommonWell Health Alliance Services Specification

Version 2.7

Revision History – Summary of Changes

V2.7 – Published September 21, 2016

- CC95, Radiology Report Exchange, updated the following:
  - Section 10.4.3, Query Parameters.
  - Section 10.4.3-2, Minimal XCA Metadata set 1.
  - Section 11.1, Normative References.
  - Appendix E, CommonWell Document Metadata:
    - Added IHE Radiology Technical Framework, Volume 2 to source list.
    - Updated CommonWellDocumentMetadataCodes.xml.
    - Updated section E.1, classCode.
    - Updated section E.3, eventCodeList.
    - Updated section E.4, formatCode.
    - Updated section E.7, typeCode.
    - Added section E.9, title.
    - Added section E.10, referenceIdList.
  - Appendix F, CommonWell Health Alliance Performance Targets and Timeout Settings.
- CC94, Network Linking Proxy Support, updated section 8.7.7.2.
- CC93, Merging of Technical Specification and Use Case Specification, added Appendix H.
- Use Case Approval
  - Appendix H, section 6.10, Patient-Directed Link Management.
  - Appendix H, section 9.6, As a patient, I can find and consume documents via a connected Portal web application.

V2.6 – Published June 13, 2016

- CC75, Post Acute Correlated Linking (REST) and EnterpriseID Auto-Linking (formerly CC76)
  - In section 8.7.6.2 Adding a local patient record, added further description to the patient identifier parameter.
- CC72, Post-Acute Correlated Linking HL7
  - Added new section 9.6, Dynamic Creation of Correlated Links Using Patient Identity Feeds (PIXv2.x)
- CC78, Patient Self-Enrollment via Tethered Portal
  - Added Appendix C.6, Patient Role and Purpose of Use Codes.
- CC64, Additional Format Codes for C-CDA R2.1 support
  - The XML document was updated on 2/23/2016, and an XML comment was added for this change control number.

V2.5 – Published January 26, 2016

- CC67, Added OPTIONAL section 8.7.1.5 for Checking for Possible Patient Matches Prior to Enrollment.

V2.4 – Published August 25, 2015

- CC62, Spec Clarification for Patient Feed
  - In section D.2 REST-based Historical Feed, added clarification that the REST-based historical feed uses a different endpoint from the one used for ongoing patient administration events.
- CC56, Additional Format Codes for C-CDA R2.0 support

- In section E.4 CommonWell Metadata Document formatCode, replaced “currently there is no formal consensus” language with a reference and link to the CommonWellDocumentMetadata Codes XML document. The XML document was updated on 5/20/2015 by George Cole, and an XML comment was added for this change control number.

V2.3 – Published February 20, 2015

- CC59, Documentation Changes
  - In section 8.7.6.2 Adding a Local Patient Record, removed the patientId portion of the URL template. Also in this section, added *identifier* with *key* and *system* as required parameters.
  - In section 8.7.6.3 Updating a Local Patient Record, added the URL template section that was removed from section 8.7.6.2 so that it reflects requirements for only updating, not adding, a Local Patient Record. Also in this section, added *identifier* with *key* and *system* as required parameters.
  - In section 8.7.1.5 Add a new Person, the sample request was updated to remove the *label* and *assigner* parameters from the sample response since they are not required and were not in the sample request.
  - In the following property sections, the *_links* property was corrected by changing *array* to *_links*:
    - 8.6.4 Patient
    - 8.6.5 PatientLink
    - 8.6.6 Person
    - 8.6.7 Picture
    - 8.6.8 NetworkLink
  - In section 7.3 Federated Authentication, the reserved and private spec claim types for JWT were added for clarity.
  - In section 7.5 JSON Web Token (JWT) for REST-based services, the example of the payload of the JWT token was was changed to remove *urn:oid:* from the OrgId. While the previous syntax was not incorrect, it is also not necessary and could cause confusion.

V2.2 – Published December 16, 2014

- CC49, Document Query Metadata
  - Added new section: 10.4.3.2 Document Query Metadata.
  - Reorganize text in section 10 so that all of 10.5 Error Responses follows 10.4.3.2.

V2.1 – Published November 20, 2014

- CC51, Add REST-based Document Query and Retrieve
  - In section 2.2.2 Cross-Community Access (XCA), added support of REST-based document query and retrieve, revised diagram, and added a reference to Appendix G.
  - In section 7.4 SAML in SOAP-based Transactions, added support for Holder-of-Key.
  - Added section 8.4.1 Links.
  - Added section 8.4.2 Link Object.
  - In section 8.6.9 Visit, revised array type to links.
  - Added section 8.6.10 DocumentReference.
  - Added section 8.7.8 Document Query and Retrieve.
  - Added section 8.7.8.1 Find Documents.
  - Added section 8.7.8.2 Retrieve Document.

- In section 10.4.1 XDS Affinity Domain Option, clarified requirements for support of On-Demand documents.
- Added section 10.4.2 On-Demand Document Support.
- Added Appendix G, REST-based Document Query and Retrieve.

V2.0 – Published October 21, 2014

- Removed "Pilot" from file name
- Changed version number to signify major change of moving to CSA.
- Accepted all Bundle #1 changes.
- CC52, Response Code for NetworkLinks for Patient not linked to Person
  - Added Sample Response: Patient not linked to Person to section 8.7.7.1.
- CC33, CommonWell policy regarding Stable & On-Demand Documents
  - Revised section 2.2.2
- CC36, Add MSH 5&6 Validation on PIX service
  - Added message constraints for MSH-5 & MSH-6 to section 9.2.
- CC50, Policy for API Backwards compatibilities
  - Added API versioning
- CC46, Patient Merge support
  - Added Patient Merge via REST

V1.17 – Published June 4, 2014

- Replaced icon with logo and adjusted spacing on cover page.
- CC38, Security Rules for Tokens
  - Modified security rules for tokens

V1.16 – Published February 21, 2014

- Final approved version (legal, marketing, board, STIG)

V1.15 – Published January 28, 2014

- CC2, Demographic Fields for Patient Search
  - Resolved which demographics are required for local patient search.
- CC3, Local Patient Link from Person
  - Added a link relation to the Person resource for acquiring the PatientLink component related to that Person.
- CC7, Update PatientLink to Support LOLA1
  - Updated PatientLink component of the Person resource to provide presumptive matches (LOLA1).
- Accepted all changes in the document that had been tracked previously as we finalize for HIMSS.

V1.14 – Published October 24, 2013

- Added Appendix E, Upload of Historical Patient Identity Data.

- Updated person resource to allow for lookup of local patients and updated a workflow diagram (section B.4) in Appendix B, Person Enrollment Workflow Scenarios.

V1.13 – Published October 2, 2013

- CC9, Add Appendix describing Patient Identity Historic upload
    - Added Appendix E, Upload of Historical Patient Identity Data.
- CC3, Local Patient Link from Person
    - Updated person resource to allow for lookup of local patients and updated a workflow diagram (section B.4) in Appendix B, Person Enrollment Workflow Scenarios.

V1.12 – Published August 27, 2013

- Updated to add Person search based on strong identifier and Enrollment workflow appendix.

V1.11 – Published August 12, 2013

- Updated REST APIs to remove asynchronous processing transactions.
- Revised Patient search and added link relations to find Persons related to Patient.

V1.10 – Published July 15, 2013

- Added enroll property to Person resource and supporting operation to unenroll person.
- Added error codes to PIX v2 section.

V1.9 – Published July 12, 2013

- Revised to account for Person enrollment change to remove constraint on strong ID.
- Renamed RemoteLink resource to NetworkLink to clarify intent.
- Provided additional content (text and sequence diagrams) for REST-based protocol operations.

V1.8 – Published July 11, 2013

- No detailed information available.

V1.7 – Published July 1, 2013

- Standardized version number between Use Case Spec and Services Spec.

V1.6 – Published June 30, 2013

- Added overview of document sharing and patient identity management.
- For REST API, removed profile link relation, JSON object wrapping, and relocated personSearch URI to root (no longer associated with Person resource).

V1.5 – Published June 28, 2013

- No detailed information available.

V1.4 – Published June 16, 2013

- Updated Document Query & Retrieval and supplemented REST API reference with detail on link relations.

V1.3 – Published June 14, 2013

- Update to include PIX Query and additional detail on CHA Broker.
- Removed REST resource definitions that will not be implemented for pilot release.

V1.2 – Published May 24, 2013

- No detailed information available.

V1.1 – Published May 24, 2013

- No detailed information available.

V1.0 – Published May 21, 2013

- Initial version published to this site.

Abstract

This document describes a set of functional and administrative web services supporting a vendor-neutral system for locating and retrieving relevant clinical data for persons across heterogeneous settings of care.

Table of Contents

1 Introduction

The CommonWell service specification defines the set of services that may be consumed by healthcare information system providers for the purpose of exchanging healthcare information over the internet.

1.1 Intended Audience

The audience for this specification consists of those responsible for designing and building software systems that will use the CommonWell services. This specification provides a detailed description of the services and how they should be used.

2 Architecture

The services described in this specification establish a common infrastructure to enable health document sharing. The architecture is based on centralized Patient discovery and matching adjudication services. CommonWell also provides document query and retrieval services that incorporate a brokered service acting against a federated network of document registries and repositories.

CommonWell will support a prior version of an API for **at least one year** from the date on which the next major version goes into general release.

2.1 Design Goals and Assumptions

The CommonWell services have the following primary design goals and assumptions:

- Leverage existing standards.
- Provide a centralized service for Patient discovery and record location.
- Provide a brokered service for document query and retrieval.
- Utilize a federated security model for authentication and authorization.
- Audit transactions occurring within the CommonWell service boundary.

The CommonWell services will NOT provide the following:

- Will NOT provide centralized document registry or repository services.
- Will NOT provide a centralized ATNA auditing service; systems leveraging the CommonWell services (hereafter referred to as *Edge Systems*) are responsible for auditing events within their respective application domains.

2.2 Integrating the Health Enterprise (IHE) Profiles

The CommonWell services defined in this specification support IHE Integration Profiles as described in the following sections.

2.2.1 Patient Identifier Cross-Referencing (PIX)

The Patient Identifier Cross-Referencing (PIX) (http://wiki.ihe.net/index.php?title=Patient_Identifier_Cross-Referencing) integration profile supports the cross-referencing of Patient Identifiers from multiple Patient Identifier Domains by:

- Transmitting Patient Identity information from an identity source to a Patient Identifier Cross-reference Manager.
- Providing the ability to access the list(s) of cross-referenced Patient Identifiers via a query/ response transaction.

The CommonWell service represents an implementation of this profile by establishing a centralized Patient Identifier Cross-reference Manager. An Edge System acts as Patient Identity Source in the context of this profile by providing a Patient Identity Feed to the CommonWell Patient Identifier Cross-reference Manager.

See Section 8.7.7.1 for Implementation details for the CommonWell Patient Identifier Cross Referencing interfaces.

See Appendix F for PIX performance targets agreed upon by the CommonWell Health Alliance.

2.2.2 Cross-Community Access (XCA)

The Cross-Community Access (XCA) integration profile supports the means to query and retrieve patient-relevant medical data held by other communities. A *community* is defined as a coupling of facilities/enterprises that have agreed to work together using a common set of policies for the purpose of sharing health information.

CommonWell represents an XCA community insofar as registered organizations have agreed to share health information. The CommonWell Health Alliance Broker (CHA Broker) service, described in section 10, provides a brokered service for **FindDocuments Registry Stored Query/Cross Gateway Query** and **Retrieve Document Set/Cross Gateway Retrieve** transactions as defined in IHE ITI-18, ITI-38, ITI-39 and ITI-43. The CHA Broker will support receiving both XDS.b (ITI-18 and ITI-43) and XCA (ITI-38 and ITI-39) forms of these transactions as specified in the IHE specifications. All communication from the CHA Broker to member responding gateways will be through the XCA query and retrieve transactions. CommonWell also supports REST-based document query and retrieve based on HL7 FHIR resources and their related transactions.

CommonWell member organizations that want to respond to document query & retrieval requests MUST register their respective XCA Responding Gateway services (or their REST-based equivalent conforming to FHIR). In addition to supporting the required query and retrieve XCA transactions (ITI-38 and ITI-39), the member responding gateway may also support one or both of two IHE options: On-Demand Documents and Persistence of Retrieved Documents. As a Document Consumer, Edge Systems MUST include the On-Demand Document option as specified in the IHE ITI On-Demand Documents Supplement; this option is necessary in order to ensure complete retrieval of all patient documentation.

Currently, CommonWell supports the following versions of the IHE specifications for each of these transactions and options:

- XCA specifications:
  - Transaction overview: Integration Profiles, publication date 10/25/2013, Version 10.1 (http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf)
  - ITI-18 specification: Transactions Part A, publication date 9/27/2013, Version 10.0 (http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2a.pdf)
  - ITI-38, ITI-39 and ITI-43 specifications: Transactions Part B, publication date 9/27/2013, Version 10 (http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol2b.pdf)
- On-Demand Documents option: On-Demand Documents, publication date 10/25/2013, Version 1.3 (http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_Suppl_On_Demand_Documents.pdf)
- Persistence of Retrieved Documents:
  - Transaction overview: Integration Profiles, publication date 10/25/2013, Version 10.1 (http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf)
  - XDS-SD specification: Cross-Transaction Specifications and Content Specifications, publication date 9/27/2013, Version 10.0 (http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol3.pdf)

CommonWell also has agreements on the set of coding systems and values to be used for document metadata. Additional information on approved metadata can be found in Appendix E of this document.

See Appendix F for CHA Broker and member responding gateway performance targets agreed upon by the CommonWell Health Alliance and current service timeouts.

See Appendix G for details on REST-based document query and retrieve operations and mappings to the IHE XDS profile.

2.2.3 Cross-Enterprise User Assertion (XUA)

The Cross-Enterprise User Assertion Profile (XUA) provides a means to communicate identity information about an authenticated principal (user, application, system) in transactions that cross enterprise boundaries.

The transactions between Edge Systems and CommonWell will use an authorization framework based on Identity Federation standards. These standards support user directories distributed among the various Edge Systems.

As part of the CommonWell-brokered document query and retrieval workflow detailed in this specification, Edge Systems will request a SAML 2.0 Token from the CommonWell service. The Edge System will include this token in the SOAP header of the SOAP-based messages exchanged as specified in the Cross-Community Access (XCA) integration profile.

2.3 CommonWell REST-based Services

In addition to the IHE-defined SOAP transactions described above, CommonWell also provides REST services which support workflows facilitating patient management, Patient Record matching, Person Enrollment and Patient discovery. These workflows are enhanced and supported by verification policies and the use of verifiable “strong identifiers” like driver’s licenses and state-issued identification cards.

2.3.1 Resource Definitions

Following the REST architectural style, the application protocol operations defined in Section 8.6.10 of this specification are executed by manipulating the underlying resource representations. Link relations included in the resource representations provide the mechanism for clients to transition the state of a resource in an application workflow.

2.3.2 Fast Healthcare Interoperability Resources (FHIR)

Fast Healthcare Interoperability Resources (FHIR) defines a set of resources for use in exchanging information about the healthcare process. In accordance with the FHIR license, this specification represents a derivative specification and a REST-based implementation and extension of particular FHIR resource definitions.

FHIR resource definitions are still in draft status. However, FHIR is sponsored by HL7 and is derived from both the collective experience of the HL7 membership and wide community feedback from the development and application of a spectrum of healthcare interoperability solutions.

This document is based on v0.08 of the HL7 FHIR Specification.

2.3.3 Link Relations

To support the hypermedia constraint, link relations associated with resource representations will use the format defined in the Hypertext Application Language (HAL) media type. HAL provides a set of conventions for expressing hyperlinks to related resources, and thus avoids the necessity to create a custom media type for the resources defined in this specification.

2.3.4 Resource Format

The supported format for resource representations is JavaScript Object Notation (JSON).

2.3.5 Performance

CommonWell Health Alliance agreed upon performance targets for the REST services are outlined in Appendix F.

3 Conventions used in this document

The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC-2119 [RFC2119] (http://www.ietf.org/rfc/rfc2119.txt).

In this document, these words will appear with that interpretation only when in ALL CAPS. Lower case uses of these words are not to be interpreted as carrying RFC-2119 significance.

4 Glossary of Terms

This section defines commonly used terms.

Object Identifier (OID)
An OID is a standard identification mechanism for naming any type of object, concept or "thing" with a globally unambiguous, persistent name.

Organization
A healthcare system that interacts with the CommonWell services as a provider of Patient Identity information and as a consumer of the CommonWell Patient discovery and record location services. This term is used interchangeably with *Community.*

- An Organization's Edge System acts as a source of Patient Record data to CommonWell.
- An Organization's Responding Gateway maintains publicly available service endpoint(s) for query and retrieval of clinical data related to Patients maintained by the Organization.
- An Organization may represent a single health care facility or a Health Information Exchange (HIE) entity.

Edge System
An Edge System is any healthcare information system that is capable of interacting with the CommonWell services. This includes systems that will submit Patient Identity data, can query for Patient Record locations and associated visits, and will perform document query and retrieval.

Visit
A Visit represents an encounter between an individual and a participating Organization for the purpose of providing patient service(s) or assessing the health status of a patient.

Local Patient Record
In the context of interactions between an Edge System and CommonWell, this describes a Patient Record that exists in the local Edge System. This may or may not include encounter information that may be used to assist in match adjudication.

Remote Patient Record
In the context of interactions between a *local* Edge System and CommonWell, this describes a Patient Record that exists in an Organization to which the Edge System does not belong.

CommonWell Patient Record
A record stored within CommonWell of Patient demographic, identity and visit information unique to the care setting(s) associated with an Organization.

CommonWell Patient Identifier
The CommonWell Patient Identifier is an object identifier (OID) that represents a unique and unambiguous name for a Patient Record.

The CommonWell Patient Identifier is created by the CommonWell system when processing a Patient Add operation in the course of a Patient Identity Feed transaction and is stored with a CommonWell Patient Record as its Identifier.

To obtain the CommonWell Patient Identifier associated with a Local Patient Record, an Edge System can query CommonWell using the PIX Query transaction or can query CommonWell directly using the REST-based resource representation for a Patient.

This identifier is essential for certain key CommonWell workflows – for example, the CommonWell Patient Identifier MUST be used to refer to a Patient in requests for documents and document metadata as described in the Document Query and Retrieval workflow.

Person Enrollment

Person Enrollment is the workflow by which an individual may be registered in the CommonWell system. In order to enroll, an individual MUST provide key demographic information to the CommonWell system and MAY also provide valid authoritative identifiers. This is an active engagement of the individual authorizing the use of their demographic information in the CommonWell system for matching purposes.

CommonWell Person Record

The CommonWell Person Record is an individual known outside the context of an individual Organization. A Person Record contains general demographic information and may also include one or more validated authoritative identifiers (stored as hashed values). This record is created in the CommonWell system by the Person Enrollment workflow.

As a pre-condition for use of CommonWell record discovery and data location services, a Patient Record MUST be related to a Person Record.

CommonWell Person Identifier

This globally-unique identifier is created during an Enrollment activity and is associated with a CommonWell Person Record. An individual will be assigned, at most, one CommonWell Person Identifier. That is, an individual whose Visits and Patient Records have been back-loaded to CommonWell does not have an associated CommonWell Person Identifier or Person Record until that individual has been enrolled in CommonWell.

Patient Link

A Patient Link represents a relationship between a Person and a Patient Record. The existence of a Patient Link implies the acquisition of patient consent to establish the link. The level of confidence of this link is represented by its Level of Link Assurance (LOLA) value.

Network Link

A Network Link represents a transitive relationship between Patient Records which reference the same Person within CommonWell. The level of confidence of this link is represented by the Level of Link Assurance (LOLA) value.

Level of Link Assurance (LOLA)

LOLA refers to an integer value expressing CommonWell's level of confidence in a Network Link (the relationship between Patient Records across Organizational boundaries). These links will, in most cases, carry a LOLA level of 1, 2, or 3. A level 0 link is established only after a patient's explicit denial of the existence of a link between his or her Person and a given Patient entity.

> **Level 0**: Identifies a false-positive match between a Local Patient Record and a Remote Patient Record. This level is can only be established by user interaction, downgrading a higher LOLA (e.g., a registration clerk confirms with an individual that a presumptive LOLA 1 network link does NOT refer to the same person; the clerk then initiates a command message from the Edge System to CommonWell to demote the Level 1 network link between the

two Patient Records). Once a Network Link is demoted to LOLA 0, the Remote Patient Record referenced by that link will no longer appear in the Local Patient Record's list of Network Links in any Edge System.

Level 1: Established by CommonWell's probabilistic matching algorithm, this identifies a presumptive match between a Local Patient Record and a Remote Patient Record. Network Links with LOLA 1 cannot be used for document query and retrieval. Edge System users may either validate this as a match (promoting the network link to LOLA 2) or confirm this is a false positive (demoting the network link to LOLA 0).

Level 2: Identifies a network relationship between Patient Records that has been validated using demographic information. Validation MUST be confirmed by an authorized user of an Edge System (e.g., a registration clerk verifies with an individual that his or her street address in the Local Patient Record is the same as the one found in a Remote Patient Record; the clerk then initiates a command message from the Edge System to CommonWell to create the Level 2 link between the two Patient Records). This is a virtual transitive link established from one Patient entity to another through a shared Person.

A network link MUST be LOLA 2 or higher for document query and retrieval.

Level 3: Identifies a network relationship between Patient Records that has been validated using demographic information and an authoritative ID.

Level 4 (not yet implemented): Identifies a network relationship between Patient Records that has been validated using biometric data.

5 Patient Identity Management

The document sharing model used by CommonWell requires that Edge Systems acting as document consumers resolve Patient Identity prior to querying for documents. To facilitate Patient discovery and identity resolution, CommonWell provides a central service for Edge Systems to register Patient Identity and associated visit information to enable Patient discovery across the network of CommonWell Organizations.

5.1 Design Goals and Assumptions

The following are goals and assumptions for the CommonWell Patient Identity management service:

- CommonWell provides REST-based and PIX v2.x services for Patient Identity feed and query transaction processing.
- CommonWell will assign a globally unique Patient Identifier for each registered patient.
- CommonWell will not provide the CommonWell Identifier to a document registry.
- The Edge System acting as a Patient Identity Source is providing Patient Identity event notifications to both CommonWell PIX and the Edge System's document registry (which is known to CommonWell via the Edge System's Organization configuration).
- Edge Systems are NOT required to provide the CommonWell Identifier to a document registry.
- The process for communicating Patient Identity event notifications is outside the scope of this specification.
- The authoritative local Patient Identifier supplied by the Edge System to CommonWell MUST be the same as the one provided to the Edge System's document registry.
- In terms of the IHE specifications, CommonWell represents a Patient Identifier Cross-reference Domain.
- CommonWell will NOT provide PIX update notifications.

- CommonWell does NOT represent an XDS Affinity Domain.
- CommonWell does NOT replace an enterprise Master Patient Index (eMPI).

The CommonWell Identifier is not an XDS Affinity Domain Patient ID (XAD-PID). An XAD-PID is a Patient Identifier assigning authority which provides a single unique identifier for each patient for which documents are registered in the document registry. CommonWell does not represent an XDS Affinity Domain to the extent it is not providing document registration services and is not constrained by the XAD-PID Change Management (XPID) profile. The local Patient Identifier supplied to CommonWell by an Edge System may, in fact, be an XAD-PID. It remains the responsibility of the Edge System to ensure that any changes to the authoritative identifier for a patient in its Organization is communicated to CommonWell and that it remain synchronized with the Edge System's associated document registry.

6 Document Sharing

The CommonWell Health Alliance Broker (CHA Broker) provides centralized discovery and retrieval services capable of brokering transactions among a federated system of document registries and repositories.

6.1 Design Goals and Assumptions

The following are the goals and assumptions for the CommonWell document query and retrieval services.

- Edge Systems, acting as document consumers, do not need to contact each community that may hold documents for a targeted patient.
- The CHA Broker WILL support the ITI-18, ITI-38, ITI-39 and ITI-43 transactions.
- CommonWell Organizations MUST register their respective XCA Responding Gateway services.
- CommonWell will NOT act as a document registry or repository.
- The CHA Broker will audit all transactions within the broker service itself ONLY.
- The CHA Broker will NOT act as an enterprise-wide audit repository.
- Edge Systems are responsible for auditing their own transactions.

7 API Security

7.1 Transport Security

All message exchanges between CommonWell and Edge Systems MUST be secured using TLS/SSL.

7.1.1 X.509 Certificates for Authentication and Signing

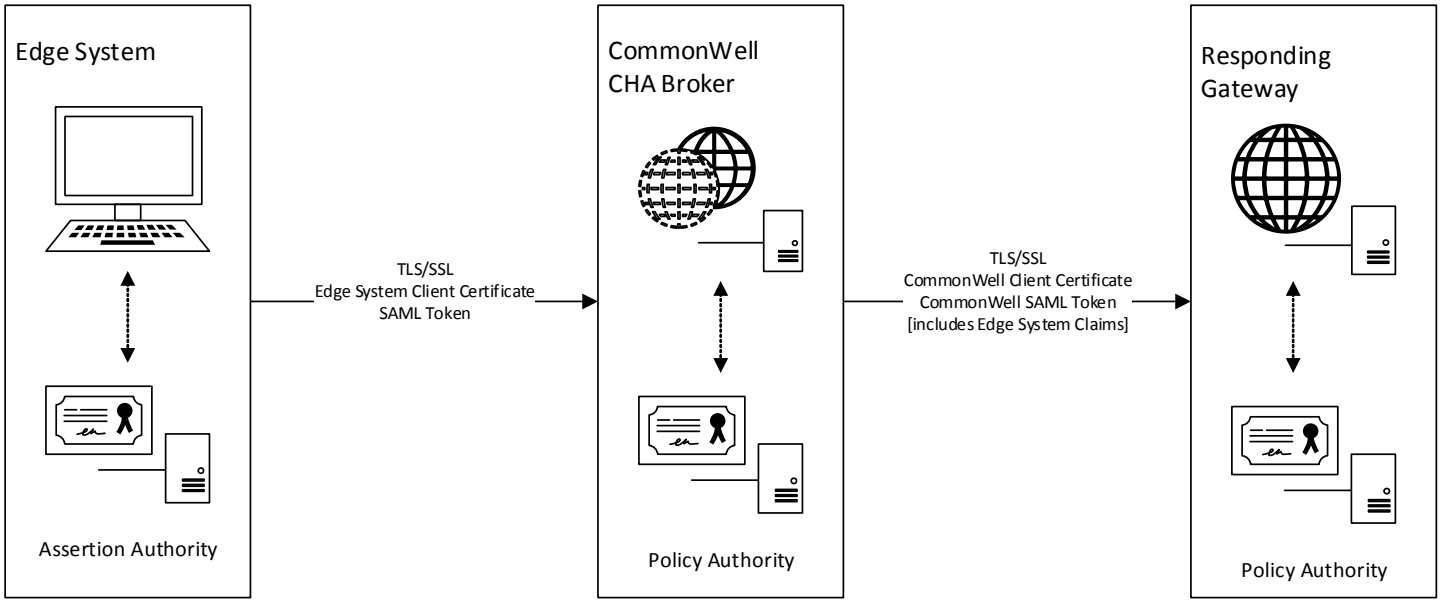
X.509 Certificates are used for authentication of all transactions described in this specification (including authenticating to the MLLP-based CommonWell Patient Identity Management service). In addition, SAML/JWT authorization tokens included in HTTP-based transactions should be signed using an X.509 Certificate.

Requests sent from an Edge System to CommonWell MUST use an X.509 Certificate maintained by the Edge System for authentication and for digitally signing the SAML/JWT authorization token included in the request. An Organization may use the same certificate for both authentication and signing or a different certificate for each.

The Organization provides the associated public key(s) to CommonWell as part of the Organization registration process.

Requests sent from CommonWell to an Organization's Responding Gateway will include an X.509 Certificate maintained by CommonWell for client authentication. CommonWell will also sign SAML tokens presented to an Organization's Responding Gateway using the same X.509 Certificate. CommonWell will provide the public key of this certificate to an Organization as part of the registration process.

Authentication and Authorization in a Brokered Transaction



7.2 Certificate Requirements

All Client/SSL Certificates MUST meet or exceed the following criteria:

7.2.1 Key Sizes

- The CA shall utilize the SHA-256 algorithm for certificate signatures.
- All keys shall be at least 2048 bit (RSA).

7.2.2 Certificate Authority

The organization's certificate MUST be issued by a mutually trusted, WebTrust-certified Certificate Authority.

7.3 Federated Authentication

This section defines the exchange of metadata used to characterize the initiator of a request to the CommonWell server.

As a pre-condition to initiating a request to the CommonWell server, an Edge System MUST determine if a local user is authorized to perform a given function using the CommonWell services. If the request is authorized, the initiating Edge System attaches the user-centric assertions to the request. CommonWell receives the request with the understanding that the Edge System has locally authorized the user to make the request. An Edge System SHOULD audit all local authentication requests in accordance with ATNA.

For SOAP-based requests, the Edge System must convey the locally-authenticated user attributes and authorizations using SAML 2.0 assertions. The Edge System MUST issue, at minimum, one new token for each user session.

For REST-based requests, the Edge System will use a JSON Web Token (JWT). The Edge System MUST issue, at minimum, one new token for each user session.

For both SAML assertions and JSON Web Tokens, the expiration timestamp must be specified and digitally signed to prevent manipulation. The expiration timestamp MUST be set to no greater than eight (8) hours after generation to prevent reuse of the token. In SAML, the Expires element exists in the Timestamp element of the security header. In JWT, the expiration time is specified in the exp claim.

The claims included in the SAML security tokens are listed below:

Name	Type	Description
Subject ID	string	The name of the user as required by HIPAA Privacy Disclosure Accounting.
Subject Organization	string	In plain text, the organization that the user belongs to as required by HIPAA Privacy Disclosure Accounting.
Subject Role	Code	The SNOMED CT value representing the role that the user is playing when making the request.
Purpose of Use	Code	The coded representation of the reason for the request.
Organization ID	string	A unique identifier for the organization that the user is representing in performing this transaction. The organization ID may be an Object Identifier (OID), or it may be a URL assigned to that organization.
National Provider Identifier	string	OPTIONAL: A National Provider Identifier (NPI) is a unique 10-digit identification number issued to healthcare providers in the United States by the Centers for Medicare and Medicaid Services (CMS).

The claims included in the JWT security tokens are listed below:

Name	Type	Description
“aud” (Audience)	string	The value for the audience claim must be *urn:commonwellalliance.org*.
“nbf” (Not Before)	integer	OPTIONAL: The ”nbf” (not before) claim identifies the time before which the JWT MUST NOT be accepted for processing. The processing of the “nbf” claim requires that the current date/time MUST be after or equal to the not-before date/time listed in the “nbf” claim. Its value MUST be a number containing an IntDate value.
“exp” (Expiration Time)	integer	OPTIONAL: The “exp” (expiration time) claim identifies the expiration time on or after which the JWT MUST NOT be accepted for processing. The processing of the “exp” claim requires that the current date/time MUST be before the expiration date/time listed in the “exp” claim. Its value MUST be a number containing an IntDate value (epoch datetime). The duration between the “exp” and the “nbf” claims cannot be more than eight (8) hours.
urn:oasis:names:tc:xspa:1.0:subject:organization-id	string	This is a private JWT claim to indicate the organization ID. The value in this claim is used to get the certificate in order to validate the signature on the token.

7.4 SAML in SOAP-based Transactions

SOAP-based service security is based on the NHIN Authorization Framework 3.0 (http://www.healthit.gov/sites/default/files/nhin-authorization-framework-production-specification-v3.0-1.pdf) (with exceptions noted below). When making SOAP-based requests to CommonWell, an Edge System MUST include the locally-authenticated user attributes and authorization claims described above (7.3 Federated Authentication) in the SAML token's attribute statement.

When brokering SOAP-based requests to an Edge System's responding gateway, CommonWell will package the claims submitted by the originating Edge System in the SAML token used in the request from CommonWell to the responding gateway identified by CommonWell as the destination for the brokered request. CommonWell will present a SAML token to the destination responding gateway using either a Bearer or Holder-of-Key subject confirmation; the subject confirmation method for the responding gateway is specified as part of the Organization registration process.

The implementation of the CommonWell SOAP-based services has additional constraints for use of SAML tokens:

- CommonWell currently supports the Bearer and Holder-of-Key subject confirmation methods for incoming SOAP requests.
- CommonWell DOES NOT support the Sender-Vouches subject confirmation method.
- For brokered requests sent from CommonWell to an Edge System responding gateway, the responding gateway MUST accept either the Bearer or Holder-of-Key subject confirmation method.

7.5 JSON Web Token (JWT) for REST-based services

When making REST-based requests to the CommonWell server, an Edge System MUST include authorization claims in the form of a JWT bearer token in the *Authorization* HTTP Header of the request.

JSON Web Token (http://tools.ietf.org/html/draft-ietf-oauth-json-web-token-08) (JWT) is a compact URL-safe means of representing and transferring claims from an Edge System to the CommonWell server. The claims in a JWT are encoded as a JavaScript Object Notation (JSON) object and added to the payload of a JSON Web Signature (JWS) structure. The JWT is digitally signed and encrypted. Below is an example of a request with a message authentication code (MAC) encrypted, base64url encoded JWT token in the HTTP *Authorization* header.

The following is an example of the payload of the JWT token. Note that the names of the claims observe the same convention described in the NHIN authorization framework.

```
{
  "iss": "self",
  "aud": "urn:commonwellalliance.org",
  "nbf": 1380560162,
  "exp": 1380560455,
  "urn:oasis:names:tc:xacml:2.0:subject:role": "112247003",
  "urn:oasis:names:tc:xspa:1.0:subject:subject-id": "Geoffrey Geiger",
  "urn:oasis:names:tc:xspa:1.0:subject:organization": "St. Barnabas Hospital",
  "urn:oasis:names:tc:xspa:1.0:subject:organization-id": "2.16.840.1.113883.4",
  "urn:oasis:names:tc:xspa:1.0:subject:purposeofuse": "TREATMENT",
  "urn:oasis:names:tc:xspa:2.0:subject:npi": "1770589525"
}
```

Sample Request

The following example shows the encoded JWT inserted as a bearer token in the HTTP Authorization header.

```
GET https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334 HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer eyJhbGciOiJSU0.WnDYvpIAeZ72deHxz3roJDXQyhxx0wKaM.fiK51VwhsxJ-siBMR-YFiA
```

8 REST API Reference

8.1 Service Root URL

The Service Root URL is the address where all of the resources defined by this interface are found.

https://rest.api.commonwellalliance.org/

Each resource type defined in this specification has a manager (or "entity set") that lives at the address "/[name]" where the name is the name of the resource type in lowercase. For instance, the resource manager for the type "Person" will live at:

https://rest.api.commonwellalliance.org/v1/person

All logical operations are defined relative to this service root URL. Note, this means that, given the address of any one resource, the correct address for all the other resources may be determined.

All URLs (and ids that form part of the URL) defined by this specification are case sensitive.

8.2 Versioning

The version of this specification and the resources associated with the CommonWell services is indicated by a subdomain name of the Service Root URL. As shown in Section 8.1, version 1 of the CommonWell services is indicated by the subdomain "v1." Subsequent versions of these services, if and when they are released, will be identified by updating the subdomain accordingly (e.g., "v2", "v3", and so on).

8.3 Data Types

This specification defines a set of types that are used as resource values. There are two categories of data type: primitive types, represented in JavaScript Object Notation (JSON) [RFC4627], and complex types, which are re-usable combinations of data elements. This section defines how data-types are represented and handled as JSON representations.

8.3.1 Primitive Types

The following table summarizes the primitive types used in this specification. These types are defined as JSON representations with additional constraints marked in bold. JSON is a text format for the serialization of structured data. It is derived from the object literals of JavaScript as defined in the ECMAScript Programming Language Standard, Third Edition [ECMA].

Name	JavaScript Data Type	Description
base64Binary	string	A string, base64 encoded (RFC 4648) (http://tools.ietf.org/html/rfc4648).
boolean	boolean	Values can be either true or false (**0 and 1 are not valid values**).
integer	number	A signed 32-bit integer (for larger values, use decimal).
decimal	number	A rational number. Note: for implementations, do not use an IEEE type floating point type, instead use something that works like a true decimal, with inbuilt precision (e.g. Java BigDecimal).

string	string	A string is a sequence of zero or more Unicode characters, wrapped in double quotes, using backslash escapes. A character is represented as a single character string. **Note that strings SHALL not exceed 1MB in size.**
uri	string	A Uniform Resource Identifier Reference. It can be absolute or relative and may have an optional fragment identifier (RFC 3986) (http://tools.ietf.org/html/rfc3986).
date	string	A date expressed per ISO 8601 in the form "YYYY-MM-DD" where: *YYYY* indicates the year *MM* indicates the month *DD* indicates the day
dateTime	string	A UTC date and time expressed per ISO 8601 in the form "YYYY-MM-DDThh:mm:ssZ" where: *YYYY* indicates the year *MM* indicates the month *DD* indicates the day *T* indicates the start of the required time section *hh* indicates the hour *mm* indicates the minute *ss* indicates the second (**optional**) *Z* indicates a zero UTC offset

8.3.2 Simple Restrictions

Name	Base Type	Description
oid	uri	An OID represented as a URI (RFC 3001) (http://www.ietf.org/rfc/rfc3001.txt): urn:oid:1.2.3.4.5
uuid	uri	A UUID, represented as a URI (RFC 4122) (http://www.ietf.org/rfc/rfc4122.txt): urn:uuid:a5afddf4-e880-459b-876e-e4591b0acc11
code	string	A string which has at least one character and no leading or trailing whitespace, and where there is no whitespace other than single spaces in the contents. regex: [^\s]+([\s]+[^\s]+)*

Name	Base Type	Description
id	string	A whole number in the range 0 to 2^64-1 (optionally represented in hex), a uuid, an oid, or any other combination of lowercase letters, numerals, "-" and ".", with a length limit of 36 characters. regex: [a-z0-9\-\.]{1,36}

8.4 Complex Types

8.4.1 Links

An object whose property names are link relation types (as defined by RFC5988) and values are an array of Link Objects. The subject resource of these links is the Resource Object of which the containing "links" object is a property.

8.4.2 Link Object

A Link Object represents a hyperlink from the containing resource to a URI.

Name	Type	Control	Description
href	uri	1…1	Required. A URI (RFC3986) or a URI Template (RFC6570). If the value is a URI Template, the Link Object SHOULD have a "template" attribute whose value is true.
templated	boolean	0…1	Optional. This value SHOULD be true when the Link Object's *href* property is a URI Template. Default value is false.
type	string	0…1	Optional. The type of resource.

8.4.3 Address

A postal address.

Name	Type	Control	Description
use	code	0…1	The use of this address. See Address Use Codes for allowed values.
line	string	0…*	The street address.
city	string	0…1	The city.

Name	Type	Control	Description
state	string	0…1	The state.
zip	string	1…1	The postal code.
country	string	0…1	The country.
period	Period	0…1	Time period when address was/is in use.

8.4.4 Attachment

Contains or references attachments which may contain additional data content defined in other formats. A common use of this is to include images or reports in some report format such as PDF. In this specification, it may also be used for an identifying photograph of a patient.

Name	Type	Control	Description
contentType	code	1…1	Mime type of the content with charset, etc.
data	base64Binary	0…1	The actual data of the attachment.
url	uri	0…1	An alternative location where the data can be accessed.
size	integer	0…1	The number of bytes of data that make up this attachment.
hash	base64Binary	0…1	The calculated hash of the data using SHA-1. Represented using base64.
title	string	0…1	A label or set of text to display in place of the data.

8.4.5 Coding

A representation of a concept using a symbol from a defined "code system," which may be an enumeration, a list of codes, a full terminology, such as SNOMED-CT or LOINC, or a formal ontology.

Name	Type	Control	Description
system	uri	0…1	Identity of the terminology system.

Name	Type	Control	Description
code	code	0…1	Symbol in syntax defined by the system.
display	string	0…1	Representation defined by the system.

The system is a Uniform Resource Identifier (URI) that references the enumeration, terminology or ontology that defines the code. The URI may be an OID (urn:oid:) or a UUID (urn:uuid:), a specially-defined URI from the named systems list, a URL that references a definition of the system, or any other URI that uniquely identifies the definitions. OIDs and UUIDs may be registered in the HL7 OID registry and should be if the content is shared or exchanged across institutional boundaries.

If present, the code must be a syntactically correct symbol as defined by the system. In some code systems, such as SNOMED-CT, the code may be an expression composed of other codes. Note that codes are case sensitive unless specified otherwise by the code system. The display is a text representation of the code defined by the system and can be used to display the meaning of the code by an application that is not aware of the system.

A listing of the FHIR-based codes used in this specification is provided in the appendix titled Terminology Bindings.

8.4.6 CodeableConcept

A CodeableConcept represents a field that is usually defined by formal reference to one or more terminologies or ontologies but may also be defined by the provision of text. This is a common pattern in healthcare data.

Name	Type	Control	Description
coding	Coding	0…*	Code defined by a terminology system.
text	string	0…1	Plain text representation of the concept.
primary	idref	0…1	The code chosen directly by the user.

Each "coding" is a representation of the concept using a symbol from a defined "code system," which may be an enumeration, a list of codes, a full terminology, such as SNOMED-CT or LOINC, or a formal ontology. The concept may be coded multiple times in different code systems (or even multiple times in the same code systems, where multiple forms are possible, such as with SNOMED-CT). The different codings may have slightly different granularity due to the differences in the definitions of the underlying codes. The ordering of codings within a CodeableConcept is undefined.

8.4.7 Contact

A variety of technology-mediated contact details for a person or organization, including telephone, email, etc.

Name	Type	Control	Description
use	Code	0…1	Identifies the context for the address. See Contact Use Codes for allowed values.
system	Code	0…1	What kind of contact this is -= what communications system is required to make use of the contact. See Contact System Codes for allowed values.
value	string	0…1	The actual contact details, in a form that is meaningful to the designated communication system (i.e., phone number or email address).
period	Period	0…1	Time period when the contact was/is in use.

8.4.8 Demographics

The demographic details for a Person.

Name	Type	Control	Description
identifier	Identifier	0…*	Identifier for a natural person. Used for identification of the person him/herself, such as driver's license, national or social security numbers, etc.
name	HumanName	1…*	A name associated with the individual.
telecom	Contact	0…*	A contact detail for the individual.
gender	Coding	1…1	Gender for administrative purposes. The gender of a person used for administrative purposes. See Administrative Gender Codes.
birthDate	dateTime	1…1	The birth date for the individual.
address	Address	1…*	One or more addresses for the individual.
photo	Picture	0…*	Image of the person.

8.4.9 EnrollmentSummary

A summary of a Person's enrollment status.

Name	Type	Control	Description
dateEnrolled	dateTime	1…1	The date a Person was enrolled.
enroller	string	1…1	The name of the Organization that enrolled the Person.
dateUnenrolled	dateTime	0…1	The date a Person was unenrolled.
unenroller	string	0…1	The name of the Organization that unenrolled the Person.

8.4.10 HumanName

A name of a Person with text, parts and usage information.

Names may be changed or repudiated. People may have different names in different contexts. Names may be divided into parts of different type that have variable significance depending on context, though the division into parts does not always matter. With personal names, the different parts may or may not be imbued with some implicit meaning; various cultures associate different importance with the name parts and the degree to which systems must care about name parts around the world varies widely.

Name	Type	Control	Description
use	Code	0…1	The use of this name. See Name Use Codes for allowed values.
text	string	0…1	Text representation of the full name.
family	string	1…*	Family name (called 'Surname').
given	string	1…*	Given names (not always 'first'). Includes middle names.
prefix	string	0…*	Parts that come before the name.
suffix	string	0…*	Parts that come after the name.
period	Period	0…1	Time period when name was/is in use.

8.4.11 Identifier

An identifier intended for use external to the FHIR protocol. As an external identifier, it may be changed or retired due to human or system process and errors.

Name	Type	Control	Description
use	Code	0…1	The use of this identifier. See Identifier Use Codes for allowed values.
label	string	0…1	Description of identifier.
system	uri	0…1	The namespace for the identifier.
key	string	1…1	The unique value of the identifier.
period	Period	0…1	Time period when identifier was valid for use.
assigner	string	0…1	Name of Organization that issued identifier.

A CommonWell Person Identifier, generated by the CommonWell server in a Person Add transaction, will have the following values:

Name	Value
use	official
label	CommonWell Person Identifier
system	urn:oid:2.16.840.1.113883.3.3330.47[1]
key	*[Person ID]*
assigner	CommonWell Health Alliance

8.4.12 Period

A time period defined by a start and end time.

[1] 2.16.840.1.113883.3.3330.47 is the CommonWell Person Identifier Assigning Authority OID.

Name	Type	Control	Description
start	dateTime	0…1	The start of the period. The boundary is inclusive.
end	dateTime	0…1	The end of the period. If the high is missing, it means that the period is ongoing.

8.4.13 Practitioner

The demographic information and role for an individual involved in the provisioning of healthcare.

Name	Type	Control	Description
name	HumanName	1…*	A name associated with the individual.
role	CodeableConcept	0…1	The role a person plays representing an organization, e.g., doctor, nurse, pharmacist. See Practitioner Role Codes for the list of allowed values.

Implementation Note

This FHIR specification defines a Practitioner as a resource. In this specification, a Practitioner ONLY has meaning within the context of a patient visit and so it is defined herein as a value type identifying the participants in a Visit. In other words, a Practitioner in this implementation is NOT addressable as a resource.

8.5 Codes and Terminologies

This specification includes by reference the codes and terminologies defined in the FHIR specification. See http://www.hl7.org/implement/standards/fhir/terminologies.htm. A subset of the codes used in this implementation is provided in the appendix titled Terminology Bindings.

8.5.1 Codes Registry

For resource properties with type "*code,"* the property is bound to a code list -- a list of defined codes or the binding references some external standard that defines the set of valid codes that can be used.

See http://www.hl7.org/implement/standards/fhir/terminologies-codes.htm for FHIR code lists.

8.5.2 Named Systems

Well-known URIs (e.g., http://snomed.info) that may be used in the system property of the Identifier, Coding, or CodeableConcept data types. URIs defined in the HL7 FHIR specification (see http://www.hl7.org/implement/standards/fhir/terminologies-systems.htm) must be used in preference to other identifying mechanisms such as OIDs.

CommonWell may define additional URIs for concepts not listed in the FHIR specification.

8.6 Resources

8.6.1 Error

A read-only representation of error information.

Name	Type	Control	Description
message	string	1…1	A description of the error.
code	int	1…1	The CommonWell error code.
reference	string	1…1	A transaction identifier.
help	uri	0…1	For client errors, the URL to a CommonWell web page providing more information about the error and suggestions for how the consumer can resolve it.

```
{
   "message": "Patient consent policy forbids access to this resource.",
   "code": 1245,
   "reference": "f57236f0-d4ad-11e2-8b8b-0800200c9a66",
   "help": {"href": "http://rest.api.commonwellalliance.org/help/#consent"}
}
```

8.6.2 Link

A resource supporting merging Patient Records within a specified Organization.

Name	Type	Control	Description
other	Resource	1..1	The other patient resource that the link refers to.
type	Code	1..1	The type of link between this patient resource and another patient resource. (see http://hl7.org/fhir/link-type for values). This value MUST be "replace".

```
{
  "link":
      {
        "other": {
          "reference": "patient/1234%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/"
        },
        "type": "replace"
      }
```

```
}
```

8.6.3 Organization

Based on the FHIR formal definition of an Organization resource (http://www.hl7.org/implement/standards/fhir/organization-definitions.htm), a CommonWell Organization represents an institution, corporation, department, community group, practice group, or other organization participating as an initiator or responder in the workflows supported by the CommonWell services.

```
{
   "_links": "link relations",
   "name": ["St. Barnabas Hospital"],
   "identifier": [{
      "use": "official",
      "label": "St. Barnabas Organization Identifier",
      "key": "urn:oid:2.16.840.1.113883.3.271.123",
      "system": "urn:ietf:rfc:3986",
      "assigner": "RelayHealth"}],
   "address": [{
      "zip": "60612",
      "state":  "Il",
      "line": ["8123 Hawthorne Ave."],
      "city": "Chicago"}],
   "telecom": [{
      "system": "phone",
      "value": "708-555-1234",
      "use": "work"},
      {
      "system": "email",
      "value": "admin@sbh.org",
      "use": "work"}]
}
```

Link Relations

An Organization resource may contain the reserved *_links* property, a collection of links available to the Edge System against this Organization resource given its current state.

Link	Description
self	Reference to this organization representation.

8.6.4 Patient

Based on the FHIR formal definition of a Patient resource (http://www.hl7.org/implement/standards/fhir/patient-definitions.htm), a patient is a person who is receiving care.

The patient resource covers all "Subjects of Care" inclusive of health-related care events where the focus is not on curative activities. This would include examples in care such as within social services or pregnancies.

Name	Type	Control	Description
_links	_links		A reserved property for presenting the link relations for this resource.
link	Link	0…*	Zero or more patients linked to this resource within the provider Organization.
active	boolean	0…1	Whether this Patient Record is active (in use).
identifier	Identifier	1…*	One or more identifiers for this patient.
provider	Organization	0…1	The resource reference to the organization managing the patient.
details	Demographics	1…1	Patient demographic details.


```
{
   "_links": "link relations",
   "active": true,
   "provider": {
      "type": "Organization",
      "reference": "https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/",
      "display": "Oswego Health System"},
   "identifier": [{
      "use": "internal",
      "label": "Oswego MRN",
      "key": "9876",
      "system": "urn:oid:2.16.840.1.113883.3.4",
      "assigner": "Oswego Health System"}],
   "details": {
      "name": [{
         "given": ["Frank"],
         "family": ["Nolan"]}],
      "address": [{
         "zip": "60610",
         "state":  "Il",
         "line": ["511 Oswego St"],
         "city": "Chicago"}],
      "gender": {
         "system": "http://hl7.org/fhir/vs/administrative-gender",
         "code": "M"},
      "birthDate": "1945-09-24",
      "photo": {
         "type": "Picture",
         "reference":
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.
3.4%26ISO/photo/1"}}
}
```

Link Relations

A Patient resource contains the reserved *_links* property, a collection of links available to the Edge System against this Patient resource given its current state.

Link	Description
self	Reference to this patient representation.
networkLink	For retrieving remote links associated with the patient. This will only appear if the Patient is linked to a Person.
person	If Patient is linked to a Person, the URL for the linked Person resource.
personMatch	If Patient is NOT linked to a Person, this retrieves a list of 0..*n* Person Records that match the Patient demographics.
upgrade	In the context of a PatientMatch response, the URL to POST a PatientLink.
downgrade	In the context of a PatientMatch response, the URL for removing this Patient from the search results for the associated Person.

Upgrade and downgrade link relations are ONLY provided in response to a PatientMatch request from a Person resource.

8.6.5 PatientLink

Within the context of a Person resource, a PatientLink represents a confirmed relationship to a Patient Record.

Name	Type	Control	Description
_links	_links		A reserved property for presenting the link relations for this resource.
assuranceLevel	int	1…1	The associated LOLA (2, 3 or 4) representing the confirmation of the relationship. **Read-only.**
patient	uri	1…1	The URL for the associated Patient resource.
identifier	Identifier	0…1	The strong identifier establishing the relationship between the person and the patient.

```
{
   "_links": "link relations",
   "assuranceLevel": 3,
   "patient":
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.
3.4%26ISO"},
   "identifier": {
      "use": "official",
```

```
      "label": "Illinois Driver's License",
      "system": "urn:oid:2.16.840.1.113883.4.3.17",
      "assigner": "Illinois DMV"}
}
```

Link Relations

A PatientLink resource contains the reserved *_links* property, a collection of links available to the Edge System against this PatientLink resource.

Link	Action
self	Reference to the PatientLink resource itself.

8.6.6 Person

The Person resource represents a natural person independent of a specific healthcare context.

Name	Type	Control	Description
_links	_links		A reserved property for presenting the link relations for this resource.
enrolled	boolean	1…1	Indicates if the Person is enrolled in CommonWell. **Read-only**.
enrollmentSummary	enrollmentSummary	1…1	The enrollment summary for the Person.
details	Demographics	1…1	Demographic details for the person.

```
{
   "_links": "link relations",
   "enrolled": true,
   "enrollmentSummary": {
        "dateEnrolled": "2013-11-24",
        "enroller": "Oswego"
   },
   "details": {
      "name": [{
         "given": ["Frank"],
         "family": ["Nolan"]}],
      "address": [{
         "line": ["511 Oswego St"],
         "city": "Chicago",
         "state":  "Il",
         "zip": "60610"}],
      "gender": {
         "system": "http://hl7.org/fhir/vs/administrative-gender",
         "code": "M"},
      "birthDate": "1945-09-24",
      "identifier": [{
         "use": "official",
         "label": "Illinois Driver's License",
         "system": "urn:oid:2.16.840.1.113883.4.3.17",
         "assigner": "Illinois DMV"}]
```

```
    }
}
```

Link Relations

A Person resource contains the reserved *_links* property, a collection of links available to the Edge System against this Patient resource.

Link	Description
self	Reference to this person representation.
unenroll	Unenrolls a Person from CommonWell. This action removes all associated Patient Links but still allows a Person to appear in search results.
patientLink	The list of patientLinks. This is constrained to ONLY include the linked patients associated with Organization identified in the calling context.
patientMatch	Retrieves a list of 0..*n* Local Patient Records that match the Person demographics. The results are filtered based on the Organization identified in the authorization context of the request. ONLY Patient Records that are NOT linked to the Person are included in the results of the query.

8.6.7 Picture

Based on the FHIR formal definition of a Picture resource (http://www.hl7.org/implement/standards/fhir/ohttp:/www.hl7.org/implement/standards/fhir/picture.htm), this an image used in healthcare. For the purposes of this implementation, a picture MAY be used to resolve the identity of an individual.

Name	Type	Control	Description
_links	_links		A reserved property for presenting the link relations for this resource.
subject	Resource	1…1	The Person or Patient resource presented in the picture.
dateTime	dateTime	0…1	When the image was taken.
height	int	0…1	Height of the image.
width	int	0…1	Width of the image.

Name	Type	Control	Description
bits	int	0…1	Number of bits of color (2..32).
content	Attachment	1…1	Actual picture data.

```
{
   "_links": "link relations",
   "content": {
      "data": "R0lGODlhfgCRAPcAAAA...",
      "contentType": "image/gif"},
   "dateTime": "2009-09-03",
   "height": "145",
   "subject": {
      "type": "Patient",
      "reference":
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.
3.4%26ISO"},
   "bits": "8",
   "width": "126"
}
```

Link Relations

A Picture resource may contain the reserved *_links* property, a collection of links available to the Edge System against this Picture resource given its current state.

Link	Description
self	Reference to this picture representation.

8.6.8 NetworkLink

Within the context of a Patient resource, a NetworkLink represents a link relationship to a Remote Patient Record.

Name	Type	Control	Description
_links	_links		A reserved property for presenting the link relations for this resource.
assuranceLevel	int	1…1	The link assurance level of the relationship to the remote Patient Record (1, 2, 3, 4). This property is read-only.
linkedPatient	Patient	1…1	The Patient associated with the linked Remote Patient Record.

Name	Type	Control	Description
visit	Visit	0…*	Recent visits for the linked patient.


```
{
   "_links": "link relations",
   "assuranceLevel": "2",
   "linkedPatient": {
   "identifier": [{
      "use": "internal",
      "label": "Oswego MRN",
      "key": "9876",
      "system": "urn:oid:2.16.840.1.113883.3.4",
      "assigner": "Oswego Health System"}],
      "details": {
         "name": [{
            "given": ["Frank"],
            "family": ["Nolan"]}],
         "address": [{
            "zip": "60610",
            "state":  "Il",
            "line": ["511 Oswego St"],
            "country": "USA",
            "city": "Metropolis"}],
         "gender": {
            "system": "http://hl7.org/fhir/vs/administrative-gender",
            "code": "M"},
         "birthDate": "1945-09-24",
         "photo": {
            "type": "Picture",
            "reference":
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.
3.4%26ISO/photo/1"}},
      "active": true,
      "provider": {
         "type": "Organization",
         "reference": "https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/"}},
   "visit": [{
      "class": "inpatient",
      "date": {
         "start": "2012-05-29",
         "end": "2012-05-30"},
      "location": "St. Barnabas Hospital",
      "reason": "appendectomy",
      "participant": [{
         "details": {
            "name": [{
               "given": ["Jeffrey"],
               "family": ["Geiger"],
               "suffix": ["MD"]}]}}]
   }]
}
```


Link Relations

The link relations associated with a NetworkLink representation depend on the state of the NetworkLink as described by the LOLA.

Link	Action
self	Reference to the NetworkLink resource itself.

Link	Action
upgrade	Promotes LOLA from 1 to 2.
downgrade	Demotes LOLA from 1 or 2 to 0; the patient will no longer appear in search results.

8.6.9 Visit

Based on the (http://www.hl7.org/implement/standards/fhir/visit-definitions.htm), this represents an interaction between a patient and healthcare participants for the purpose of providing patient services or assessing the health status of a patient.

Name	Type	Control	Description
_links	_links		A reserved property for presenting the link relations for this resource.
subject	Patient	1…1	Patient that was present at the visit.
class	Code	1…1	Inpatient, Outpatient, etc.
date	Period	1…1	Period during which the visit took place.
location	string	0…1	The name of the location where the visit occurred.
reason	string	0…1	Reason the visit took place.
participant	Practitioner	0…*	Healthcare providers present at the visit.


```
{
   "_links": "link relations",
   "type": "Patient",
   "reference":
"https://rest.api.commonwellalliance.org/v1/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO",
   "class": "inpatient",
   "date": {
      "start": "2012-05-29",
      "end": "2012-05-30"},
   "location": "St. Barnabas Hospital",
   "reason": "appendectomy",
   "participant": [{
      "details": {
         "name": [{
            "given": ["Jeffrey"],
            "family": ["Geiger"],
            "suffix": ["MD"]}]
```

```
    }}]
}
```

Link Relations

A Visit resource may contain the reserved *_links* property, a collection of links available to the Edge System against this Visit resource given its current state.

Link	Description
self	Reference to this visit representation.

8.6.10 DocumentReference

Based on the FHIR DSTU 1 DocumentReference resource (http://www.hl7.org/implement/standards/fhir/documentreference.html), this represents a reference to a document.

Name	Type	Control	Description
_links	_links		A reserved property for presenting the link relations for this resource.
masterIdentifier	Identifier	1..1	Master Version Specific Identifier
identifier	Identifier	0..*	Other identifiers for the document
subject	Patient | Practitioner | Group | Device	1..1	Who|what is the subject of the document
type	CodeableConcept	1..1	What kind of document this is (LOINC if possible)
class	CodeableConcept	0..1	Categorization of Document
author	Practitioner | Device | Patient | RelatedPerson	1..*	Who and/or what authored the document
custodian	Organization	0..1	Org that maintains the document

Name	Type	Control	Description
policyManager	uri	0..1	Manages access policies for the document
authenticator	Practitioner | Organization	0..1	Who/What authenticated the document
created	dateTime	0..1	Document creation time
indexed	instant	1..1	When this document reference was created
status	code	1..1	current | superceded | entered in error
docStatus	CodeableConcept	0..1	preliminary | final | appended | amended | entered in error
relatesTo	Element	0..*	Relationships to other documents
code	code	1..1	replaces | transforms | signs | appends
target	DocumentReference	1..1	Target of the relationship
description	string	0..1	Human-readable description (title)
confidentiality	CodeableConcept	0..*	Sensitivity of source document
primaryLanguage	code	0..1	The marked primary language for the document
mimeType	code	1..1	Mime type, + maybe character encoding
format	uri	0..*	Format/content rules for the document

Name	Type	Control	Description
size	integer	0..1	Size of the document in bytes
hash	base64Binary	0..1	Base64 representation of SHA1
location	uri	0..1	Where to access the document
service	Element	0..1	If access is not fully described by location
type	CodeableConcept	1..1	Type of service (i.e. XDS.b)
address	string	0..1	Where service is located (usually a URL)
parameter	Element	0..*	Service call parameters
name	string	1..1	Parameter name in service call
value	string	0..1	Parameter value for the name
context	Element	0..1	Clinical context of document
event	CodeableConcept	0..*	Main Clinical Acts Documented
period	Period	0..1	Time of service that is being documented
facilityType	CodeableConcept	0..1	Kind of facility where patient was seen

```
{
   "_links": "link relations",
   "resourceType": "DocumentReference",
   "text": {
      "status": "generated",
```

```
      "div": "<div>!-- Snipped for Brevity --></div>"
   },
   "contained": [
      {
         "resourceType": "Practitioner",
         "id": "a1",
         "name": {
            "family": [
               "Dopplemeyer"
            ],
            "given": [
               "Sherry"
            ]
         },
         "telecom": [
            {
               "system": "email",
               "value": "john.doe@healthcare.example.org"
            }
         ],
         "organization": {
            "display": "Cleveland Clinic"
         },
         "role": [
            {
               "text": "Primary Surgeon"
            }
         ],
         "specialty": [
            {
               "text": "Orthopedic"
            }
         ]
      },
      {
         "resourceType": "Practitioner",
         "id": "a2",
         "name": {
            "family": [
               "Smitty"
            ],
            "given": [
               "Gerald"
            ]
         },
         "telecom": [
            {
               "system": "email",
               "value": "john.doe@healthcare.example.org"
            }
         ],
         "organization": {
            "display": "Cleveland Clinic"
         },
         "role": [
            {
               "text": "Attending"
            }
         ],
         "specialty": [
            {
               "text": "Orthopedic"
            }
         ]
      }
   ],
   "masterIdentifier": {
```

```
      "system": "urn:ietf:rfc:3986",
      "value": "urn:oid:1.3.6.1.4.1.21367.2005.3.7"
   },
   "subject": {
      "reference": "Patient/xcda"
   },
   "type": {
      "coding": [
         {
            "system": "http://loinc.org",
            "code": "34108-1",
            "display": "Outpatient Note"
         }
      ]
   },
   "author": [
      {
         "reference": "#a1"
      },
      {
         "reference": "#a2"
      }
   ],
   "created": "2005-12-24T09:35:00+11:00",
   "indexed": "2005-12-24T09:43:41+11:00",
   "status": "current",
   "description": "Physical",
   "confidentiality": [
      {
         "coding": [
            {
               "system": "http://ihe.net/xds/connectathon/confidentialityCodes",
               "code": "1.3.6.1.4.1.21367.2006.7.101",
               "display": "Clinical-Staff"
            }
         ]
      }
   ],
   "primaryLanguage": "en-US",
   "mimeType": "application/hl7-v3+xml",
   "size": 3654,
   "hash": "2jmj7l5rSw0yVb/vlWAYkK/YBwk=",
   "location": "http://example.org/xds/mhd/Binary/07a6483f-732b-461e-86b6-edb665c45510",
   "context": {
      "event": [
         {
            "coding": [
               {
                  "system": "http://ihe.net/xds/connectathon/eventCodes",
                  "code": "T-D8200",
                  "display": "Arm"
               }
            ]
         }
      ],
      "period": {
         "start": "2004-12-23T08:00:00",
         "end": "2004-12-23T08:01:00"
      },
      "facilityType": {
         "coding": [
            {
               "system": "http://www.ihe.net/xds/connectathon/healthcareFacilityTypeCodes",
               "code": "Outpatient",
               "display": "Outpatient"
            }
         ]
```

```
      }
    }
}
```

Link Relations

A DocumentReference resource may contain the reserved *_links* property, a collection of links available to the Edge System given its current state.

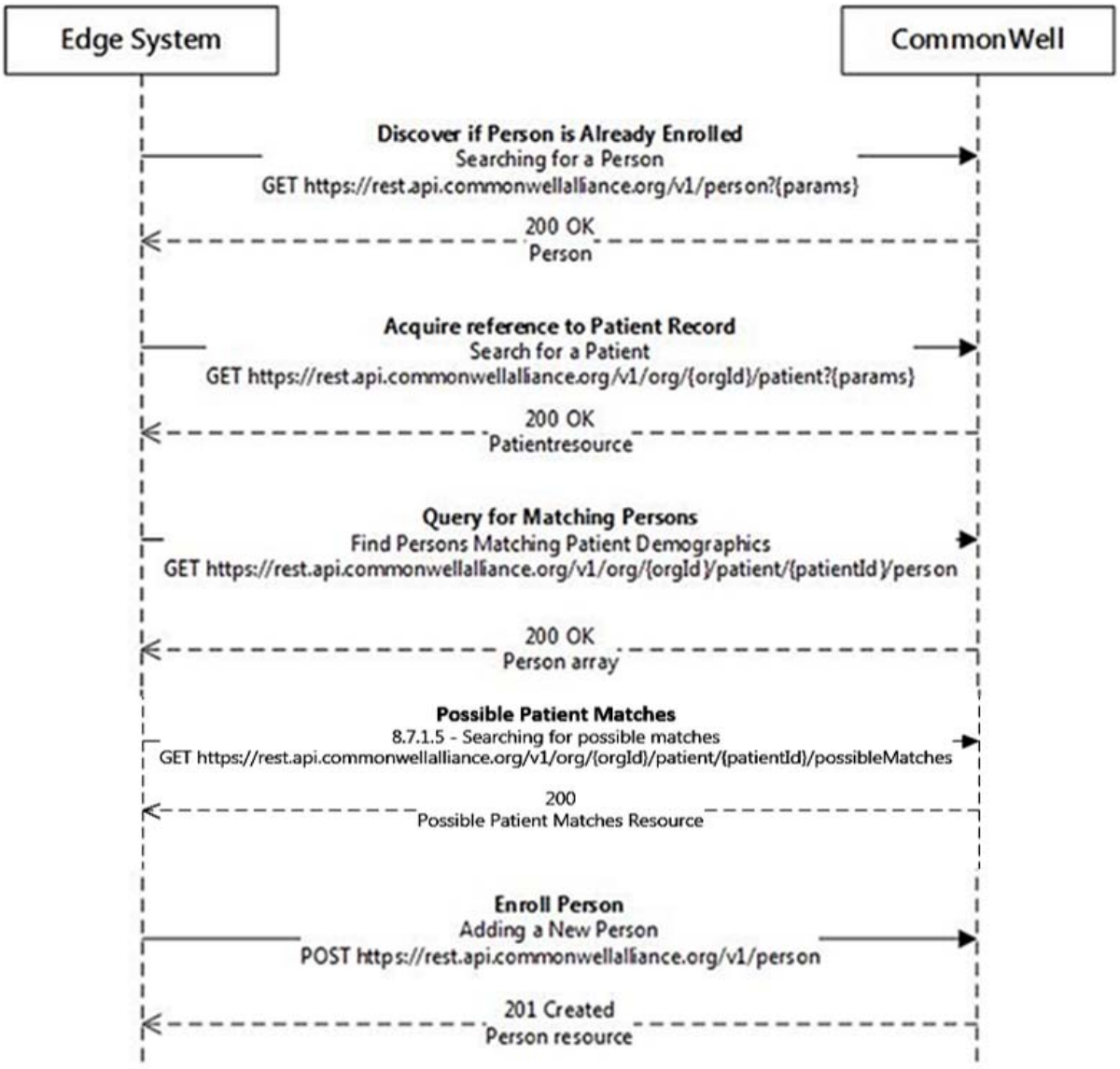
Link	Description
self	Reference to this DocumentReference representation.

8.7 Protocol Operations

The following sections describe the application protocol operations available for each of the various resources defined in this specification.

8.7.1 Person Enrollment

The following sequence diagram illustrates the key interactions between an Edge System and CommonWell in the Person Enrollment workflow.



8.7.1.1 Search for a Person

GET https://rest.api.commonwellalliance.org/v1/person?{*parameters*}

An Edge System can search for an existing Person based on a strong identifier. The query parameters are provided in a query string as name-value pairs.

Parameters

- key (required)
- system (required)

Sample Request: Search for Person

```
GET https://rest.api.commonwellalliance.org/v1/person?key=12345ABCD&system=urn%3Aoid%3A2.16.840.1.113883.4.3.17
HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

The CommonWell server returns the Person Records matching the search criteria.

Sample Response: Person Found

```
HTTP/1.1 200 OK
Content-Length: 174
Content-Type: application/hal+json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "_links": {
      "self": {"href": "v1/person?key=12345ABD&system=urn:oid:2.16.840.1.113883.4.3.17"}},
   "message": "CommonWell found one Person matching your search criteria.",
   "_embedded": {
      "person": [{
         "_links": {
            "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334"},
            "unenroll": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/unenroll"},
            "patientLink": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink"},
            "patientMatch": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-
5de498903334/patientMatch?orgId='2.16.840.1.113883.4.3.17'"}},
         "enrolled": true,
         "enrollmentSummary": {
            "dateEnrolled": "2013-11-24",
            "enroller": "Oswego"
         },
         "details": {
            "name": [{
               "given": ["Frank"],
               "family": ["Nolan"]}],
            "address": [{
               "line": ["511 Oswego St"],
               "city": "Chicago",
               "state":  "Il",
               "zip": "60610"}],
            "gender": {
               "system": "http://hl7.org/fhir/vs/administrative-gender",
               "code": "M"},
            "birthDate": "1945-09-24"}}
      ]}
}
```

8.7.1.2 Retrieve Patient Links

GET https://rest.api.commonwellalliance.org/v1/person/{*personId*}/patientLink?orgid={*orgId*}/

An Edge System can request the PatientLinks to a known Person. The results of that query will be limited to only those PatientLinks associated with Patients in the Organization the Edge System user is authorized to view.

The Organization MAY be specified in the optional *orgId* query parameter of the request. If this is not included, the CommonWell server will use the Organization Identifier provided in the authorization token.

Sample Request: Retrieve Patient Link without Organization Identifier

```
GET https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink HTTP/1.1
```

```
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

When the *orgId* query is not included, the CommonWell server uses the Organization Identifier provided in the authorization token to locate the Patient Links associated with Patients within that organization.

Sample Response: One Patient Link

```
HTTP/1.1 200 OK
Content-Type: application/hal+json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:44 GMT

{
  "_links": {
   "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-
5de498903334/patientLink?orgId='2.16.840.1.113883.4.3.17'"}},
  "_embedded": {
    "patientLink": [
      {
        "_links": {
          "self": {"href": "v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink/1"}},
        "assuranceLevel": "3",
        "patient":
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.4.3.17/patient/9876%5E%5E%5E%262.16.840.1.1138
83.3.4%26ISO"}]
}}
```

The *self* link returned in the response will always include the *orgId* query parameter.

Sample Response: No Patient Links

```
HTTP/1.1 200 OK
Content-Type: application/hal+json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:44 GMT

{
    "_links": {
     "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-
5de498903334/patientLink?orgId='2.16.840.1.113883.4.3.17'"}},
    "_embedded": {
        "patientLink": []
}}}
```

Sample Request: Search for Patient Links Using Organization Identifier

This example shows the same request using the *orgId* query parameter specifying the organization.

```
GET https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-
5de498903334/patientLink?orgId='2.16.840.1.113883.4.3.17' HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

Sample Response: Authorization Error

If the user does not have access to the Patient Links in the Organization specified in the *orgId* input parameter, the CommonWell server returns an access denied response.

```
HTTP/1.1 403 Forbidden
Content-Length: 64
Content-Type: application/json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "message": "You are not authorized to view patient links associated with the specified Organization.",
   "code": XXXX,
   "help": {"href": "http://rest.api.commonwellalliance.org/help/#patientLink"}
}
```

8.7.1.3 Find Persons Matching Patient Demographics

GET https://rest.api.commonwellalliance.org/v1/org/{orgId}/patient/{patient*id*}/person

Given a known patient, an Edge System may query CommonWell for persons matching the demographic data of the Patient resource.

Sample Request

```
GET https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/1ba10b15-0885-48f3-9e70-
e9418f42f605/person HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

If the Person Record exists, the CommonWell server returns the Person Record matching the search criteria.

Sample Response: Person Found

```
HTTP/1.1 200 OK
Content-Length: 1774
Content-Type: application/hal+json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "_links": {
     "self": {"href":
"/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/person"}},
   "message": "CommonWell found one Person matching your search criteria.",
   "_embedded": {
      "person": [{
         "_links": {
            "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334"},
            "unenroll": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/unenroll"},
            "patientLink": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink"},
            "patientMatch": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-
5de498903334/patientMatch?orgId='2.16.840.1.113883.4.3.17'"}},
         "enrolled": true,
         "enrollmentSummary": {
             "dateEnrolled": "2013-11-24",
             "enroller": "Oswego"
         },
         "details": {
            "name": [{
               "given": ["Frank"],
               "family": ["Nolan"]}],
            "address": [{
               "line": ["511 Oswego St"],
               "city": "Chicago",
               "state":  "Il",
               "zip": "60610"}],
```

```
            "gender": {
               "system": "http://hl7.org/fhir/vs/administrative-gender",
               "code": "M"},
            "birthDate": "1945-09-24"}}
      ]}
}
```

The key value of a strong identifier is stored in CommonWell as a hashed value for use in search algorithms and never returned in search or get operations.

Alternatively, if no match is found the CommonWell server returns an empty result set. In the context of a Person Enrollment workflow, this would signal to the Edge System that it should create a new Person Record.

Sample Response: Person Not Found

```
HTTP/1.1 200 OK
Content-Length: 100
Content-Type: application/hal+json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "_links": {
      "self": {"href":
"/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/person"}},
   "message": "No match on demographic information.",
   "_embedded": {
      "person": []
   }
}
```

In this case, the *message* property of the response provides the reason the search failed to find a Person matching the search criteria.

8.7.1.4 Resolving Partial Matches

In the Person Enrollment workflow, Edge Systems MUST be capable of handling search results that include partial matches. Partial matches may result for different reasons, including:

- A person who has multiple addresses
- A person who has moved to another address
- A person who has been issued a new strong identifier (e.g., a new driver's license)

As a result, the CommonWell Person search operation may locate Person Records that match on the provided demographic information and/or the strong identifier. In the event of a match based on the strong identifier only, the CommonWell server provides a description of the result in the *message* property.

Sample Response: Strong Identifier Match

```
HTTP/1.1 200 OK
Content-Length: 1774
Content-Type: application/hal+json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "_links": {
```

```
      "self": {"href":
"/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/person"}},
   "message": "CommonWell found a person with a different zip code: you MUST verify this is the same person and,
if necessary, update the person's information as needed.",
   "_embedded": {
      "person": [{
         "_links": {
            "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334"},
            "unenroll": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/unenroll"},
            "patientLink": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink"},
            "patientMatch": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-
5de498903334/patientMatch?orgId='2.16.840.1.113883.4.3.17'"}},
         "enrolled": true,
         "enrollmentSummary": {
             "dateEnrolled": "2013-11-24",
             "enroller": "Oswego"
         },
         "details": {
            "address": [{
               "line": ["511 Oswego St"],
               "city": "Chicago",
               "state":  "Il",
               "zip": "60610",
               "period": {
                  "start": "1994-04-12"}],
            "name": [{
               "given": ["Frank"],
               "family": ["Nolan"]}],
            "gender": {
               "system": "http://hl7.org/fhir/vs/administrative-gender",
               "code": "M"},
            "birthDate": "1945-09-24"}}]}
}
```

In this example, the Person in CommonWell has a single address with an Illinois zip code. In addition, the *period* property indicates that the address is current (there is no *end* value) and that he has lived there since 1994.

The user of the Edge System should verify that the individual has a second address in Florida and then update the Person Record to add that address. Once the Edge System has captured the additional address information, the Edge System sends the update to the CommonWell server using the *update* link relation provided in the embedded Person resource.

After the addition of the new address has completed successfully, the Edge System may query again for a match. In this example, this will return a response showing a complete match based on the new Florida address.

Sample Response: Person Found

```
HTTP/1.1 200 OK
Content-Length: 1774
Content-Type: application/hal+json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "_links": {
      "self": {"href":
"/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/person"}},
   "message": "CommonWell found one Person matching your search criteria.",
   "_embedded": {
      "person": [{
      "_links": {
         "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334"},
         "unenroll": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/unenroll"}},
```

```
        "patientLink": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink"},
        "patientMatch": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-
5de498903334/patientMatch?orgId='2.16.840.1.113883.4.3.17'"}},
      "enrolled": true,
      "enrollmentSummary": {
          "dateEnrolled": "2013-11-24",
          "enroller": "Oswego"
      },
      "details": {
         "address": [{
           "line": ["511 Oswego St"],
           "city": "Chicago",
           "state":  "Il",
           "zip": "60610"},
           {
           "line": ["4423 46th Ave.", "Apt. 16B"],
           "city": "Tampa",
           "state":  "Fl",
           "zip": "33663",
           "period": {
              "start": "2013-01-07"}}],
         "name": [{
           "given": ["Frank"],
           "family": ["Nolan"]}],
         "gender": {
           "system": "http://hl7.org/fhir/vs/administrative-gender",
           "code": "M"},
         "birthDate": "1945-09-24"}}
      ]}
}
```

8.7.1.5 Checking for Possible Patient Matches Prior to Enrollment

GET https://rest.api.commonwellalliance.org/v1/org/{orgId}/patient/{patientId}/possibleMatches

Note: A patientId must be registered in CommonWell in order to use this endpoint, but no person enrollment is required.

Checking for possible patient matches is an optional transaction in the Person Enrollment workflow. This transaction results in both an indication of whether possible patient matches exist as well as the number of possible matches for the patient. A Patient Record with possible matches is more valuable because there is an immediate return on the time invested in enrolling the Person in CommonWell. In order to avoid possible duplicate Person Records, you SHOULD use this protocol after ensuring there is no Person Record matching the patient's demographics.

Sample Request

```
GET
https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3
.4%26ISO/possibleMatches HTTP/1.1
Host: rest.api.commonwellalliance.org
Content-Length: 0
Accept: */*
Authorization: Bearer mF_9.B5f-4.1JqM
```

Sample Response: Possible Patient Matches Found

```
{
     "totalPossibleMatches" : 8,
     "_links" : {
```

```
            "self" : {
                  "href" :
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.11388
3.3.4%26ISO/possibleMatches"
            },
            "patient" : {
                  "href" :
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.11388
3.3.4%26ISO/"
            }
      }
}
```

The response indicates the number of possible Patient matches.

Sample Response: No Patient Matches Found

```
{
      "totalPossibleMatches" : 0,
      "_links" : {
            "self" : {
                  "href" :
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.11388
3.3.4%26ISO/possibleMatches"
            },
            "patient" : {
                  "href" :
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.11388
3.3.4%26ISO/"
            }
      }
}
```

The response indicates that no possible Patient matches were found.

8.7.1.6 Adding a New Person

POST https://rest.api.commonwellalliance.org/v1/person

Adding a new Person is a mandatory transaction in the Person Enrollment workflow. Basic demographic data are required input parameters to the request, as shown below.

Required Parameters

- person
  - details
    - name
      - family
      - given
    - birthDate
    - gender
      - code
    - address
      - zip

Optionally, the Person resource may include a strong identifier.

Optional Parameters

- person
  - details
    - identifier
      - key
      - period
        - start
      - system

Sample Request

```
POST https://rest.api.commonwellalliance.org/v1/person HTTP/1.1
Content-Type: application/json; charset=UTF-8
Host: rest.api.commonwellalliance.org
Content-Length: 2134
Authorization: Bearer mF_9.B5f-4.1JqM

{
   "details": {
      "address": [{
         "zip": "60610",
         "state":  "Il",
         "line": ["511 Oswego St"],
         "city": "Chicago"}],
      "name": [{
         "given": ["Frank"],
         "family": ["Nolan"]}],
      "gender": {
         "code": "M"},
      "birthDate": "1945-09-24",
      "identifier": [{
         "key": "12345ABCD",
         "system": "urn:oid:2.16.840.1.113883.4.3.17",
         "period": {
            "start": "2011-06-08"}}]
   }
}
```

Sample Response: Created

```
HTTP/1.1 201 Created
Content-Type: application/hal+json; charset=UTF-8
Location: https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334
Date: Wed, 06 Feb 2013 20:54:44 GMT

{
   "_links": {
      "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334"},
      "unenroll": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/unenroll"},
      "patientLink": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink"},
      "patientMatch": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-
5de498903334/patientMatch?orgId='2.16.840.1.113883.4.3.17'"}},
   "enrolled": true,
   "enrollmentSummary": {
       "dateEnrolled": "2013-11-24",
       "enroller": "Oswego"
   },
   "details": {
      "name": [{
        "given": ["Frank"],
```

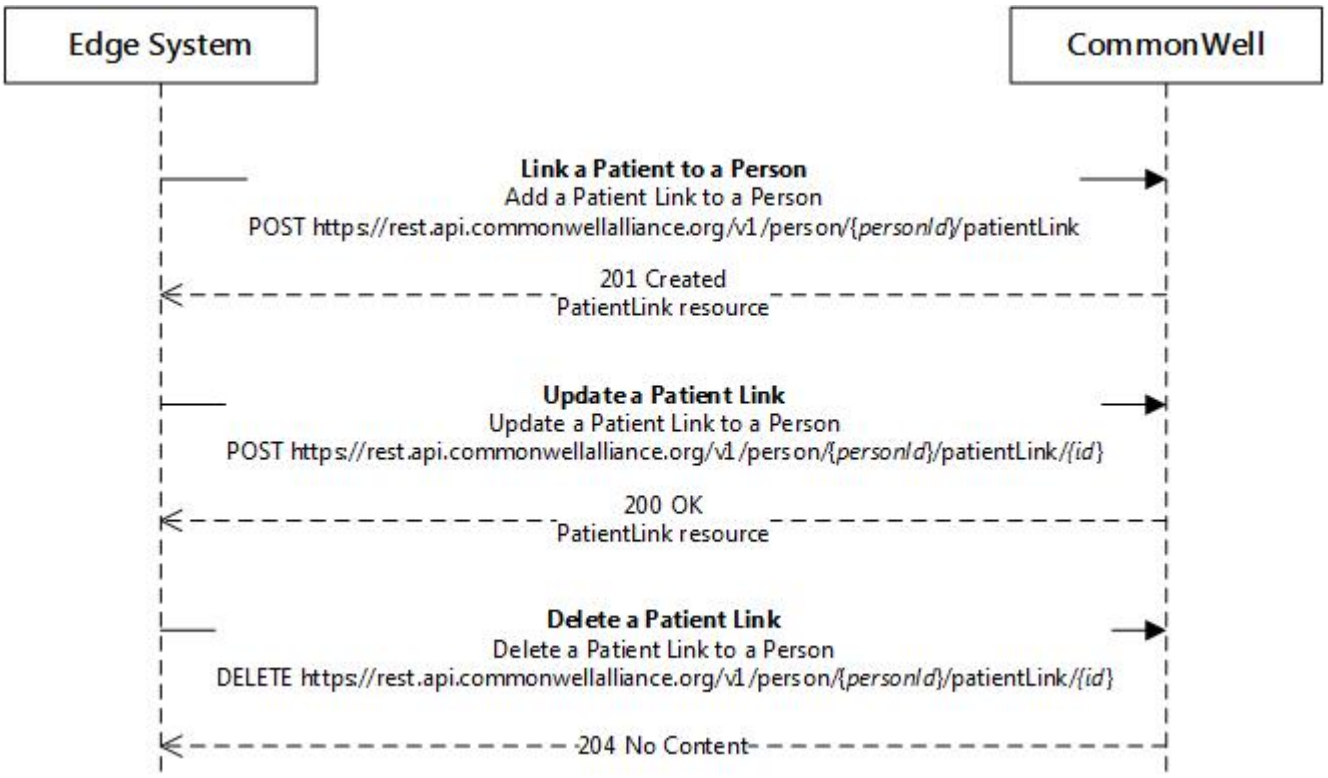
```
        "family": ["Nolan"]}],
      "identifier": [{
         "use": "official",
         "system": "urn:oid:2.16.840.1.113883.4.3.17",
      "address": [{
         "zip": "60610",
         "state":  "Il",
         "line": ["511 Oswego St"],
         "city": "Chicago"}],
      "gender": {
         "system": "http://hl7.org/fhir/vs/administrative-gender",
         "code": "M"},
      "birthDate": "1945-09-24"}
}
```

The response indicates the CommonWell server has created the Person resource. The body of the response includes the resource data, and the Location header provides the absolute URI of the resource.

A Person resource also includes the reserved *_links* property, a collection of links and their associated link relations defining the actions available to the Edge System against this Person resource given its current state.

8.7.2 Managing Links from a Person to a Patient

This section describes the transactions involved in managing link relations from a known Person resource to a known Patient resource. The transactions are illustrated in the sequence diagram below.



8.7.2.1 *Adding a PatientLink to a Person*

POST https://rest.api.commonwellalliance.org/v1/person/{*personId*}/patientLink

Once an Edge System has obtained the resource identifier for a Person (either by successfully finding an existing Person or creating a new Person resource), the Edge System can link a Local Patient Record by creating a PatientLink resource for the associated Person resource.

Assumptions

The Edge System has access to the fully qualified URL of the Patient Record that is the target of the link. This may be stored by the Edge System as an aliased identity in the local patient management system, or retrieved from the CommonWell server using the Patient search API described in section 8.7.6.1.

Required Parameter

- patient (*referenced by URI*)

Optional Parameter

- identifier
  - key
  - period
    - start
  - system

Sample Request: Create a Patient Link with Strong Identifier

```
POST https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink HTTP/1.1
Content-Type: application/json
Host: rest.api.commonwellalliance.org
Content-Length: 267
Authorization: Bearer mF_9.B5f-4.1JqM

{
   "patient":
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.4.3.17/patient/9876%5E%5E%5E%262.16.840.1.1138
83.3.4%26ISO",
   "identifier": {
      "key": "Z1234567",
      "period": {
         "start": "2010-09-12"},
      "system": "urn:oid:2.16.840.1.113883.4.3.17"
   }
}
```

Sample Response: Created

```
HTTP/1.1 201 Created
Content-Type: application/hal+json; charset=UTF-8
Location: https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink/1
Date: Wed, 06 Feb 2013 20:54:44 GMT

{
   "_links": {
      "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink/1"}},
```

```
   "assuranceLevel": "3",
   "patient":
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.4.3.17/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO"
}
```

If the strong identifier does not belong to the associated Person Record, CommonWell will return an error.

Sample Response: Invalid Strong Identifier

```
HTTP/1.1 409 Conflict
Content-Type: application/json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:52 GMT

{
   "message": "The strong identifier does not belong to this person.",
   "code": XXXX,
   "reference": "f57236f0-d4ad-11e2-8b8b-0800200c9a66",
   "help": {"href": "http://rest.api.commonwellalliance.org/help/#patientLink"}
}
```

If the user identified in the authorization token does not have permission to create links to the Patient, the CommonWell server returns an authorization error.

Sample Response: Authorization Error

```
HTTP/1.1 403 Forbidden
Content-Length: 64
Content-Type: application/json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "message": "You are not authorized to created links for this patient.",
   "code": XXXX,
   "help": {"href": "http://rest.api.commonwellalliance.org/help/#patientLink"}
}
```

8.7.2.2 Updating a PatientLink

POST https://rest.api.commonwellalliance.org/v1/person/{personId}/patientLink/{linkId}/

Once a PatientLink resource is created, an Edge System can update the PatientLink to add, update or remove identifier information. Changes to the identifier data will directly reflect on the LOLA of the PatientLink.

Required Parameter

- patient (*referenced by URI*)

Optional Parameter

- identifier
  - key
  - period
    - start
  - system

Sample Request: Adding a Strong Identifier

```
POST https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink/1
HTTP/1.1
Content-Type: application/json
Host: rest.api.commonwellalliance.org
Content-Length: 267
Authorization: Bearer mF_9.B5f-4.1JqM

{
   "patient":
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.4.3.17/patient/9876%5E%5E%5E%262.16.840.1.1138
83.3.4%26ISO",
   "identifier": {
      "key": "Z1234567",
      "period": {
         "start": "2010-09-12"},
      "system": "urn:oid:2.16.840.1.113883.4.3.17"
   }
}
```

In this example, adding the strong identifier to the PatientLink will result in upgrading the assurance level from LOLA 2 to 3.

Sample Response

```
HTTP/1.1 200 OK
Content-Type: application/hal+json; charset=UTF-8
Location: https://rest.api.commonwellalliance.org/v1/ person/1234/patientLink/1
Date: Wed, 06 Feb 2013 20:54:44 GMT

{
   "_links": {
      "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink/1"}},
   "assuranceLevel": "3",
   "patient":
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.4.3.17/patient/9876%5E%5E%5E%262.16.840.1.1138
83.3.4%26ISO"
}
```

As with adding a PatientLink, when adding or updating strong identifiers to an existing PatientLink, the strong identifier MUST be part of the associated Person resource.

Sample Response: Invalid Strong Identifier

```
HTTP/1.1 409 Conflict
Content-Type: application/json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:52 GMT

{
   "message": "The strong identifier does not belong to this person.",
   "code": XXXX,
   "reference": "f57236f0-d4ad-11e2-8b8b-0800200c9a66",
   "help": {"href": "http://rest.api.commonwellalliance.org/help/#patientLink"}
}
```

Sample Request: Removing a Strong Identifier

```
POST https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink/1
HTTP/1.1
Content-Type: application/json
```

```
Host: rest.api.commonwellalliance.org
Content-Length: 267
Authorization: Bearer mF_9.B5f-4.1JqM

{
   "patient":
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.4.3.17/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO",
   "identifier": null
}
```

In this example, removing the strong identifier to the PatientLink will result in downgrading the assurance level from LOLA 3 to 2.

Sample Response

```
HTTP/1.1 200 OK
Content-Type: application/hal+json; charset=UTF-8
Location: https://rest.api.commonwellalliance.org/v1/ person/1234/patientLink/1
Date: Wed, 06 Feb 2013 20:54:44 GMT

{
   "_links": {
      "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink/1"}},
   "assuranceLevel": "2",
   "patient":
"https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.4.3.17/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO"
}
```

8.7.2.3 Deleting a Patient Link

DELETE https://rest.api.commonwellalliance.org/v1/person/{personId}/patientLink/{linkId}/

An Edge System may delete a link relationship between a Person and a Patient. This action will indicate to CommonWell that the individual represented in the Person resource is not the same individual represented in the Patient resource, and CommonWell will downgrade the LOLA of this Patient to 0 for all subsequent match queries associated with the Person. This includes patient match requests from the Person, as well as any network link requests originating from another Patient resource that is linked to this Person.

Sample Request

```
DELETE https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink/1
HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

Sample Response

```
HTTP/1.1 204 No Content
Date: Mon, 25 Mar 2013 22:20:42 GMT
```

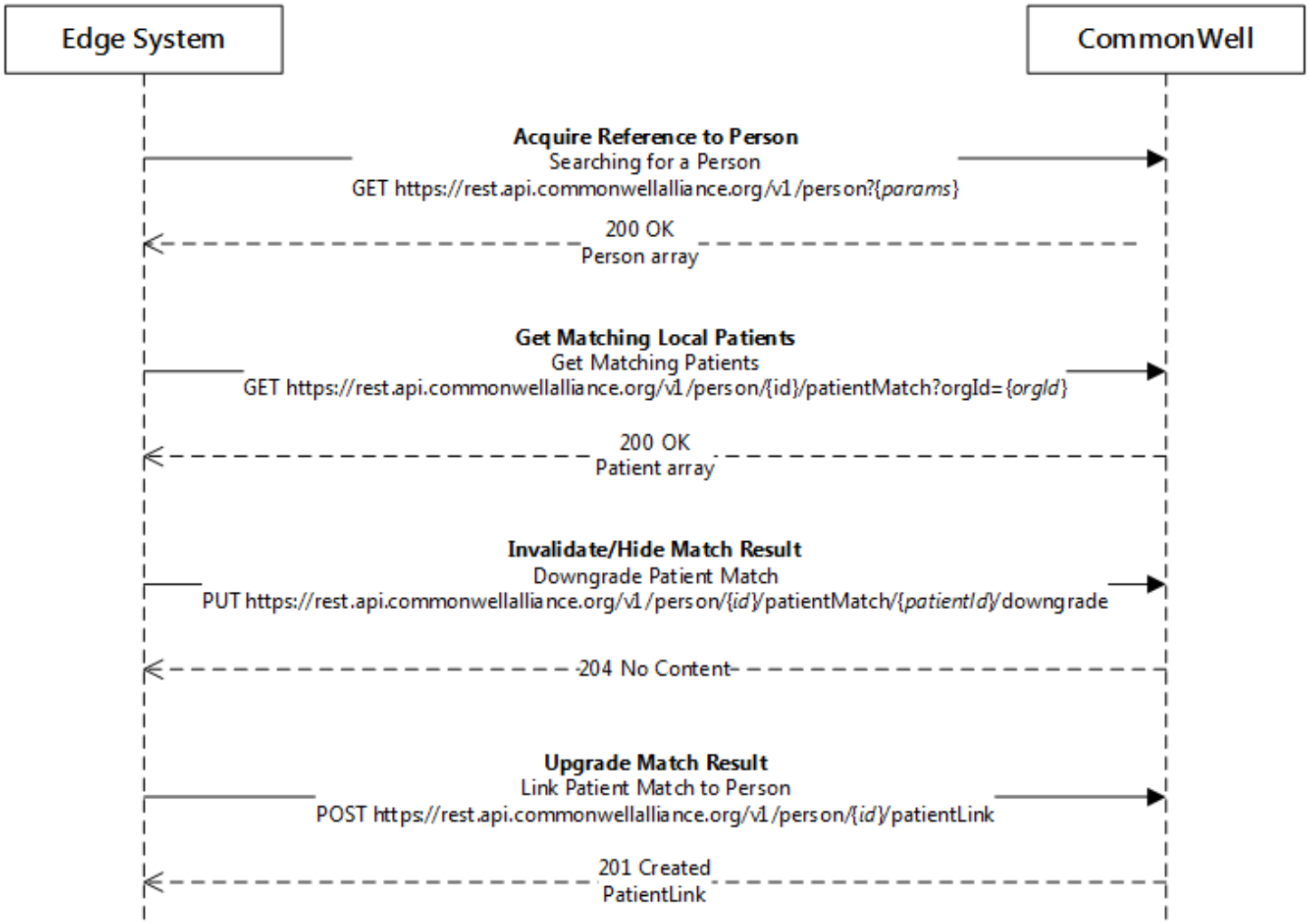
If the user identified in the authorization token does not have permission to manage links to the Patient, the CommonWell server returns an authorization error.

Sample Response: Authorization Error

```
HTTP/1.1 401 Unauthorized
Content-Length: 64
Content-Type: application/json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "message": "You are not authorized to change links associated with this patient.",
   "code": XXXX,
   "help": {"href": "http://rest.api.commonwellalliance.org/help/#patientLink"}
}
```

8.7.3 Managing Links from a Patient to a Person



Not every Edge System will have access to a Local Patient Record (e.g., remote third-party applications acting on behalf of an Organization). This application protocol describes an alternative to the operations described in Section 8.7.2 for creating a link between a Person and a Patient, wherein an Edge System needs to discover the patient who may be associated with a known Person. In this instance, once the Edge System locates a matched Patient, the Edge System can act on the included link relations within the Patient resource to link the Patient to the known Person.

This protocol also provides a mechanism for an Edge System to invalidate a presumptive match between a known Person and a Patient Record returned in the patient match query. By confirming that a Person is not the same individual as the one represented in a given Patient Record, this action will cause the Patient Record to no longer appear in any network searches in which the known Person is linked with the subject patient.

8.7.3.1 Acquire Reference to Person

As with the Person Enrollment, the workflow begins by searching for a Person (see 8.7.1.1).

Sample Response: Person Found

```
HTTP/1.1 200 OK
Content-Length: 174
Content-Type: application/hal+json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "_links": {
      "self": {"href": "v1/person?key=12345ABD&system=urn:oid:2.16.840.1.113883.4.3.17"}},
   "message": "CommonWell found one Person matching your search criteria.",
   "_embedded": {
      "person": [{
         "_links": {
            "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334"},
            "unenroll": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/unenroll"},
            "patientLink": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink"},
            "patientMatch": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-
5de498903334/patientMatch?orgId='2.16.840.1.113883.4.3.17'"}},
         "enrolled": true,
         "enrollmentSummary": {
             "dateEnrolled": "2013-11-24",
             "enroller": "Oswego"
         },
         "details": {
            "name": [{
               "given": ["Frank"],
               "family": ["Nolan"]}],
            "address": [{
               "line": ["511 Oswego St"],
               "city": "Chicago",
               "state":  "Il",
               "zip": "60610"}],
            "gender": {
               "system": "http://hl7.org/fhir/vs/administrative-gender",
               "code": "M"},
            "birthDate": "1945-09-24"}}
      ]}
}
```

An Edge System can use the *patientLink* and *patientMatch* link relations included in the returned Person resource to find the Patient Records that either 1) have a confirmed link relationship with a Patient Record in the Organization

(*patientLink);* or 2) are not linked to the Person, but match the key demographic information of the Person (*patientMatch*).

8.7.3.2 Retrieve Patient Matches

GET https://rest.api.commonwellalliance.org/v1/person/{*personId*}/patientMatch?orgId={*orgid*}/

Given a known person, an Edge System can request Patient Records contained within an Organization that match the person's demographic data.

The Organization MAY be specified in the optional *orgId* query parameter of the request. If this is not included, the CommonWell server will use the Organization Identifier provided in the authorization token.

This query ONLY returns Local Patient Records that are NOT already linked to the Person. To retrieve the list of linked Local Patient Records, use the *patientLink* link relation.

Sample Request: Search for Matching Patients

```
GET https://rest.api.commonwellalliance.org/v1/person/ c21cc31d-6c57-442b-8e76-
5de498903334/patientMatch?orgId='2.16.840.1.113883.4.3.17' HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

Sample Response: Patient Found

```
HTTP/1.1 200 OK
Content-Length: 174
Content-Type: application/hal+json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "_links": {
      "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-
5de498903334/patientMatch?orgId='2.16.840.1.113883.4.3.17'"}},
   "message": "CommonWell found one Patient matching the Person.",
   "_embedded": {
      "patient": [{
         "_links": {
            "self": {"href": "/v1/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO"},
            "networkLink": {"href": "/v1/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink"},
            "personMatch": {"href": "/v1/org/2.16.1.1
/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/person"},
            "downgrade": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientMatch/
9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/downgrade"}
            "upgrade": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink"}},
         "active": true,
         "provider": {
            "type": "Organization",
            "reference": "https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/",
            "display": "Oswego Health System"},
         "identifier": [{
            "use": "internal",
            "label": "Oswego MRN",
            "key": "9876",
            "system": "urn:oid:2.16.840.1.113883.3.4",
            "assigner": "Oswego Health System"}],
         "details": {
            "name": [{
               "given": ["Frank"],
```

```
            "family": ["Nolan"]}],
         "address": [{
            "line": ["511 Oswego St"],
            "city": "Chicago",
            "state":  "Il",
            "zip": "60610"}],
         "gender": {
            "system": "http://hl7.org/fhir/vs/administrative-gender",
            "code": "M"},
         "birthDate": "1945-09-24"}}
     ]}
}
```

8.7.3.3 Downgrading a Patient Match

PUT https://rest.api.commonwellalliance.org/v1/person/{*Id*}/patientMatch/{*patientId*}/downgrade

Following a patient match request, an Edge System can instruct CommonWell to remove a particular Patient from subsequent Patient match requests.

This action will also remove the Patient from remote NetworkLink queries in which the subject Patient Record has a PatientLink to the Person identified in this request.

Sample Request

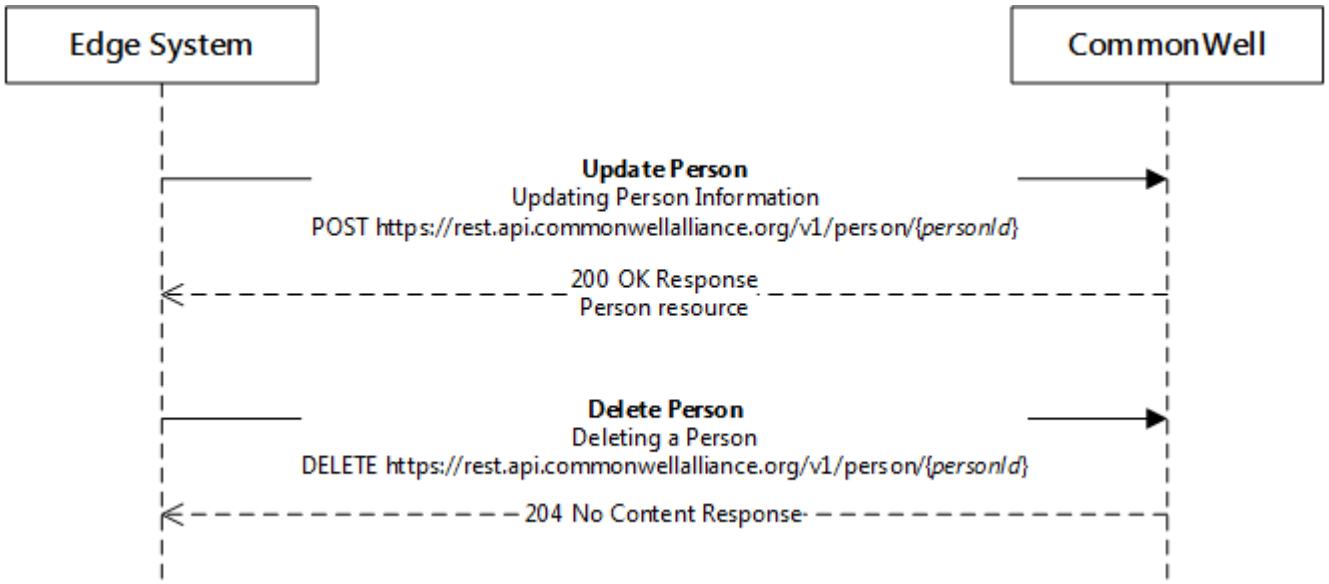
```
PUT https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientMatch/
9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/downgrade HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

8.7.3.4 Upgrading a Patient Match

An Edge System can create a PatientLink for a Patient returned in the result of a patient match using the *upgrade* link relation included in the Patient resource (see Section 8.7.2.1).

8.7.4 Person Management

This section describes the transaction for updating Person information illustrated in the sequence diagram below.



8.7.4.1 *Updating Person Information*

POST https://rest.api.commonwellalliance.org/v1/person/{personId}/

The CommonWell request message for updating a Person resource is the same as that for creating a Person resource described in section 8.7.1.5. The only difference is that the URL of the request uniquely identifies the Person resource that is the target of the update.

Sample Request

```
POST https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334 HTTP/1.1
Content-Type: application/json; charset=UTF-8
Host: rest.api.commonwellalliance.org
Content-Length: 2134
Authorization: Bearer mF_9.B5f-4.1JqM

{
   "details": {
      "address": [{
         "zip": "60610",
         "state":  "Il",
         "line": ["511 Oswego St"],
         "city": "Chicago"}],
      "name": [{
         "given": ["Frank"],
         "family": ["Nolan"]}],
      "gender": {
         "code": "M"},
      "birthDate": "1945-09-24",
      "identifier": [{
         "key": "12345ABCD",
         "system": "urn:oid:2.16.840.1.113883.4.3.17",
         "period": {
            "start": "2011-06-08"}}]
   }
}
```

Sample Response: OK

```
HTTP/1.1 200 OK
Content-Type: application/hal+json; charset=UTF-8
Last-Modified: Wed, 06 Feb 2013 20:54:43 GMT
Date: Wed, 06 Feb 2013 20:54:44 GMT

{
   "_links": {
      "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334"},
      "unenroll": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/unenroll"},
      "patientLink": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink"},
      "patientMatch": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-
5de498903334/patientMatch?orgId='2.16.840.1.113883.4.3.17'"}},
   "details": {
      "name": [{
         "given": ["Frank"],
         "family": ["Nolan"]}],
      "identifier": [{
         "use": "official",
         "label": "Illinois Driver's License",
         "system": "urn:oid:2.16.840.1.113883.4.3.17",
         "assigner": "Illinois DMV"}],
```

```
      "address": [{
         "zip": "60610",
         "state":  "Il",
         "line": ["511 Oswego St"],
         "city": "Chicago"}],
      "gender": {
         "system": "http://hl7.org/fhir/vs/administrative-gender",
         "code": "M"},
      "birthDate": "1945-09-24"}
}
```

8.7.4.2 Deleting a Person

DELETE https://rest.api.commonwellalliance.org/v1/person/{*personId*}/

Deleting a Person resource removes the Person resource from the system. As part of the deletion process, CommonWell will unenroll the Person from CommonWell and remove all network links to associated Patient resources. Once deleted, the Person will no longer appear in searches.

Sample Request

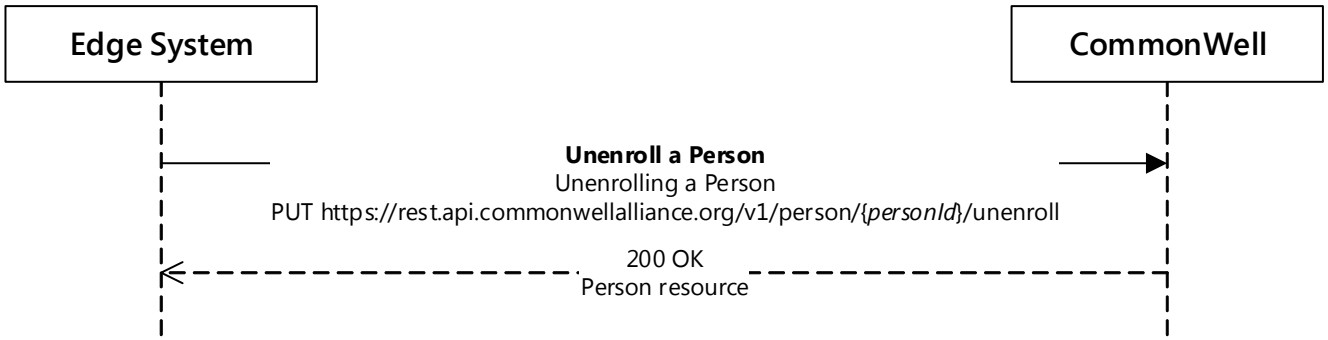
```
DELETE https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334 HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

Sample Response

```
HTTP/1.1 204 No Content
Date: Mon, 25 Mar 2013 22:20:42 GMT
```

8.7.5 Person Unenrollment

This section describes the transaction for unenrolling a Person illustrated in the sequence diagram below.



8.7.5.1 *Unenrolling a Person*

PUT https://rest.api.commonwellalliance.org/v1/person/{*personId*}/unenroll

Unenrolling a Person from CommonWell will remove all links to associated Patient resources. The Person may still appear in searches but with its *enrolled* status set to *False*.

Sample Request

```
PUT https://rest.api.commonwellalliance.org/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/unenroll HTTP/1.1
Content-Type: application/json
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

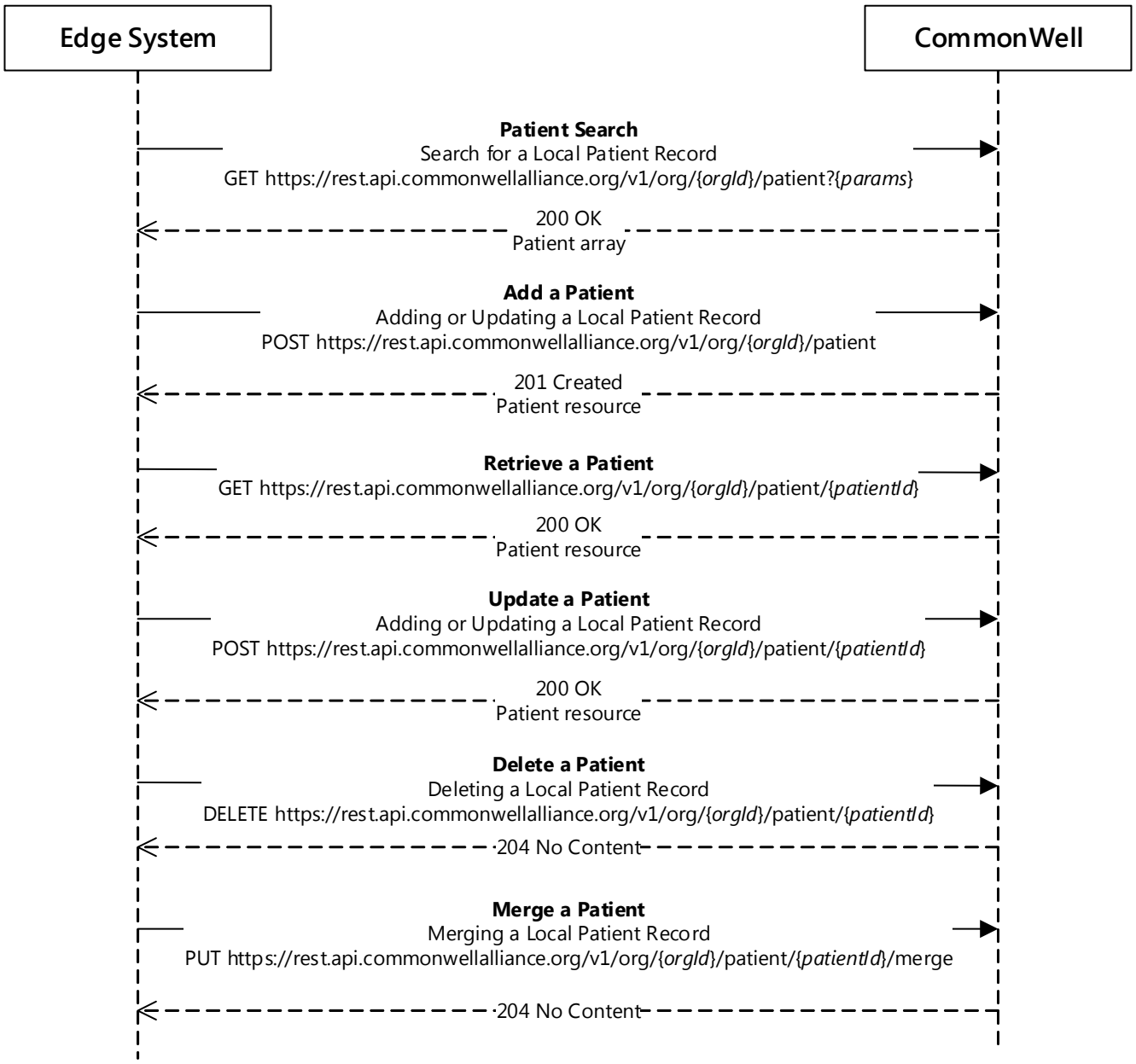
Sample Response: OK

```
HTTP/1.1 200 OK
Content-Type: application/hal+json; charset=UTF-8
Last-Modified: Wed, 06 Feb 2013 20:54:43 GMT
Date: Wed, 06 Feb 2013 20:54:44 GMT

{
   "_links": {
      "self": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334"},
      "enroll": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/enroll"}},
   "enrolled": false,
   "enrollmentSummary": {
       "dateEnrolled": "2013-11-24",
       "enroller": "Oswego",
       "dateUnenrolled": "2013-11-28",
       "unenroller": "Brisby Medical"
   },
   "details": {
      "name": [{
         "given": ["Frank"],
         "family": ["Nolan"]}],
      "identifier": [{
         "use": "official",
         "label": "Illinois Driver's License",
         "system": "urn:oid:2.16.840.1.113883.4.3.17",
         "assigner": "Illinois DMV"}],
      "address": [{
         "zip": "60610",
         "state":  "Il",
         "line": ["511 Oswego St"],
         "city": "Chicago"}],
      "gender": {
         "system": "http://hl7.org/fhir/vs/administrative-gender",
         "code": "M"},
      "birthDate": "1945-09-24"}
}
```

8.7.6 Patient Management

This section describes the transactions for managing Local Patient Records from an Edge System summarized in the sequence diagram below.



8.7.6.1 Search for a Patient

GET https://rest.api.commonwellalliance.org/v1/org/{ *orgid* }/patient?{*parameters*}

An Edge System can search for an existing Patient based on demographic information. The query parameters are provided in a query string as a series of name-value pairs.

Parameters

- fname (**required**)
- lname (**required**)
- dob (**required**)
- gender (optional)
- zip (optional)

Sample Request: Search for Patient

```
GET
hhttps://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient?fname=Frank&lname=Nolan&dob=1945-
09-24&gender=m&zip=60610 HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

The CommonWell server returns the Patient Records matching the search criteria.

Sample Response: Patient Found

```
HTTP/1.1 200 OK
Content-Length: 174
Content-Type: application/hal+json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "_links": {
      "self": {"href": "v1/org/2.16.840.1.113883.3.4/patient?fname=Frank&lname=Nolan&dob=1945-09-
24&gender=m&zip=606130}},
   "message": "CommonWell found one Patient matching your search criteria.",
   "_embedded": {
      "patient": [{
         "_links": {
            "self": {"href":
"/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO"},
            "networkLink": {"href":
"/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink"},
            "personMatch": {"href":
"/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/person"},
            "downgrade": {"href": "/v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientMatch/
9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/downgrade"}},
         "active": true,
         "provider": {
            "type": "Organization",
            "reference": "https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/",
            "display": "Oswego Health System"},
         "identifier": [{
            "use": "internal",
            "label": "Oswego MRN",
            "key": "9876",
            "system": "urn:oid:2.16.840.1.113883.3.4",
            "assigner": "Oswego Health System"}],
         "details": {
            "name": [{
               "given": ["Frank"],
               "family": ["Nolan"]}],
            "address": [{
               "line": ["511 Oswego St"],
               "city": "Chicago",
               "state":  "Il",
```

```
               "zip": "60610"}],
            "gender": {
               "system": "http://hl7.org/fhir/vs/administrative-gender",
               "code": "M"},
            "birthDate": "1945-09-24"}}
      ]}
}
```

If the user identified in the authorization token does not have permission to search the Organization referenced in the request, the CommonWell server returns an authorization error.

Sample Response: Authorization Error

```
HTTP/1.1 403 Forbidden
Content-Length: 64
Content-Type: application/json; charset=utf-8
Date: Wed, 06 Mar 2013 21:12:04 GMT

{
   "message": "You are not authorized to search for patients in this Organization.",
   "code": XXXX,
   "help": {"href": "http://rest.api.commonwellalliance.org/help/#patient"}
}
```

8.7.6.2 Adding a Local Patient Record

POST https://rest.api.commonwellalliance.org/v1/org/{*orgId*}/patient

Adding patient information to the CommonWell server using the Patient resource is functionally equivalent to ADT event notifications in a PIX ITI-8 transaction.

The URL template for adding a patient has one variable that is essential to uniquely identifying a local Patient Record:

- *orgId* – Identifies the Patient Identity Domain owned by the Organization represented by the Edge System.

Required Parameters

- patient
  - identifier (one identifier is always required; two or more are required for correlated linking)
    - key
    - system
  - details
    - name
      - family
      - given
    - birthDate
    - gender
      - code
    - address
      - zip

Sample Request

```
POST https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient HTTP/1.1
Content-Type: application/json
Host: rest.api.commonwellalliance.org
Content-Length: 363

{
   "identifier": [{
      "use": "internal",
      "label": "Oswego MRN",
      "key": "9876",
      "system": "urn:oid:2.16.840.1.113883.3.4",
      "assigner": "Oswego Health System"}],
   "details": {
      "name": [{
         "family": ["Nolan"],
         "given": ["Frank"],
         "use": "usual"}],
      "address": [{
         "line": ["511 Oswego St"],
         "city": "Chicago",
         "state":  "Il",
         "zip": "60610"}],
      "birthDate": "1945-09-24",
      "gender": {
         "code": "M"},
      "telecom": [{
         "system": "phone",
         "use": "home",
         "value": "(708) 555 6473"}]
   }
}
```

Sample Response

```
HTTP/1.1 201 Created
Content-Length: 1234
Content-Type: application/hal+json; charset=UTF-8
Last-Modified: Wed, 06 Feb 2013 20:52:58 GMT
Date: Wed, 06 Feb 2013 20:54:59 GMT

{
   "_links": {
         "self": {"href": "/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/"},
         "personMatch": {"href":
"/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/person"},
         "networkLink": {"href":
"/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink"}},
   "identifier": [{
      "use": "internal",
      "label": "Oswego MRN",
      "key": "9876",
      "system": "urn:oid:2.16.840.1.113883.3.4",
      "assigner": "Oswego Health System"}],
   "details": {
      "address": [{
         "line": ["511 Oswego St"],
         "city": "Chicago",
         "state":  "Il",
         "zip": "60610"}],
      "birthDate": "1945-09-24",
      "gender": {
         "code": "M",
         "system": "http://hl7.org/fhir/vs/administrative-gender"},
      "name": [{
```

```
         "family": ["Nolan"],
         "given": ["Frank"]}],
      "telecom": [{
         "system": "phone",
         "use": "home",
         "value": "(708) 555-6473"}]
   }
}
```

8.7.6.3 Updating a Local Patient Record

POST https://rest.api.commonwellalliance.org/v1/org/{*orgId*}/patient/{*patientId*}/

Updating patient information is functionally equivalent to ADT event notifications in a PIX ITI-8 transaction.

The URL template for updating a patient has two variables that are essential to uniquely identifying a local Patient Record:

- *orgId* – Identifies the Patient Identity Domain owned by the Organization represented by the Edge System.
- *patientId* – The local Patient Identifier. The value is under the control of the local Edge System and represents the unique identifier for the Patient Record in the local system. The format for this identifier MUST follow the HL7 CX data type format: *IdentifierValue^^^AssigningAuthority*.

Note: The Patient Identifier MUST be percent encoded in all URLs (see RFC 3986: http://tools.ietf.org/html/rfc3986). For example, the *patientId* "1234^^^&1.3.6.1.4.1.29928&ISO" will be represented in a URL string as "1234%5E%5E%5E 1.3.6.1.4.1.29928%26ISO".

Together, the *orgId* and *patientId* establish a unique URL resource identifier for a Patient Record in the CommonWell REST interface.

Required Parameters

- patient
  - identifier
    - key
    - system
  - details
    - name
      - family
      - given
    - birthDate
    - gender
      - code
    - address
      - zip

Sample Request

```
POST
https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3
.4%26ISO/ HTTP/1.1
```

```
Content-Type: application/json
Host: rest.api.commonwellalliance.org
Content-Length: 363

{
   "identifier": [{
      "use": "internal",
      "label": "Oswego MRN",
      "key": "9876",
      "system": "urn:oid:2.16.840.1.113883.3.4",
      "assigner": "Oswego Health System"}],
   "details": {
      "name": [{
         "family": ["Nolan"],
         "given": ["Frank"],
         "use": "usual"}],
      "address": [{
         "line": ["511 Oswego St"],
         "city": "Chicago",
         "state":  "Il",
         "zip": "60610"}],
      "birthDate": "1945-09-24",
      "gender": {
         "code": "M"},
      "telecom": [{
         "system": "phone",
         "use": "home",
         "value": "(708) 555 6473"}]
   }
}
```

Sample Response

```
HTTP/1.1 200 OK
Content-Length: 1234
Content-Type: application/hal+json; charset=UTF-8
Last-Modified: Wed, 06 Feb 2013 20:52:58 GMT
Date: Wed, 06 Feb 2013 20:54:59 GMT

{
   "_links": {
         "self": {"href": "/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/"},
         "personMatch": {"href":
"/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/person"},
         "networkLink": {"href":
"/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink"}},
   "identifier": [{
      "label": "CommonWell Identifier",
      "key": "abcdefg",
      "system": "urn:oid: 2.16.840.1.113883.3.3330.32",
      "assigner": "CommonWell"},
      {
      "use": "internal",
      "label": "Oswego MRN",
      "key": "9876",
      "system": "urn:oid:2.16.840.1.113883.3.4",
      "assigner": "Oswego Health System"}],
   "details": {
      "address": [{
         "line": ["511 Oswego St"],
         "city": "Chicago",
         "state":  "Il",
         "zip": "60610"}],
      "birthDate": "1945-09-24",
      "gender": {
         "code": "M",
```

```
         "system": "http://hl7.org/fhir/vs/administrative-gender"},
      "name": [{
         "family": ["Nolan"],
         "given": ["Frank"]}],
      "telecom": [{
         "system": "phone",
         "use": "home",
         "value": "(708) 555-6473"}]
   }
}
```

The CommonWell server automatically creates the CommonWell Identifier.

8.7.6.4 Deleting a Local Patient Record

DELETE https://rest.api.commonwellalliance.org/v1/org/{*orgId*}/patient/{*patientId*}/

The URL template for deleting a patient has two variables that are essential to uniquely identifying a local Patient Record:

- *orgId* – Identifies the Patient Identity Domain owned by the Organization represented by the Edge System.
- *patientId* – The local Patient Identifier. The value is under the control of the local Edge System and represents the unique identifier for the Patient Record in the local system.

Sample Request

```
DELETE
https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3
.4%26ISO/ HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

Sample Response

```
HTTP/1.1 204 No Content
Date: Wed, 06 Feb 2013 20:54:44 GMT
```

8.7.6.5 Merging Local Patient Records

PUT https://rest.api.commonwellalliance.org/v1/org/{*orgId*}/patient/{*non-surviving-patientId*}/merge

This operation supports merging Patient Records within an Organization. It is functionally equivalent to ADT merge event notifications in a PIX ITI-8 transaction.

The URL template for merging a patient has two variables identifying the local Patient Record subject to merge:

- *orgId* – Identifies the Patient Identity Domain owned by the Organization represented by the Edge System.
- *non-surviving-patientId* – The local Patient Identifier of the non-surviving Patient Record. The value is under the control of the local Edge System and represents the unique identifier for the Patient Record in the local system.

The body of the PUT request MUST be a Link resource with its *type* property value set to "replace".

Sample Request

```
PUT
https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3
.4%26ISO/merge HTTP/1.1
Content-Type: application/json
Host: rest.api.commonwellalliance.org
Content-Length: 63
Authorization: Bearer mF_9.B5f-4.1JqM

{
  "link":
      {
        "other": {
          "reference": "patient/1234%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/"
        },
        "type": "replace"
      }
}
```

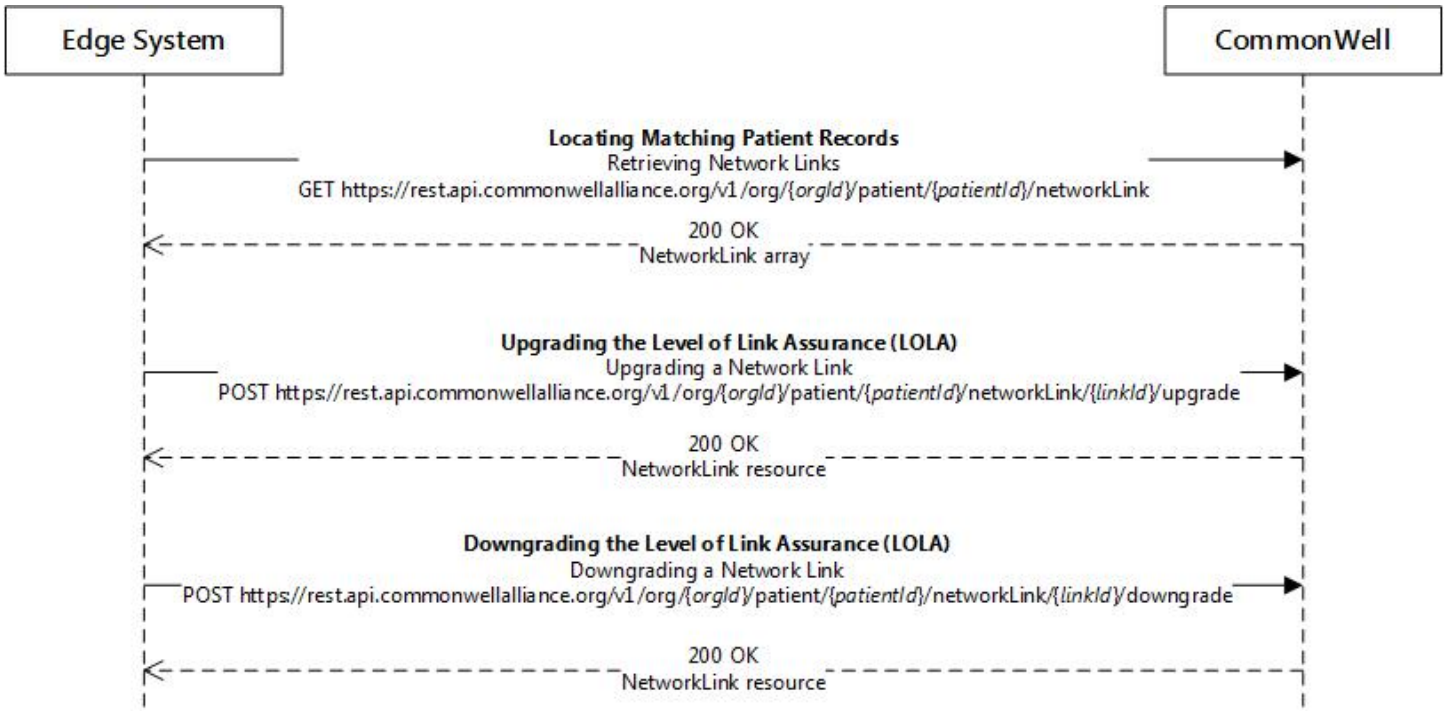
Sample Response

```
HTTP/1.1 204 No Content
Date: Wed, 06 Feb 2013 20:54:44 GMT
```

8.7.7 Record Location and Patient-to-Patient Linking

This section describes the operations associated with the NetworkLink resource used to manage patient-to-patient linking. The transactions are summarized in the sequence diagram below.

For REST-based linking of Patient Records within a specific Organization, see the Merge Operation in Patient Administration.



8.7.7.1 Retrieving Network Links

GET https://rest.api.commonwellalliance.org/v1/{*orgId*}/patient/{*patientId*}/networkLink

Obtaining the network links associated with a local Patient Record is the primary transaction for discovery of Patient Records across the CommonWell network. The results from this request will return zero or more network links with associated levels of link assurance. This section provides examples of common scenarios and the actions an Edge System can take in response to each.

Discovery of network links begins with a GET request for the network links for a Patient Record.

Sample Request: Get Network Links

```
GET
https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3
.4%26ISO/networkLink HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

Sample Response: One Level 3 Link

```
HTTP/1.1 200 OK
Content-Length: 1234
Content-Type: application/hal+json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:59 GMT

{
   "_links": {
      "self": {"href": "v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/
networkLink"}},
   "_embedded": {
      "networkLink": [{
         "_links": {
            "self": {"href":
v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/150a03eb"}},
         "assuranceLevel": "3",
         "patient": {
            "details": {
               "identifier": [{
                  "assigner": "Illinois DMV",
                  "period": {
                     "start": "2010-09-12"},
                  "system": "urn:oid:2.16.840.1.113883.4.3.17",
                  "use": "official"}],
               "address": [{
                  "line": ["511 Oswego St"],
                  "city": "Chicago",
                  "state":  "Il",
                  "zip": "60610"}],
               "birthDate": "1945-09-24",
               "gender": {
                  "code": "M",
                  "system": "http://hl7.org/fhir/vs/administrative-gender"},
               "name": [{
                  "family": ["Nolan"],
                  "given": ["Frank"]}]
         }}
   }]
}}
```

In this example, CommonWell has returned a single network link that is validated with a Level 3 LOLA.

Sample Response: One Level 1 Link

```
HTTP/1.1 200 OK
Content-Length: 1234
Content-Type: application/hal+json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:59 GMT

{
   "_links": {
      "self": {"href": "v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO
/networkLink"}},
   "_embedded": {
      "networkLink": [{
         "_links": {
            "self": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/a1effd9"},
            "upgrade": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/a1effd9/upgrade"},
            "downgrade": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/a1effd9/downgrade"
}},
         "assuranceLevel": "1",
```

```
         "patient": {
            "details": {
               "address": [{
                  "line": ["511 Oswego St"],
                  "city": "Chicago",
                  "state":  "Il",
                  "zip": "60610"}],
               "birthDate": "1945-09-24",
               "gender": {
                  "code": "M",
                  "system": "http://hl7.org/fhir/vs/administrative-gender"},
               "name": [{
                  "family": ["Nolan"],
                  "given": ["Frank"]}]},
         "visit": [{
            "class": "inpatient",
            "date": {
               "start": "2012-05-29",
               "end": "2012-05-30"},
            "location": "St. Barnabas Hospital",
            "reason": "appendectomy",
            "participant": [{
               "details": {
                  "name": [{
                     "given": ["Jeffrey"],
                     "family": ["Geiger"],
                     "suffix": ["MD"]}]}}]
      }]
   }]}
}
```

In this example, the single remote link is represented as an embedded resource. Consuming Edge Systems may use this data to present detail about a Level 1 presumptive match for purposes of determining the validity of the match.

Sample Response: Multiple Network Links

```
HTTP/1.1 200 OK
Content-Length: 4567
Content-Type: application/hal+json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:59 GMT

{
   "_links": {
      "self": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink"}},
   "_embedded": {
      "networkLink": [{
         "_links": {
            "self": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/da547f1d"},
         "assuranceLevel": "3",
         "patient": {
            "details": {
               "address": [{
                  "line": ["511 Oswego St"],
                  "city": "Chicago",
                  "state":  "Il",
                  "zip": "60610"}],
               "birthDate": "1945-09-24",
               "gender": {
                  "code": "M",
                  "system": "http://hl7.org/fhir/vs/administrative-gender"},
               "name": [{
                  "family": ["Nolan"],
                  "given": ["Frank"]}],
```

```
               "identifier": [{
                  "use": "official",
                  "label": "Illinois driver’s license",
                  "system": "urn:oid:2.16.840.1.113883.4.3.17",
                  "assigner": "Illinois DMV"}]}}},
           {
           "_links": {
              "self": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/d4607fcd"},
              "downgrade": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/d4607fcd/downgrade
"}},
           "assuranceLevel": "2",
           "patient": {
              "details": {
                 "address": [{
                    "line": ["511 Oswego Stret"],
                    "city": "Chicago",
                    "state":  "Il",
                    "zip": "60610"}],
                 "birthDate": "1945-09-24",
                 "gender": {
                    "code": "M",
                    "system": "http://hl7.org/fhir/vs/administrative-gender"},
                 "name": [{
                    "family": ["Nolan"],
                    "given": ["Frank"]}]}}},
           {
           "_links": {
              "self": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/a1effd9"},
              "upgrade": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/a1effd9/upgrade"},
              "downgrade": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/a1effd9/downgrade"
}},            "assuranceLevel": "1",
           "patient": {
              "details": {
                 "address": [{
                    "line": ["511 Oswego"],
                    "city": "Chicago",
                    "state":  "Il",
                    "zip": "60610"}],
                 "birthDate": "1945-09-24",
                 "gender": {
                    "code": "M",
                    "system": "http://hl7.org/fhir/vs/administrative-gender"},
                 "name": [{
                    "family": ["Nolan"],
                    "given": ["Frank"]}]}}},
           {
           "_links": {
              "self": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/b850c8"},
              "upgrade": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/b850c8/upgrade"},
              "downgrade": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/b850c8/downgrade"}
},
           "assuranceLevel": "1",
           "patient": {
              "details": {
                 "address": [{
                    "line": ["511 Oswego Street"],
                    "city": "Chicago",
                    "state":  "Il",
                    "zip": "60610"}],
```

```
               "birthDate": "1945-09-24",
               "gender": {
                  "code": "M",
                  "system": "http://hl7.org/fhir/vs/administrative-gender"},
               "name": [{
                  "family": ["Nolan"],
                  "given": ["Frank"]}]}}}
     ]}
}
```

In this example, the CommonWell server returned an ordered list of network links ranked by confidence level.

Sample Response: Patient not linked to Person

```
HTTP/1.1 412 Precondition Failed
Content-Type: application/json; charset=utf-8
Date: Fri, 05 Sep 2014 22:40:53 GMT
Content-Length: 273

{
  "message": "Patient with Local Id 7128LKZX^^^urn:oid:1.3.3.556 is not linked to any Person",
  "code": 9532,
  "reference": "73bb2c7a-e9f5-4faf-ab61-39792a5a3ddb",
  "help": {
    "href":
"https://commonwellalliance.sharepoint.com/developers/SitePages/Log%20Message%20Troubleshooting.aspx"
  }
}
```

8.7.7.2 Upgrading a Network Link

POST https://rest.api.commonwellalliance.org/v1/{*orgId*}/patient/{*patientId*}/networkLink/{*linkId*}/upgrade

The URL template for validating a relationship between a Local Patient Record and a Remote Patient Record has three variables:

- *orgId* –Identifies the Patient Identity Domain owned by the Organization represented by the Edge System.
- *patientId* – The local Patient Identifier. The value is under the control of the local Edge System and represents the unique identifier for the Patient Record in the local system.
- *linkId* – The network link identifier.

Optional Variables

• proxy	Element	0…1	The proxy for the patient link action.
• name	String	1…1	The full name of the proxy.
• relationship	CodeableConcept	1…1	The relationship of the proxy to the patient.

As shown in the previous examples, the template is populated with this data in the *upgrade* link relation included in the *_links* collection of the NetworkLink resource.

Sample Request

```
POST
https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3
.4%26ISO/networkLink/a1effd9/upgrade HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM


{
    “Proxy”:
    {
        “Relationship”:”Parent”,
        “Name:”John Smith”
    }
}
```

Sample Response: OK

```
HTTP/1.1 200 OK
Content-Type: application/hal+json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:44 GMT

{
   "_links": {
      "self": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/b850c8"},
      "downgrade": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/b850c8/downgrade"}
},
   "assuranceLevel": "2",
   "patient": {
      "details": {
         "address": [{
            "line": ["511 Oswego Street"],
            "city": "Chicago",
            "state":  "Il",
            "zip": "60610"}],
         "birthDate": "1945-09-24",
         "gender": {
            "code": "M",
            "system": "http://hl7.org/fhir/vs/administrative-gender"},
         "name": [{
            "family": ["Nolan"],
            "given": ["Frank"]}]}}
   }
}
```

If the current LOLA of the NetworkLink is NOT level 1, the CommonWell server will return an error.

Sample Response: Invalid LOLA State

```
HTTP/1.1 409 Conflict
Content-Length: 67
Content-Type: application/json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:59 GMT
```

```
{
   "message": "The network link cannot be upgraded given its current level of link assurance.",
   "code": XXX,
   "help": {"href": "http://rest.api.commonwellalliance.org/help/#networkLink"}
}
```

8.7.7.3 Downgrading a Network Link

POST https://rest.api.commonwellalliance.org/v1/{*orgId*}/patient/{*patientId*}/networkLink/{*linkId*}/downgrade

The URL template for invalidating a relationship between a Local Patient Record and a Remote Patient Record has three variables:

- *orgId* – Identifies the Patient Identity Domain owned by the Organization represented by the Edge System.
- *patientId* – The local Patient Identifier. The value is under the control of the local Edge System and represents the unique identifier for the Patient Record in the local system.
- *linkId* – The network link identifier.

As shown in the previous examples, the template is populated with this data in the *downgrade* link relation included in the *_links* collection of the NetworkLink resource.

Sample Request

```
POST
https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3
.4%26ISO/networkLink/a1effd9/downgrade HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

Sample Response: OK

```
HTTP/1.1 200 OK
Content-Type: application/hal+json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:44 GMT

{
   "_links": {
      "self": {"href":
"v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO/networkLink/b850c8"}},
   "assuranceLevel": "0",
   "patient": {
      "details": {
         "address": [{
            "line": ["511 Oswego Street"],
            "city": "Chicago",
            "state":  "Il",
            "zip": "60610"}],
         "birthDate": "1945-09-24",
         "gender": {
            "code": "M",
            "system": "http://hl7.org/fhir/vs/administrative-gender"},
         "name": [{
            "family": ["Nolan"],
            "given": ["Frank"]}]}}
   }
}
```

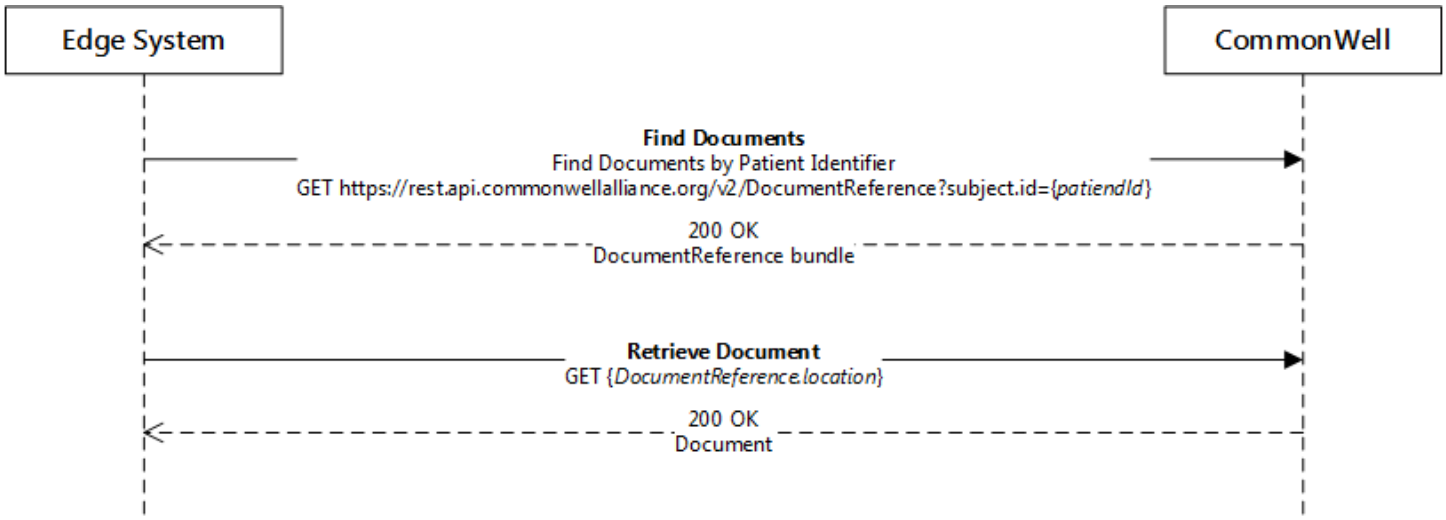
If the current LOLA of the NetworkLink is NOT level 1 or 2, the CommonWell server will return an error.

Sample Response: Invalid LOLA State

```
HTTP/1.1 409 Conflict
Content-Length: 67
Content-Type: application/json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:59 GMT

{
   "message": "The network link cannot be downgraded given its current level of link assurance.",
   "code": XXXX,
   "help": {"href": "http://rest.api.commonwellalliance.org/help/#networkLink"}
}
```

8.7.8 Document Query and Retrieve



This section is based on the transactions described in the IHE Mobile Health Documents (MHD) profile. IHE and HL7 FHIR working groups are collaborating to revise and enhance MHD, and this portion of the CommonWell service is subject to change once MHD has stabilized.

8.7.8.1 Find Documents

GET https://rest.api.commonwellalliance.org/v2/DocumentReference?subject.id={*patientId*}

Find Documents is equivalent to the IHE ITI-18 (Registry Stored Query) transaction. It finds *DocumentReference* resources satisfying provided query parameters. The result of the query is a bundle of *DocumentReference* resources that match the query parameters.

Search Parameter	Required	Notes
subject.id	Yes	*Token* matching the value of the patient identifier: [**system**]|[**code**]: the value of [code] matches Identifier.value and the value of [system] matches the system property of the

Search Parameter	Required	Notes
		Identifier, separated by a pipe delimiter.
created	No	A *date* specifying the time when the DocumentReference was created. Edge Systems shall populate the created search parameter using either a less-than or equal to, or greater-than or equal to search parameter modifier. In XDS nomenclature, this query parameter represents from/to parameters filtering by when the submission set was submitted.
author.given and author.family	No	Specify the name parts of the author person associated with the DocumentReference.
contentTypeCode	No	A *token* specifying the *contentTypeCode* value supplied in the DocumentReference resource, or in XDS nomenclature, the content type of the submission set.
status	No	The status of the DocumentReference, or in XDS nomenclature, the availability status of the submission set, using one of the shortened values listed below: **Short Code** — **ebRIM Code equivalent** current — urn:oasis:names:tc:ebxml-regrep:StatusType:Approved superceded — urn:oasis:names:tc:ebxml-regrep:StatusType:Deprecated

A token type is a parameter that searches on a code or identifier value where the value may have a URI that scopes its meaning.

Sample Request

In this example, the query string contains the mandatory subject identifier for the patient (urn:oid:2.16.840.1.113883.3.4|9876) and optional status input parameters.

```
GET https://rest.api.commonwellalliance.org/v2/DocumentReference?
subject.id=urn%3Aoid%3A2.16.840.1.113883.3.4%7C9876&status=current HTTP/1.1
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

Sample Response

```
HTTP/1.1 200 OK
Content-Type: application/hal+json; charset=UTF-8
Date: Wed, 06 Oct 2014 20:54:44 GMT

{
  "_links": {
    "self": {
```

```
      "href": "/v2/DocumentReference?subject.id=urn%3Aoid%3A2.16.840.1.113883.3.4%7C9876&status=current"
    }
  },
  "_embedded": {
    "DocumentReference": [
      {
        "resourceType": "DocumentReference",
        "text": {
          "status": "generated",
          "div": "<div>\n <p>\n <b>Generated Narrative</b>"
        },
        "contained": [
          {
            "resourceType": "Practitioner",
            "_id": "a1",
            "name": {
              "family": [
                "Geiger"
              ],
              "given": [
                "Geoffrey"
              ]
            },
            "telecom": [
              {
                "system": "email",
                "value": "ggieger@oswego.org"
              }
            ],
            "organization": {
              "display": "Oswego Medical"
            },
            "role": [
              {
                "text": "Primary Surgeon"
              }
            ],
            "specialty": [
              {
                "text": "Orthopedic"
              }
            ]
          },
          {
            "resourceType": "Practitioner",
            "_id": "a2",
            "name": {
              "family": [
                "Smitty"
              ],
              "given": [
                "Gerald"
              ]
            },
            "telecom": [
              {
                "system": "email",
                "value": "gsmitty@oswego.org"
              }
            ],
            "organization": {
              "display": "Oswego Medical"
            },
            "role": [
              {
                "text": "Attending"
              }
```

```
        ],
        "specialty": [
          {
            "text": "Orthopedic"
          }
        ]
      }
    ],
    "masterIdentifier": {
      "system": "urn:ietf:rfc:3986",
      "value": "urn:oid:1.3.6.1.4.1.21367.2005.3.7"
    },
    "subject": {
      "reference": "Patient/1234 "
    },
    "type": {
      "coding": [
        {
          "code": "34108-1",
          "display": "Outpatient Note"
        }
      ]
    },
    "author": [
      {
        "reference": "#a1"
      },
      {
        "reference": "#a2"
      }
    ],
    "created": "2005-12-24T09:35:00+11:00",
    "indexed": "2005-12-24T09:43:41+11:00",
    "status": "current",
    "description": "Physical",
    "confidentiality": [
      {
        "coding": [
          {
            "code": "1.3.6.1.4.1.21367.2006.7.101",
            "display": "Clinical-Staff"
          }
        ]
      }
    ],
    "primaryLanguage": "en-US",
    "mimeType": "application/hl7-v3+xml",
    "size": 3654,
    "hash": "da39a3ee5e6b4b0d3255bfef95601890afd80709",
    "location": "https://rest.api.commonwellalliance.org/Binary/urn%3Aoid%3A1.3.6.1.4.1.21367.2005.3.7",
    "context": {
      "event": [
        {
          "coding": [
            {
              "code": "T-D8200",
              "display": "Arm"
            }
          ]
        }
      ],
      "period": {
        "start": "2004-12-23T08:00:00",
        "end": "2004-12-23T08:01:00"
      },
      "facilityType": {
        "coding": [
```

```
              {
                "code": "Outpatient",
                "display": "Outpatient"
              }
            ]
          }
        }
      }
    ]
  }
}
```

8.7.8.2 Retrieve Document

GET {*DocumentReference.location*}

To retrieve a document, the Edge System sends an HTTP GET request to the server using the *location* value from the *DocumentReference* returned in the results of the *Find Documents* transaction. The Edge System should use content negotiation by providing an HTTP Accept header according to the semantics of the HTTP protocols (see RFC 2616, section 14.1). The only MIME type assured to be returned is the MIME type indicated in the *mimeType* property of the *DocumentReference*.

Sample Request

Following the Find Documents response from section 8.7.8.1 above, the sample request uses the *location* value as the request URL and *mimeType* as the HTTP Accept header value.

```
GET https://rest.api.commonwellalliance.org/v2/Binary/urn%3Aoid%3A1.3.6.1.4.1.21367.2005.3.7 HTTP/1.1
Accept: application/hl7-v3+xml
Host: rest.api.commonwellalliance.org
Authorization: Bearer mF_9.B5f-4.1JqM
```

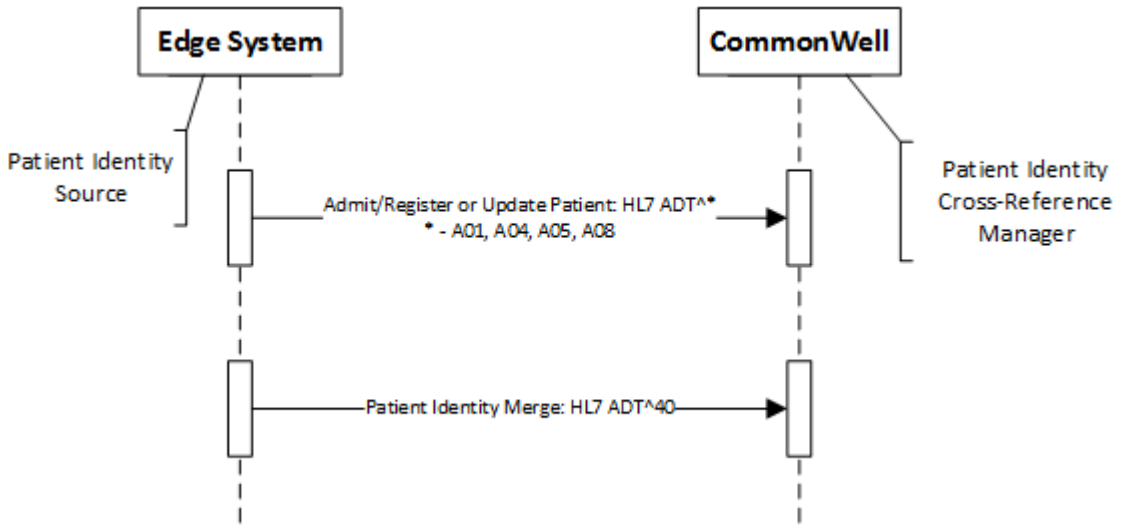
The response to the request will be the document and an HTTP 200 (OK) response code.

Sample Response: Document Not Found

In the case where a document cannot be found (for example, if the Edge System is using a location URL cached from a query performed in the past), an HTTP 404 (Not Found) response indicates the Edge System should perform the Find Documents transaction again.

9 CommonWell Patient Identity Management Service

This section describes a CommonWell PIX v2.x service, which is offered as an alternative for HIT vendors to the REST-based services for Patient Identity management described in Section 8.7.2 above. The conforming message events are summarized in the diagram below.



9.1 Design Principles and Assumptions

The implementation of the CommonWell PIX Manager has the following general assumptions and design goals:

- A Patient Identity source MAY send alternatives to the A-40 merge event messages.
- Support the transmission of Patient Identity information from an Edge System identity source to the CommonWell PIX Manager.
- Enable Edge Systems to access the CommonWell Identifier for an indexed Patient Identity via a query/response.
- Does NOT support PIX update notifications.
- Support widely deployed HL7 interface engines based on v2 of the IHE PIX specification and using the Minimal Lower Layer Protocol (MLLP) as the underlying session framing and transport protocol.
- Secure communication between an Edge System and the CommonWell PIX Manager using a dedicated Virtual Private Network (VPN) or using SSL/TLS 1.0 -1.2 with X509 client certificate.
- The Edge System acting as a Patient Identity Source is providing Patient Identity event notifications to both the CommonWell PIX Manager and the Edge System's Document Registry (which is known to CommonWell via the Edge System's Organization configuration). How Patient Identity event notifications are communicated to the Document Registry is outside the scope of this specification.

9.2 Message Constraints

Messages MUST follow version 2.3.1 (or higher) of the HL7 Specification. The primary messaging constraints for HL7 messages are listed below.

- All messages MUST include MSH, EVN and PID segments.
- Segments PV1 and PV2 are optional.
- The MSH segment MUST include MSH-1, MSH-2, MSH-3, MSH-4, MSH-5, MSH-6, MSH-7, MSH-9 and MSH-10.
- MSH-1 MUST have the value "|".
- MSH-2 MUST have the value "^~\&".

- MSH-5 MUST have the specified receiving application value.
- MSH-6 MUST have the specified receiving facility value.
- The message MUST include only one identifier in the PID-3 and that identifier MUST be a unique identifier in the Patient Identifier Domain and will be globally unique.
- For add and update messages, the PID segment MUST include PID-5, PID-7, PID-8 and PID-11 (Postal Code).
- For A40 merge messages, there MUST be only one identifier in MRG-2, and that identifier MUST be a unique identifier in the Patient Identifier Domain.
- All date and time fields MUST include UTC offset if the local time is used; otherwise it will be treated as UTC.

Codes that may be returned in the message acknowledgement are summarized below.

MSA-1	Description	Error Code
CA	Message accepted	0
CE	Segment sequence error	100
CE	Required field missing	101
CE	Data type error	102
CE	Table value not found	103
CR	Unsupported message type	200
CR	Unsupported event code	201
CR	Unsupported version id	203
CR	Application internal error	207

9.3 Acknowledgments: Enhanced Mode

The CommonWell server will perform basic data validation as mentioned in ADT Message Constraints. If no errors are found, CommonWell will commit the message to safe storage and return an accept acknowledgment to the sending Edge System. This acknowledgement releases the sending Edge System from the need to resend the message.

After the message has been processed by CommonWell, the message processing status can be queried using CommonWell Management portal. In addition, CommonWell MAY provide an alerting mechanism based on high failure rates for messages that have been acknowledged as accepted for processing.

9.4 Patient Add and Update

In response to patient admission, registration or update events, an Edge System acting as a Patient Identity Source Actor MUST respond by sending one of the following Admit/Register or Update messages to the CommonWell server acting as a Patient Identity Cross-reference Manager:

- A01 – Admission of an inpatient into a facility
- A04 – Registration of an outpatient for a visit of the facility
- A05 – Pre-admission of an inpatient (i.e., registration of patient information ahead of actual admission)

Changes to patient demographics (e.g., change in patient name, patient address, etc.) shall trigger the following Admit/Register or Update message:

- A08 – Update Patient Information

This message shall use the field PID-3 Patient Identifier List to convey the Patient ID uniquely identifying the patient within a given Patient Identification Domain.

Sample Request: ADT Update Message

```
MSH|^~\&|Resonance^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|CW_App|CW_Facility|201307080944||ADT^A01|5616|D|2
.5
EVN|A01|200711060941
PID|1||4933^^^&1.3.6.1.4.1.29928&ISO||Nolan^Frank||19450924|M|||8123 Hawthorne
Ave^^chicago^IL^60612^US^P^042||(708)555-1234|(312)555-3456|E^ENGLISH^CLAN
PD1||||15014^Geiger^Jeffrey
```

The CommonWell server returns an ACK response to the Edge System. CommonWell follows the HL7 2.5 specification to generate a message acknowledgement.

Sample Response: ACK Message

```
MSH|^~\|CW_App|CW_Facility|Resonance^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|201101040941||ADT^A08|5616|D|2.
5
MSA|CA|0
```

If the system sends an unsupported event type, CommonWell will return response with error.

Sample Request: Unsupported ADT Event

```
MSH|^~\&|Resonance^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|CW_App|CW_Facility|201307080944||ADT^A60|5616|D|2
.5
EVN|
PID|1||4933^^^&1.3.6.1.4.1.29928&ISO||Nolan^Frank||19450924|M|||8123 Hawthorne
Ave^^chicago^IL^60612^US^P^042||(708)555-1234|(312)555-3456|E^ENGLISH^CLAN
PD1||||15014^Geiger^Jeffrey
PV1|1|O|30968||||15014^Geiger^Jeffrey
```

Sample Response: Error Message

```
MSH|^~\&|CW_App|CW_Facility|Resonance^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|20130711194552||ACK^A60^ACK|56
16|D|2.5
MSA|CR|5616
ERR||MSH^1^9^^2^|201^Unsupported event code&HL70357|E||||
```

For complete list of requests and responses, see the Appendix.

9.5 Patient Merge

When two Patient Records are found to identify the same patient in a Patient Identity Domain, an Edge System, acting as a Patient Identity Source Actor, MUST respond by sending the appropriate ADT merge event notification to the CommonWell server acting as the Patient Identity Cross-reference Manager:

- A40 – Merge Patient – Internal ID

An A40 message indicates that the Patient Identity Source Actor has merged Patient Records within a specific Patient Identification Domain. That is, MRG-1 (Patient ID) has been merged into PID-3 (Patient ID).

Sample ADT Merge Message

```
MSH|^~\&|Resonance^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|CW_App|CW_Facility|201307080944||ADT^A40|5616|D|2
.5
EVN|A40
PID|1||6676^^^&1.3.6.1.4.1.29928&ISO||Lannister^Tyrel||19681108|M|||81280 Peachtree
Street^^Atlanta^GA^30309^US^P^042||(404)555-3054|(404)555-3054|E^ENGLISH^CLAN
PV1|1|O|30968||||15014^Geiger^Jeffrey
MRG|6689^^^EPI
```

The CommonWell server returns an acknowledgement response to the Edge System.

Sample Response: ACK Message

```
MSH|^~\&amp;|CW_App|CW_Facility|Resonance^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|20130711153905||ACK^A40^AC
K|5616|D|2.5
MSA|CA|5616
```

Sample Request: ADT Merge Message with No Identifier in MRG-1

```
MSH|^~\&|Resonance^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|CW_App|CW_Facility|201307080944||ADT^A40|5616|D|2
.5
EVN|A40
PID|1||6676^^^EPI||Lannister^Tyrel||19681108|M|||81280 Peachtree Street^^Atlanta^GA^30309^US^P^042||(404)555-
3054|(404)555-3054|E^ENGLISH^CLAN
PV1|1|O|30968||||15014^Geiger^Jeffrey
MRG|
```

The CommonWell server returns an error message to the Edge System.

Sample Response: Error Message

```
MSH|^~\&|CW_App|CW_Facility|Resonance^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|001|4|20130711184856||ACK^A40^
ACK|5616|D|2.5
MSA|CE|5616
ERR||MRG^^1^^1^|101^Required field missing&HL70357|E||||
```

For complete list of requests and responses, see the Appendix.

9.6 Dynamic Creation of Correlated Links using Patient Identity Feeds (PIXv2.x)

CommonWell supports the automatic linking of patients to Organizations from which they need to receive care but may not visit by sharing and comparing patient identifiers. The destination system sends identifiers from a previously-linked Organization initiating the order or referral in question, and additionally from its own Organization, which now requires access to the patient's clinical data.

If the same identifier can be sent by both systems and can be validated by CommonWell along with a demographic match, the platform dynamically creates a LOLA2-equivalent link between the acting systems.

Workflow and Messaging

1. An order or referral is created for a patient.
2. The ordering system's local patient ID is sent to the downstream system within the order or referral.
3. The local identifier for the downstream system and the ordering system's local patient ID are then sent to CommonWell from the downstream system within a PIX registration message. This shared identifier can be used to correlate the identity of the patient as the same person.

In order to initiate the process of establishing a Correlated Link, the initiating system (that is, the Patient Identity Source Actor) shall provide its identifier for the patient receiving care in the ID component (the first component) of the PID-3 field (PID-3.1).

The Patient Identity Source Actor shall use component PID-3.4 to convey the assigning authority (Patient Identification Domain) of the patient identifier. Either the first subcomponent (namespace ID) or the second and third subcomponents (universal ID and universal ID type) shall be populated. If all three subcomponents are populated, the first subcomponent shall reference the same entity as is referenced by the second and third components.

Recipients of such orders shall add the identifier from the ordering system to an outbound HL7 PIXv2 ADT transaction in the PID-3 segment before sending this message to CommonWell.

Upon receipt of these messages, the service provider shall examine these PID-3 identifiers, comparing them to known patients. If a) a match is found and b) demographic values meet the current system threshold for LOLA1 matches, then a new LOLA2-equivalent link will be created for the person, enabling the originating system to query for and retrieve documents from all linked endpoints.

Sample Message

A. PIX from Ordering System to CommonWell

```
MSH|^~\&|Resonance^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|CW_App|CW_Facility|201307080944||ADT^A08|5616|P|2
.5
EVN|A08|201202150937
PID|1||4933^^^&1.3.6.1.4.1.29928&ISO||Nolan^Frank||19450924|M|||8123 Hawthorne
Ave^^Chicago^IL^60612^US^P^042||(708)555-1234|(312)555-3456|E^ENGLISH^CLAN
PD1||||15014^Geiger^Geoffrey
PV1||O|128~355~C~PMA^^^^^^^^^^||||15014^Geiger^Geoffrey^^^^|||||||||||201202178|||||||||||||||||||||||20160215
0937||||||
1233443234
```

B. Lab or AP Orders/Referrals

Variant 1: New Order from Upstream EHR to Downstream Lab

```
MSH|^~\&|Resonance^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|CW_App|CW_Facility|201307080955||ORM^O01|MSGID200
60307110114|P|2.5
 PID|1||4933^^^&1.3.6.1.4.1.29928&ISO||Nolan^Frank||19450924|M|||8123 Hawthorne

Ave^^Chicago^IL^60612^US^P^042||(708)555-1234|(312)555-3456|E^ENGLISH^CLAN
PV1||O|OP^PAREG^||||2342^^Geiger^Geoffrey^^^^|||OP|||||||2|||||||||||||||||||||||20160307110111|
 ORC|NW|20060307110114
 OBR|1|20060307110114||003038^Urinalysis^L|||20060307110114
```

Variant 2: New Post-Acute Referral from Upstream System to Downstream System

```
MSH|^~\&|Brightree^2.16.840.1.113883.3.12.2.2^ISO|PA_Facility|CW_App|CW_Facility|201307080944||ADT^A08|5616|D|2.
5
RF1||R|MED|RP|O|REF4502|20140111|20140510|20140111||4933^^^&1.3.6.1.4.1.29928&ISO
EVN|A08|201202150937
PID|1||4933^^^&1.3.6.1.4.1.29928&ISO|Nolan^Frank||19450924|M|||8123 Hawthorne
Ave^^Chicago^IL^60612^US^P^042||(708)555-1234|(312)555-3456|E^ENGLISH^CLAN
PD1||||15014^Geiger^Geoffrey
PV1||O|128~355~C~PMA^^^^^^^^^^||||15014^Geiger^Geoffrey^^^^||||||||||||201202178|||||||||||||||||||||||20160215
0937||||||
1233443234
```

Variant 3: Orders Submitted via FAX

Fax is a common referral mechanism for Post-Acute systems. In this scenario, the Post-Acute system can manually enter the sending system's MRN and OID to enable the correlated linking via PIX. It is expected that the Post-Acute system will already have access to this OID.

C. Destination System to CommonWell

Note: There are *two* fully qualified patient identifiers in the PID field.

```
MSH|^~\&|Sunquest^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|CW_App|CW_Facility|201307080944||ADT^A08|5616|D|2.
5
EVN|A08|201202150937
PID|1||1234^^^&1.3.6.1.4.1.299303&ISO~4933^^^&1.3.6.1.4.1.29928&ISO|Nolan^Frank||19450924|M|||8123 Hawthorne
Ave^^Chicago^IL^60612^US^P^042||(708)555-1234|(312)555-3456|E^ENGLISH^CLAN
PD1||||15014^Geiger^Jeffrey
PV1||O|128~355~C~PMA^^^^^^^^^^||||15014^Geiger^Geoffrey^^^^||||||||||||201202178|||||||||||||||||||||||20160215
0937||||||
1233443234
```

10 CommonWell Health Alliance Broker (CHA Broker)

The CHA Broker provides a centralized service for executing document query and retrieval transactions on behalf of Edge Systems to the various EHR Registries and EHR Repositories participating in the CommonWell network. The transactions implement the Cross-Community Access (XCA) profile specified in the IHE Technical Framework.

10.1 IHE Roles

With reference to the roles defined in the IHE Technical Framework for XCA, an Edge System will act as a Document Consumer in all transactions. The CHA Broker will provide a layer of abstraction to the Edge System Document Consumer.

10.2 Synchronous and Asynchronous Exchange

The CHA Broker currently supports only synchronous transactions.

The IHE Technical Framework requires that Responding Gateways support the Asynchronous Web Services Exchange Option for both document query and retrieval. However, this specification does NOT require that an Organization's Responding Gateway support asynchronous transactions.

10.3 homeCommunityId

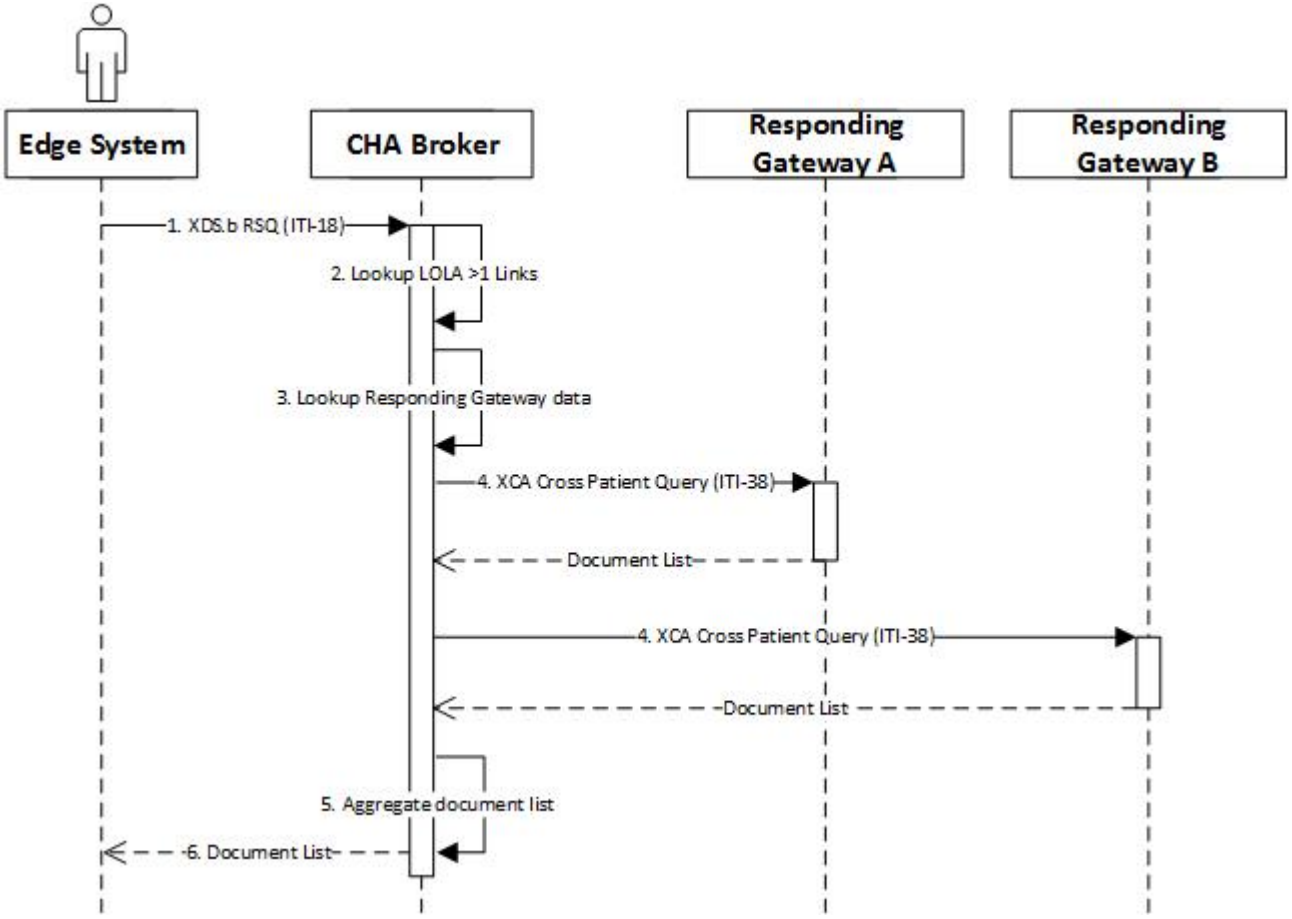
A community is identifiable by a globally unique id called the *homeCommunityId*. Membership of a CommonWell Organization in one community does not preclude it from being a member in another community. The following information is included in the IHE XCA profile to define the use of the *homeCommunityId*.

- The *homeCommunityId* is a globally unique identifier for a community used to assist in subsequent requests for locating the data held by that community. *homeCommunityId* is structured as an OID limited to 64 characters and specified in URI syntax, for example the *homeCommunityId* of *2.16.840.1.113883.3.166* would be formatted as *urn:oid: 2.16.840.1.113883.3.166*.
- It is returned within the response to Cross Gateway Query to indicate the association of a response element with a community. It is specified as the ebRIM home attribute within the relevant response elements. Document Consumers process the value in the response as an opaque unique identifier.
- It is used by Initiating Gateways to direct requests to the community where the data originated.

A CommonWell organization MUST provide its *homeCommunityId* to CommonWell when registering as a CommonWell organization.

10.4 Document Query

The figure below illustrates the actors and transactions involved in the Registry Stored Query transaction.



1. The Edge System sends a FindDocuments Registry Stored Query (ITI-18) message to the CHA Broker. In this example the Edge System sends an ITI-18 request, but a comparable ITI-38 Cross Gateway Query request could have been sent instead. The request message contains either the local patient Identifier for the patient or the CommonWell identifier for the patient.
2. The CHA Broker uses the patient Identifier to lookup the remote Patient Records with LOLA 2 or higher.
3. The CHA Broker references the responding gateway configuration for the Organizations corresponding to each of the remote Patient Records.
4. The CHA Broker sends a Cross-Gateway Query (ITI-38) request to each of the responding gateways.
5. The CHA Broker aggregates the document lists returned by each of the responding gateways.
6. The CHA Broker returns the aggregated document list to the Edge System.

10.4.1 XDS Affinity Domain Option

With respect to the XDS Affinity Domain Option as defined in the IHE IT Infrastructure Technical Framework (ITI TF-1, Section 18.2.1), the CHA Broker acts as an Initiating Gateway and the Edge System as a Document Consumer

submitting a Registry Stored Query (ITI-18) or Cross-Gateway Query (ITI-38). The Edge System acting as a Document Consumer includes a local Patient Identifier or a CommonWell Patient Identifier in a Registry Stored Query (ITI-18) or Cross-Gateway Query (ITI-38). The CHA Broker, acting as an Initiating Gateway, adjusts the patient identifier known to the Responding Gateway in the Cross Gateway Query Request (ITI-38) submitted to the Responding Gateway.

10.4.2 On-Demand Document Support

With respect to On-Demand Documents as defined in the IHE IT Infrastructure Technical Framework (ITI TF-1, Section 18.2.4), the CHA Broker will act as described in the underlying specification based on its support for the XDS Affinity Domain Option. Specifically, the CHA Broker, acting as an Initiating Gateway, relies on an Edge System, acting as a Document Consumer, to generate requests that support On-Demand Document Entries. The CHA Broker will not modify the content related to On-Demand Entries and will pass it in the Cross-Gateway Query (ITI-38) to the Responding Gateway. CHA Broker will return the full results to the Edge System.

10.4.3 Query Parameters

The query parameters for the Cross Gateway Query are defined by the IHE. See Volume 2a of IHE ITI Technical Framework, Section 3.18.4.1.2.3.7 “Parameters for Required Queries.” For more detailed descriptions of the parameters, see Volume 3 of the IHE IT Technical Framework, Section 4.1.7 “Document Definition Metadata” Table 4.1-5.

For document searches using the CHA Broker, an Edge System may use the following elements as the primary search parameters:

- Patient ID (required)
- Class code
- Type code
- Practice Setting Code
- Healthcare Facility Type
- Document Creation Time(s)
- Service Time(s)
- Event Codes
- Confidentiality Code
- Author Person
- Format Code
- Status (required)
- Reference ID List

Both the Patient ID and Status are required.

10.4.3.1 Patient ID

The patient ID is the technical identifier for the person for whom the related documents are sought. A patient ID consists of two parts:

- The Organization’s Assigning Authority in the form of an OID.

- The Patient identifier in the Organization's Assigning Authority domain.

Within the query request, these components of the patient ID MUST be specified in the HL7 CX format.

The Assigning Authority is the root of the Patient Identifier and the Patient ID is the extension. Per the IHE specification, the required format for the document query is:

IDNumber^^^&OIDofAA&ISO

Example: CommonWell Patient Identifier

```
<rim:Slot name="$XDSDocumentEntryPatientId">
   <rim:ValueList>
      <Value>'1234^^^&amp;1.3.6.1.4.1.29928&amp;ISO'</Value>
   </rim:ValueList>
</rim:Slot>
```

Note that the '&' character must be properly HTML-encoded and the Patient Identifier surrounded by single quotes.

10.4.3.2 Document Query Metadata

The Edge System should display the response from the CHA Broker using the document metadata to provide the necessary information for users of the Edge System to decide whether or not they want to retrieve the document.

For every potential document, there is a minimal set of XCA Metadata that is useful for identifying documents, identified by the Table 10.4.3-2.

Edge Systems should display the minimal set of XCA Metadata, with the suggested labels, when showing CommonWell Document Query responses to users.

Table 10.4.3-2 Minimal XCA Metadata set 1

Metadata	Suggested Label	Notes
serviceStartTime	Date of Service	
Title	Title	Open today. No enforced constraints to date.
typeCode	DocType	
authorInstitution	Service Location	
eventCodeList	Services	
practiceSettingCode	Practice Type	
authorPerson	Doc Author	not always present – system generated documents
referenceIdList	References *or, if appropriate,* Accession	The element can reference identifiers of several types; accession numbers are of particular use in Radiology.

Metadata	Suggested Label	Notes
	Number	

Edge systems should also be capable of allowing users to see any errors and warnings that may be returned along with metadata content for documents.

Sample Response: Aggregated Document List

```
HTTP/1.1 200 OK
Content-Type: text/xml; charset=utf-8
Date: Thu, 02 May 2013 03:33:58 GMT
Content-Length: 423

<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope" xmlns:a="http://www.w3.org/2005/08/addressing">
   <s:Header>
      <a:Action s:mustUnderstand="1">urn:ihe:iti:2007:RegistryStoredQueryResponse</a:Action>
      <a:RelatesTo>urn:uuid:a02ca8cd-86fa-4afc-a27c-616c183b2055</a:RelatesTo>
   </s:Header>
   <s:Body>
      <query:AdhocQueryResponse xsi:schemaLocation="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0
../../schema/ebRS/query.xsd" status="Success" xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0">
         <rim:RegistryObjectList>
            <rim:ExtrinsicObject id="urn:uuid:08a15a6f-5b4a-42de-8f95-89474f83abdf" isOpaque="false"
mimeType="text/xml" objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1" status="urn:oasis:names:tc:ebxml-
regrep:StatusType:Approved" xmlns:q="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0">
               <rim:Slot name="URI">
                  <rim:ValueList>
                     <rim:Value>http://localhost:8080/XDS/Repository/08a15a6f-5b4a-42de-8f95-
89474f83abdf.xml</rim:Value>
                  </rim:ValueList>
               </rim:Slot>
               <rim:Slot name="authorInstitution">
                  <rim:ValueList>
                     <rim:Value>Fairview Hospital</rim:Value>
                  </rim:ValueList>
               </rim:Slot>
               <rim:Slot name="creationTime">
                  <rim:ValueList>
                     <rim:Value>200412261119</rim:Value>
                  </rim:ValueList>
               </rim:Slot>
               <rim:Slot name="hash">
                  <rim:ValueList>
                     <rim:Value>4cf4f82d78b5e2aac35c31bca8cb79fe6bd6a41e</rim:Value>
                  </rim:ValueList>
               </rim:Slot>
               <rim:Slot name="languageCode">
                  <rim:ValueList>
                     <rim:Value>en-us</rim:Value>
                  </rim:ValueList>
               </rim:Slot>
               <rim:Slot name="serviceStartTime">
                  <rim:ValueList>
                     <rim:Value>200412230800</rim:Value>
                  </rim:ValueList>
               </rim:Slot>
               <rim:Slot name="serviceStopTime">
                  <rim:ValueList>
                     <rim:Value>200412230801</rim:Value>
                  </rim:ValueList>
               </rim:Slot>
               <rim:Slot name="size">
```

```
                  <rim:ValueList>
                     <rim:Value>54449</rim:Value>
                  </rim:ValueList>
               </rim:Slot>
               <rim:Slot name="sourcePatientId">
                  <rim:ValueList>
                     <rim:Value>jd12323^^^wsh</rim:Value>
                  </rim:ValueList>
               </rim:Slot>
               <rim:Slot name="sourcePatientInfo">
                  <rim:ValueList>
                     <rim:Value>PID-3|pid1^^^domain</rim:Value>
                     <rim:Value>PID-5|Nolan^Frank^^^</rim:Value>
                     <rim:Value>PID-7|19560527</rim:Value>
                     <rim:Value>PID-8|M</rim:Value>
                     <rim:Value>PID-11|511 Oswego St^^Chicago^Il^60610^USA</rim:Value>
                  </rim:ValueList>
               </rim:Slot>
               <rim:Name>
                  <rim:LocalizedString charset="UTF-8" value="Sample document 1" xml:lang="en-us"/>
               </rim:Name>
               <rim:Description/>
               <rim:Classification classificationScheme="urn:uuid:41a5887f-8865-4c09-adf7-e362475b143a"
classifiedObject="urn:uuid:08a15a6f-5b4a-42de-8f95-89474f83abdf" id="urn:uuid:ac872fc0-1c6e-439f-84d1-
f76770a0ccdf" nodeRepresentation="Education" objectType="Urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:Classification">
                  <rim:Slot name="codingScheme">
                     <rim:ValueList>
                        <rim:Value>Connect-a-thon classCodes</rim:Value>
                     </rim:ValueList>
                  </rim:Slot>
                  <rim:Name>
                     <rim:LocalizedString charset="UTF-8" value="Education" xml:lang="en-us"/>
                  </rim:Name>
                  <rim:Description/>
               </rim:Classification>
               <rim:Classification classificationScheme="urn:uuid:f4f85eac-e6cb-4883-b524-f2705394840f"
classifiedObject="urn:uuid:08a15a6f-5b4a-42de-8f95-89474f83abdf" id="urn:uuid:f1a8c8e4-3593-4777-b7e0-
8b0773378705" nodeRepresentation="C" objectType="Urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:Classification">
                  <rim:Slot name="codingScheme">
                     <rim:ValueList>
                        <rim:Value>Connect-a-thon confidentialityCodes</rim:Value>
                     </rim:ValueList>
                  </rim:Slot>
                  <rim:Name>
                     <rim:LocalizedString charset="UTF-8" value="Celebrity" xml:lang="en-us"/>
                  </rim:Name>
                  <rim:Description/>
               </rim:Classification>
               <rim:Classification classificationScheme="urn:uuid:a09d5840-386c-46f2-b5ad-9c3699a4309d"
classifiedObject="urn:uuid:08a15a6f-5b4a-42de-8f95-89474f83abdf" id="urn:uuid:b6e49c73-96c8-4058-8c95-
914d83bd262a" nodeRepresentation="CDAR2/IHE 1.0" objectType="Urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:Classification">
                  <rim:Slot name="codingScheme">
                     <rim:ValueList>
                        <rim:Value>Connect-a-thon formatCodes</rim:Value>
                     </rim:ValueList>
                  </rim:Slot>
                  <rim:Name>
                     <rim:LocalizedString charset="UTF-8" value="CDAR2/IHE 1.0" xml:lang="en-us"/>
                  </rim:Name>
                  <rim:Description/>
               </rim:Classification>
               <rim:Classification classificationScheme="urn:uuid:f33fb8ac-18af-42cc-ae0e-ed0b0bdb91e1"
classifiedObject="urn:uuid:08a15a6f-5b4a-42de-8f95-89474f83abdf" id="urn:uuid:61e2b376-d74a-4984-ac21-
```

```
dcd0b8890f9d" nodeRepresentation="Emergency Department" objectType="Urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:Classification">
                <rim:Slot name="codingScheme">
                   <rim:ValueList>
                      <rim:Value>Connect-a-thon healthcareFacilityTypeCodes</rim:Value>
                   </rim:ValueList>
                </rim:Slot>
                <rim:Name>
                   <rim:LocalizedString charset="UTF-8" value="Assisted Living" xml:lang="en-us"/>
                </rim:Name>
                <rim:Description/>
             </rim:Classification>
             <rim:Classification classificationScheme="urn:uuid:cccf5598-8b07-4b77-a05e-ae952c785ead"
classifiedObject="urn:uuid:08a15a6f-5b4a-42de-8f95-89474f83abdf" id="urn:uuid:fb7677c5-c42f-485d-9010-
dce0f3cd4ad5" nodeRepresentation="Cardiology" objectType="Urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:Classification">
                <rim:Slot name="codingScheme">
                   <rim:ValueList>
                      <rim:Value>Connect-a-thon practiceSettingCodes</rim:Value>
                   </rim:ValueList>
                </rim:Slot>
                <rim:Name>
                   <rim:LocalizedString charset="UTF-8" value="Cardiology" xml:lang="en-us"/>
                </rim:Name>
                <rim:Description/>
             </rim:Classification>
             <rim:Classification classificationScheme="urn:uuid:f0306f51-975f-434e-a61c-c59651d33983"
classifiedObject="urn:uuid:08a15a6f-5b4a-42de-8f95-89474f83abdf" id="urn:uuid:0a8a8ed9-8be5-4a63-9b68-
a511adee8ed5" nodeRepresentation="34098-4" objectType="Urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:Classification">
                <rim:Slot name="codingScheme">
                   <rim:ValueList>
                      <rim:Value>LOINC</rim:Value>
                   </rim:ValueList>
                </rim:Slot>
                <rim:Name>
                   <rim:LocalizedString charset="UTF-8" value="Conference Evaluation Note" xml:lang="en-us"/>
                </rim:Name>
                <rim:Description/>
             </rim:Classification>
             <rim:ExternalIdentifier id="urn:uuid:db9f4438-ffff-435f-9d34-d76190728637"
registryObject="urn:uuid:08a15a6f-5b4a-42de-8f95-89474f83abdf" identificationScheme="urn:uuid:58a6f841-87b3-
4a3e-92fd-a8ffeff98427" objectType="ExternalIdentifier"
value="st3498702^^^&amp;1.3.6.1.4.1.21367.2005.3.7&amp;ISO">
                <rim:Name>
                   <rim:LocalizedString charset="UTF-8" value="XDSDocumentEntry.patientId" xml:lang="en-us"/>
                </rim:Name>
                <rim:Description/>
             </rim:ExternalIdentifier>
             <rim:ExternalIdentifier id="urn:uuid:c3fcbf0e-9765-4f5b-abaa-b37ac8ff05a5"
registryObject="urn:uuid:08a15a6f-5b4a-42de-8f95-89474f83abdf" identificationScheme="urn:uuid:2e82c1f6-a085-
4c72-9da3-8640a32e42ab" objectType="ExternalIdentifier" value="1.3.6.1.4.1.21367.2005.3.99.1.1010">
                <rim:Name>
                   <rim:LocalizedString charset="UTF-8" value="XDSDocumentEntry.uniqueId" xml:lang="en-us"/>
                </rim:Name>
                <rim:Description/>
             </rim:ExternalIdentifier>
          </rim:ExtrinsicObject>
          <rim:ObjectRef id="urn:uuid:41a5887f-8865-4c09-adf7-e362475b143a" xmlns:q="urn:oasis:names:tc:ebxml-
regrep:xsd:query:3.0"/>
          <rim:ObjectRef id="urn:uuid:f4f85eac-e6cb-4883-b524-f2705394840f" xmlns:q="urn:oasis:names:tc:ebxml-
regrep:xsd:query:3.0"/>
          <rim:ObjectRef id="urn:uuid:a09d5840-386c-46f2-b5ad-9c3699a4309d" xmlns:q="urn:oasis:names:tc:ebxml-
regrep:xsd:query:3.0"/>
          <rim:ObjectRef id="urn:uuid:f33fb8ac-18af-42cc-ae0e-ed0b0bdb91e1" xmlns:q="urn:oasis:names:tc:ebxml-
regrep:xsd:query:3.0"/>
```

```
            <rim:ObjectRef id="urn:uuid:cccf5598-8b07-4b77-a05e-ae952c785ead" xmlns:q="urn:oasis:names:tc:ebxml-
regrep:xsd:query:3.0"/>
            <rim:ObjectRef id="urn:uuid:f0306f51-975f-434e-a61c-c59651d33983" xmlns:q="urn:oasis:names:tc:ebxml-
regrep:xsd:query:3.0"/>
            <rim:ObjectRef id="urn:uuid:58a6f841-87b3-4a3e-92fd-a8ffeff98427" xmlns:q="urn:oasis:names:tc:ebxml-
regrep:xsd:query:3.0"/>
            <rim:ObjectRef id="urn:uuid:2e82c1f6-a085-4c72-9da3-8640a32e42ab" xmlns:q="urn:oasis:names:tc:ebxml-
regrep:xsd:query:3.0"/>
         </rim:RegistryObjectList>
      </query:AdhocQueryResponse>
   </s:Body>
</s:Envelope>
```

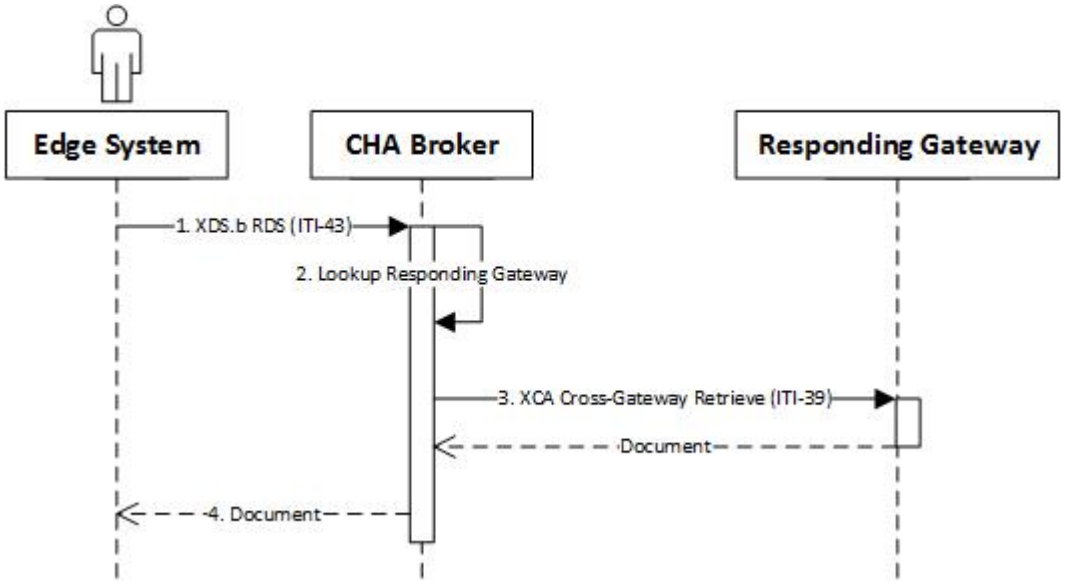
10.5 Error Responses

Error codes used in the CHA Broker document query service conform to those listed in IHE TF Volume 3 Section 4.1.13, as summarized below.

Error Code	Description
XDSRegistryError	Error from the registry in processing the query (e.g., invalid query criteria).
XDSRegistryBusy	Too much activity.
XDSRegistryOutOfResources	Resources are low.
XDSTooManyResults	The query resulted in too many results.
XDSUnknownStoredQuery	The Query ID provided in the request is not recognized.
XDSStoredQueryMissingParam	A required parameter to a stored query is missing.
XDSStoredQueryParamNumber	A parameter which only accepts a single value is coded with multiple values.
XDSUnknownPatientId	The Patient ID specified is no longer valid.

10.6 Document Retrieval

The document retrieval transaction allows an Edge System to retrieve one or more documents found via the document query transaction described in the previous section.



1. The Edge System sends the CHA Broker a Retrieve Document Set (ITI-43) request message which includes the required identifiers: *HomeCommunityId, RepositoryUniqueId,* and *DocumentUniqueId*. In this example, the Edge System sends an ITI-43 request but a comparable ITI-39 Cross Gateway Retrieve could have been sent instead.

2. The CHA Broker looks up the Responding Gateway configuration for the Organization corresponding to the requested document.

3. The CHA Broker sends a Cross-Gateway Retrieve (ITI-39) request to the XCA Community's Responding Gateway service endpoint.

4. Once the document is received from the Responding Gateway, the CHA Broker forwards the response to the Edge System.

Sample Request: Retrieve Document Set (ITI-43)

```
POST https://chabroker.api.commonwellalliance.org/v1/rds HTTP/1.1
Content-Type: text/xml;charset=UTF-8
SOAPAction: "http://rest.api.commonwellalliance.org/v1/rds"
Host: rest.api.commonwellalliance.org
Content-Length: 956

<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
xmlns:a="http://www.w3.org/2005/08/addressing">
   <s:Header>
      <a:Action s:mustUnderstand="1">urn:ihe:iti:2007:CrossGatewayRetrieve</a:Action>
      <a:MessageID>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:MessageID>
    <a:To s:mustUnderstand="1"
>http://broker.api.commonwellalliance.org/XCASerivce/xca.svc</a:To>
   </s:Header>
   <s:Body>
```

```
      <RetrieveDocumentSetRequest xmlns="urn:ihe:iti:xds-b:2007">
         <DocumentRequest>
            <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
            <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
            <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
         </DocumentRequest>
         <DocumentRequest>
            <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
            <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
            <DocumentUniqueId>1.3.6.1.4...2301</DocumentUniqueId>
         </DocumentRequest>
      </RetrieveDocumentSetRequest>
   </s:Body>
</s:Envelope>
```

Sample Response: Document Set

```
HTTP/1.1 200 OK
Content-Type: text/xml; charset=utf-8
Date: Thu, 02 May 2013 03:33:58 GMT
Content-Length: 423

<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
xmlns:a="http://www.w3.org/2005/08/addressing">
   <s:Header>
      <a:Action s:mustUnderstand="1">urn:ihe:iti:2007:CrossGatewayRetrieveResponse</a:Action>
      <a:RelatesTo>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:RelatesTo>
   </s:Header>
   <s:Body>
      <RetrieveDocumentSetResponse xmlns="urn:ihe:iti:xds-b:2007"
      xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
      xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
      xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
      xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0">
         <rs:RegistryResponse
         status="urn:oasis:names:tc:ebxml-regrep:ResponseStatusType:Success"/>
         <DocumentResponse>
            <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
            <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
            <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
            <mimeType>text/xml</mimeType>
            <Document>UjBsR09EbGhjZ0dTQUxNQUFBUUNBRU1tQ1p0dU1GUXhEUzhi</Document>
         </DocumentResponse>
         5 NHIN Retrieve Documents Web Service Interface Specification
         v3.0
         Page 15 of 16
         <DocumentResponse>
            <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
            <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
            <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
            <mimeType>text/xml</mimeType>
            <Document>UjBsR09EbGhjZ0dTQUxNQUFBUUNBRU1tQ1p0dU1GUXhEUzhi</Document>
         </DocumentResponse>
      </RetrieveDocumentSetResponse>
   </s:Body>
</s:Envelope>
```

11 References

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12 Acknowledgments

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Appendix A Person Enrollment Workflow Scenarios

A.1 Person Enrollment Workflow

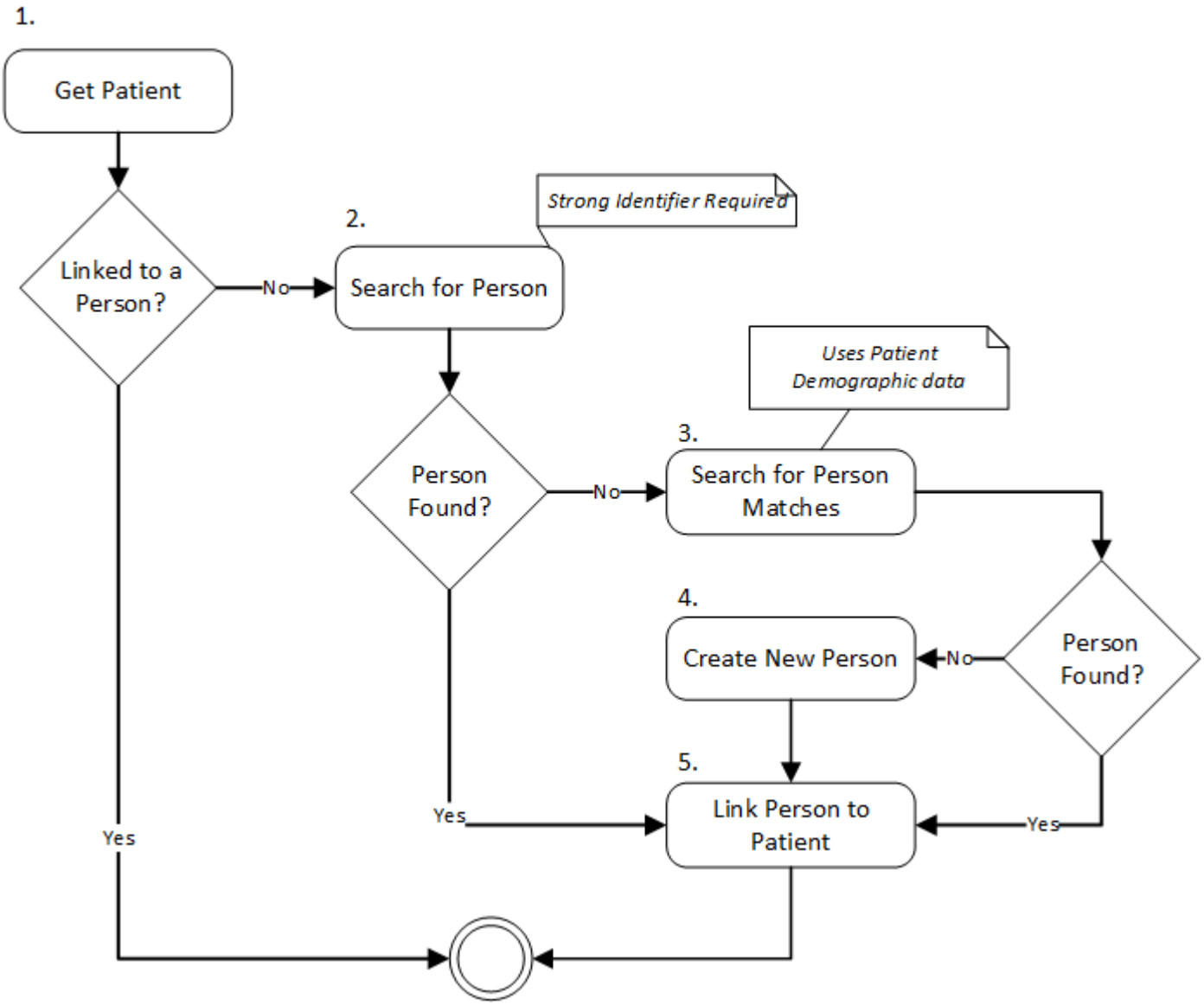
The primary workflow for enrolling a person in CommonWell begins by establishing whether or not a Person Record exists in CommonWell and is linked to the local Patient Record. The CommonWell Person API allows Edge Systems to search for persons using strong identifiers. Because persons may be enrolled in CommonWell without associated strong identifiers, the CommonWell APIs also provide a way to locate Person Records indirectly using patient demographic information stored with CommonWell. This mechanism works by providing the known Patient Identifier to CommonWell in the Person search request. This approach aims to mitigate the risk of exposing the person data store to ad-hoc demographic searches.

The following sections describe workflows for enrollment using the CommonWell APIs with two alternative pre-conditions: 1) where the Edge System has access to the local Patient Identifier, or 2) where the Edge System does NOT have access to the local Patient Identifier.

A.2 Patient Identifier Known

If the Edge System has access to the Patient Identifier, it may follow the workflow diagrammed below to determine whether or not a patient is registered with CommonWell as a person. This base workflow begins with accessing the local Patient Record stored in CommonWell.

Person Enrollment Activity



1. The Edge System gets the Patient resource using the known Patient Identifier.

```
GET /v1/org/{orgId}/patient/{patientId}
```

The Edge System should evaluate the link relations included in the returned Patient resource to determine the next step in the workflow.

a. If a “Person” link relation is included, this indicates the state of the Patient is “linked to a Person,” and this completes the workflow.

```
"person": {"href": "/v1/person/{personId}"}}
```

b. If the Patient Record is not linked to a Person, and the presenting patient has a strong identifier, the Edge System should search for a matching Person using the strong identifier (Step 2).

2. The Edge System queries CommonWell for the Person Record using a strong identifier. This is supported using a HTTP GET request with the appropriate query string parameters identifying the strong identifier value (key) and assigning system.

```
GET /v1/person?key={key}&system={system}
```

a. If the search is successful, the Edge System may link the Person to the Patient (Step 5).
b. If the query does not return a Person Record, the Edge System may search for Person Records based on the demographic data in the Patient Record (Step 3).

3. The Edge System queries CommonWell for a matching Person Record based on the demographic data in the Patient Record. This is supported using an HTTP GET request rooted in the patient CommonWell URI.

```
GET /v1/org/{orgId}/patient/{patientId}/person
```

Note that this URI is provided in the link relation named “personMatch” in the Patient resource representation returned in Step 1.

a. If the query returns a matching Person Record, the Edge System should link the Person to the Patient Record (Step 5).
b. If there is no matching Person Record, the Edge System should create a new Person Record (Step 4).

4. The Edge System creates a new Person Record.

```
POST https://.../v1/person

{
   "details": {
      "address": [{
         "zip": "60610",
         "state":  "Il",
         "line": ["511 Oswego St"],
         "city": "Chicago"}],
      "name": [{
         "given": ["Frank"],
         "family": ["Nolan"]}],
      "gender": {
         "code": "M"},
      "birthDate": "1945-09-24",
      "identifier": [{
         "key": "12345ABCD",
         "system": "urn:oid:2.16.840.1.113883.4.3.17",
         "period": {
            "start": "2011-06-08"}}]
}}
```

5. Once the Person Record has been discovered via search or created, the Edge System will link the Patient to the Person by creating a new “PatientLink” resource.

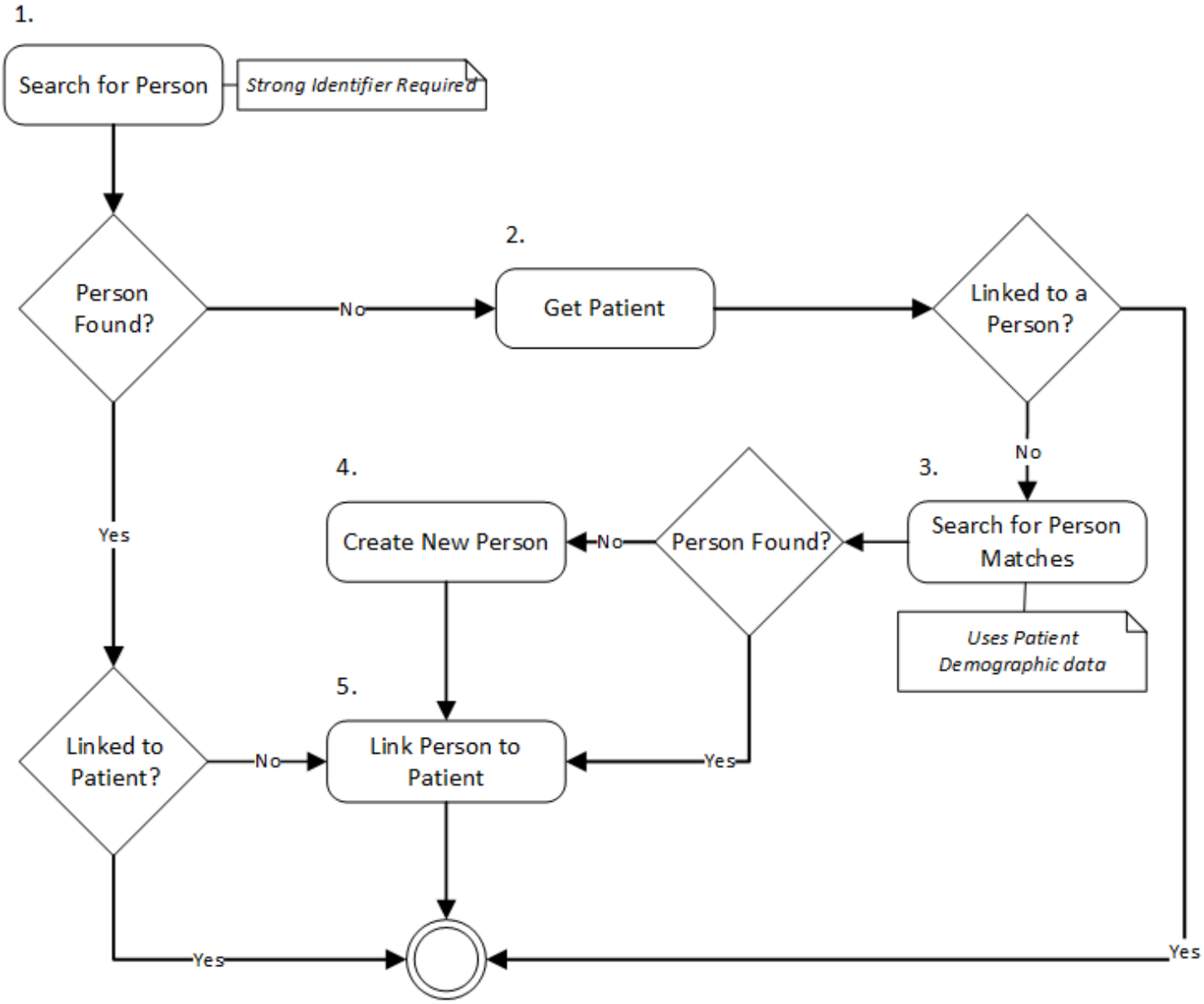
```
POST https://.../v1/person/c21cc31d-6c57-442b-8e76-5de498903334/patientLink

{
   "patient": "https://.../v1/org/2.16.840.1.113883.4.3.17/patient/9876%5E%5E%5E%262.16.840.1.113883.3.4%26ISO",
   "identifier": {
      "key": "Z1234567"},
      "period": {
         "start": "2010-09-12"}},
      "system": "urn:oid:2.16.840.1.113883.4.3.17"}
}}
```

A.3 Patient Identifier Known – Starting with Person Search

As an alternative to the primary workflow above, the diagram below illustrates a variation wherein the workflow begins with a Person search based on strong identifier.

Person Enrollment Activity – Alternative



1. An Enrollment workflow may begin with a Person search based on a strong identifier. This is supported using a HTTP GET operation with the appropriate query string parameters identifying the strong identifier value (key) and assigning system.

```
GET /v1/person?key={key}&system={system}
```

a. If the search is successful, the Edge System may examine the Patient Links in the returned Person resource to learn whether or not the Person is linked to the Patient.

```
GET /v1/person/{personId}/patientLink
```

I. If the subject Patient Record is included in the list of Patient Links, the workflow is completed.

II. If the Patient is not linked to the Person, the Edge System must link the Person to the Patient (see Step 5 below).

b. If no Person Record is found, the Edge System should acquire the Patient Record from CommonWell.

2. The Edge System gets the Patient resource using the known Patient Identifier.

```
GET /v1/org/{orgId}/patient/{patientId}
```

The Edge System should evaluate the link relations included in the returned Patient resource to determine the next step in the workflow.

a. If a "Person" link relation is included, this indicates the state of the Patient is "linked to a Person," and this completes the workflow.

```
"person": {"href": "/v1/person/{personId}"}}
```

b. If, instead, a "personMatch" link relation is included, this indicates the state of Patient is "not linked to a Person." The Edge System should dereference the associated hyperlink to execute a search for Person Records matching the patient demographics.

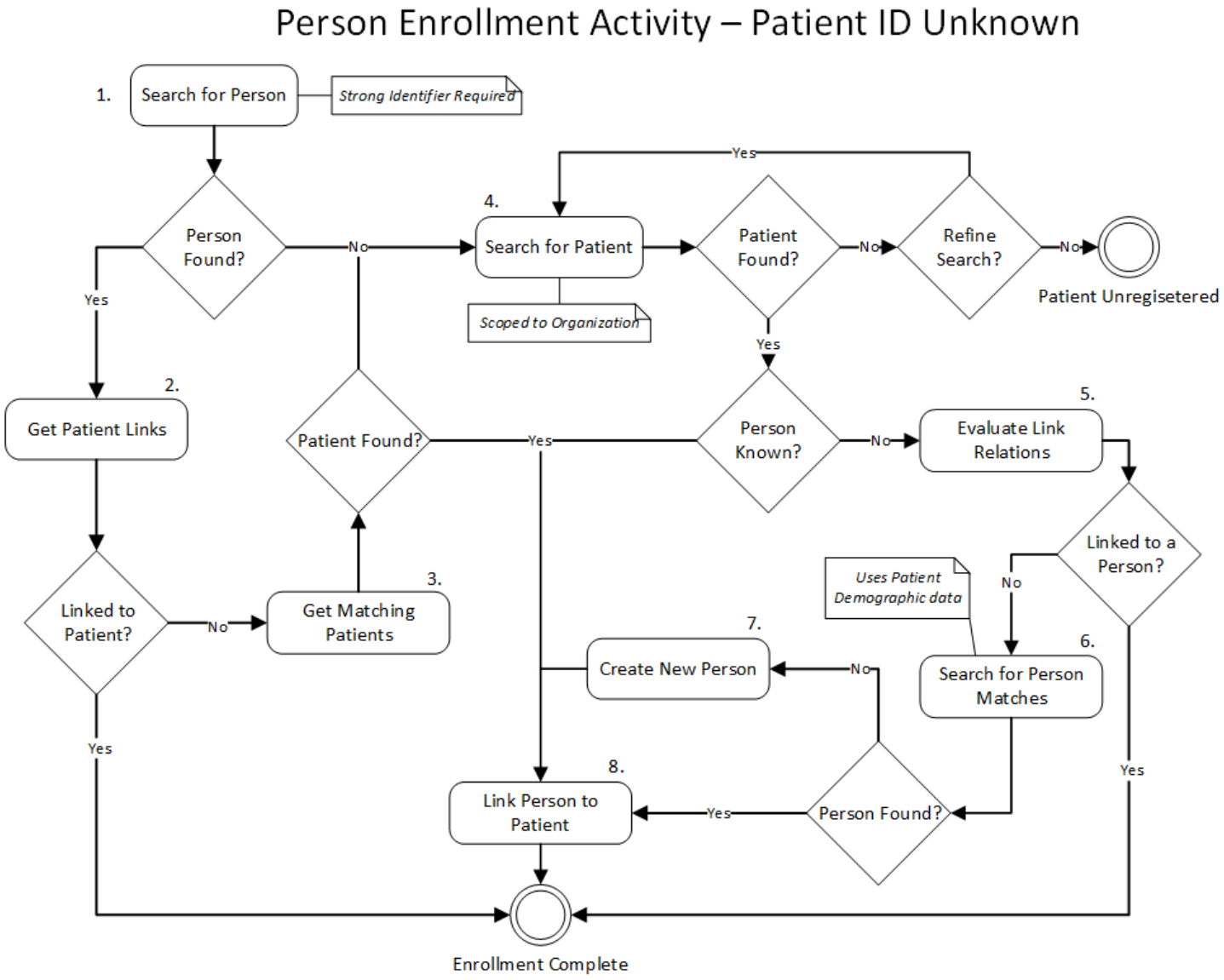
```
"personMatch": {"href": "/v1/org/{orgId}/patient/{patientId}/person"}}
```

Because link relations indicate the available state transitions for a given resource, the "person" and "personMatch" link relations will NEVER appear together in the same Patient resource representation.

3. As described in Step b above, the Edge System dereferences the "personMatch" link to query CommonWell for Person Records that match the specified Patient Record demographics.
   a. If CommonWell returns a matching Person Record, the Edge System should link the Person to the Patient Record (Step 5).
   b. If the query returns no matching Person Record, the Edge System should add a new Person Record (Step 4).
4. The Edge System creates a new Person Record.
5. The Edge System links the Person to the Patient.

A.4 Patient Identifier Unknown

When the Edge System does NOT have access to the local Patient Identifier, the workflow includes a mechanism for locating the Patient Record using demographic search. This may apply to a third-party application acting on behalf of any number of CommonWell organizations such as the Person Enrollment web application.



1. If the presenting patient has a strong identifier, the workflow may begin with a Person search based on that strong identifier. This is supported using a HTTP GET operation with the appropriate query string parameters identifying the strong identifier value and assigning system.

```
GET /v1/person?key={key}&system={system}
```

   a. If the search is successful, the Edge System may examine the Patient Links in the returned Person resource to learn whether or not the Person is linked to the Patient (Step 2).
   b. If the Person search returns no results, the Edge System may use the Patient API to search for the Patient (Step 4).
2. The Edge System requests the Patient Links associated with the returned Person.

```
GET /v1/person/{personId}/patientLink
```

a. If the subject Patient Record is included in the list of Patient Links, the workflow is completed.
b. If the subject Patient Record is not linked to the Person, the Edge System must find the local Patient (Step 3).

3. The Edge System requests a list of local Patient Records matching the Person.

```
GET /v1/person/{personId}/patientMatch?orgId={orgId}
```

a. If the search is successful, users of the Edge System should examine the returned Patients to locate the Patient Record representing the presenting patient. If the Patient Record is located in the list of match results, the Edge System can link the Person to the found Patient Record (Step 7).
b. If no matching Patient Records are located, the Edge System may search for the local Patient Records using the Patient search API (Step 4).

4. The SEdge ystem searches for the Patient Record using the Patient search API. This is supported using an HTTP GET operation with the required first name, last name and date of birth input parameters submitted as query string parameters.

```
GET /v1/org/{orgId}/patient?fname={fname}k&lname={lname}&DoB={DoB}
```

a. If no patient matches are returned, the Edge System can refine its search criteria or determine that the Patient Record has not been registered with CommonWell. If the latter, this represents an unsuccessful end to the workflow.
b. If the Patient Record is found, the Edge System proceeds based on the current state of the workflow.
    i. If the patient search was entered after finding a Person by strong ID, followed by a failure to get a matching Patient Record (from Step 3), the Edge System may link the located Patient Record to the known Person (Step 8).
    ii. If the patient search was entered after a failed Person search by strong ID (from Step 1), the Edge System should examine the link relations included in the Patient resource to determine the next step in the workflow (Step 5).

5. The Edge System examines the link relations included in the found Patient Record to determine the next step in the workflow.
a. If a “Person” link relation is included, this indicates the state of the Patient is “linked to a Person,” and this completes the workflow.

```
"person": {"href": "/v1/person/{personId}"}}
```

b. If instead a “personMatch” link relation is included, this indicates the state of Patient is “not linked to a Person.” The Edge System should dereference the associated hyperlink to execute a search for Person Records matching the patient demographics.

```
"personMatch": {"href": "/v1/org/{orgId}/patient/{patientId}/person"}}
```

Because link relations indicate the available state transitions for a given resource, the “person” and “personMatch” link relations will NEVER appear together in the same Patient resource representation.

6. As described in Step b above, the Edge System dereferences the “personMatch” link to query CommonWell for Person Records that match the specified Patient Record demographics.
    a. If CommonWell returns a matching Person Record, the Edge System should link the Person to the Patient Record (Step 8).
    b. If the query returns no matching Person Record, the Edge System should add a new Person Record (Step 7).
7. The Edge System creates a new Person Record.
8. The Edge System links the Person to the Patient.

Appendix B PIX v2 to Patient Resource Data Mapping

The following table provides a mapping of HL7 2.5/2.6 segments to their Patient resource equivalent.

PIX V2	Patient Resource	Comments
	patient.active	
Not mapped	patient.identifier.use	Infer based on the type code and assigning authority
PID-2.5	patient.identifier.label	
PID-2.4	patient.identifier.system	
PID-2.1	patient.identifier.key	
PID-2.7	patient.identifier.period.start	
PID-2.8	patient.identifier.period.end	
Not mapped	patient.identifier.assigner	
Not mapped	patient.details.identifier.use	Infer based on the type code
PID-3.5	patient.details.identifier.label	
PID-3.4, PID-20.2	patient.details.identifier.system	
PID-3.1,PID-20.1	patient.details.identifier.key	PID 20 DL
PID-3.7	patient.details.identifier.period.start	
PID-3.8, PID-20.3	patient.details.identifier.period.end	
Not mapped	patient.details.identifier.name.use	
Not mapped	patient.details.identifier.name.text	Full name
PID-5.1	patient.details.identifier.name.family	
PID-5.2	patient.details.identifier.name.given	
PID-5.5	patient.details.identifier.name.prefix	
PID-5.4	patient.details.identifier.name.suffix	

PIX V2	Patient Resource	Comments
PID-5.12	patient.details.identifier.period.start	
PID-5.13	patient.details.identifier.period.end	
Not mapped	patient.details.telecom.system	Not critical for identity match
PID-13.1, PID 14	patient.details.telecom.value	
PID-13.2, PID 14	patient.details.telecom.use	
	patient.details.telecom.period.start	
	patient.details.telecom.period.end	
Not mapped	patient.details.gender.system	Not critical for identity match
PID-8	patient.details.gender.code	
PID-8	patient.details.gender.display	
PID-7	patient.details.birthDate	
PID-11.7	patient.details.address.use	
PID-11.1,11.2	patient.details.address.line[]	
PID-11.3	patient.details.address.city	
PID-11.4	patient.details.address.state	
PID-11.5	patient.details.address.zip	
PID-11.6	patient.details.address.country	
PID-16-3	patient.details.maritialStatus.coding.system	
PID-16-1	patient.details.maritialStatus.coding.code	
PID-16-2	patient.details.maritialStatus.coding.display	
PID-16-1	patient.details.maritialStatus.text	
Not mapped	patient.details.maritialStatus.primary	Not critical for identity match
Visit information		

PIX V2	Patient Resource	Comments
Pv2-3,pv2-4	visit.type.coding	We could use it if we have all the values, otherwise, we will just update the text field with combined information.
	visit.type.coding.system	
	visit.type.coding.code	
	visit.type.coding.display	
Pv1-3 + Pv1-4, pv2-12	visit.type.text	
	visit.type.primary	
PV1.44/45	visit.date.start	
	visit.date.end	

Appendix C Terminology Bindings

The table below contains the terminology bindings used in this specification. For a full list of the FHIR terminology bindings, see http://www.hl7.org/implement/standards/fhir/terminologies-bindings.htm.

Name	Definition	Type	Reference
AddressUse	The use of an address	Code List	http://hl7.org/fhir/address-use
AdministrativeGender	The gender of a person used for administrative purposes	Value Set	http://hl7.org/fhir/vs/administrative-gender
ContactSystem	What kind of contact this is	Code List	http://hl7.org/fhir/contact-system
ContactUse	How to use this address	Code List	http://hl7.org/fhir/contact-use
VisitClass	Classification of the visit	Code List	http://hl7.org/fhir/visit-class
IdentifierUse	Identifies the use for this identifier, if known	Code List	http://www.hl7.org/fhir/identifier-use
MimeType	The mime type of an attachment	Reference	BCP 13 (RFCs 2045, 2046, 2047, 4288, 4289 and 2049) (http://www.rfc-editor.org/bcp/bcp13.txt)
NameUse	The use of a human name	Code List	http://hl7.org/fhir/name-use
PractitionerRole	The role a person plays representing an organization	Value Set	http://hl7.org/fhir/vs/practitioner-role

The associated value sets and code lists are detailed in the following sections.

C.1 Address Use Codes

The use of an address. This value set defines its own terms in the system http://hl7.org/fhir/address-use.

Code	Display	Definition
home		A communication address at a home.
work		An office address. First choice for business-related contacts during business hours.

Code	Display	Definition
temp		A temporary address. The period can provide more detailed information.
old		This address is no longer in use (or was never correct, but retained for records).

C.2 Administrative Gender Codes

This value set defines the set of codes that can be used to indicate the administrative gender of a person.

Code	Display	Definition
F	Female	Female
M	Male	Male
UN	Undifferentiated	The gender of a person could not be uniquely defined as male or female, such as hermaphrodite.

C.3 Contact System Codes

Describes the kind of contact. This value set defines its own terms in the system http://hl7.org/fhir/contact-system.

Code	Display	Definition
phone		The value is a telephone number used for voice calls. Use of full international numbers starting with + is recommended to enable automatic dialing support but not required.
fax		The value is a fax machine. Use of full international numbers starting with + is recommended to enable automatic dialing support but not required.
email		The value is an email address.
url		The value is a url. This is intended for various personal contacts including blogs, Twitter, Facebook, etc. Do not use for email addresses.

C.4 Contact Use Codes

How to use this address. This value set defines its own terms in the system http://hl7.org/fhir/contact-use.

Code	Display	Definition
home		A communication contact at a home; attempted contacts for business purposes might intrude privacy and chances are one will contact family or other household members instead of the person

Code	Display	Definition
		one wishes to call. Typically used with urgent cases, or if no other contacts are available.
work		An office contact. First choice for business-related contacts during business hours.
temp		A temporary contact. The period can provide more detailed information.
old		This contact is no longer in use (or was never correct, but retained for records).
mobile		A telecommunication device that moves and stays with its owner. May have characteristics of all other use codes, suitable for urgent matters, not the first choice for routine business.
home		A communication contact at a home; attempted contacts for business purposes might intrude privacy and chances are one will contact family or other household members instead of the person one wishes to call. Typically used with urgent cases, or if no other contacts are available.

C.5 Practitioner Role Codes

This example value set defines a set of codes that can be used to indicate the role of a Practitioner. This value set defines its own terms in the system http://hl7.org/fhir/practitioner-role.

Code	Display	Definition
doctor		
nurse		
pharmacist		
researcher		
teacher	Teacher/educator	
ict	ICT professional	

C.6 Patient Role and Purpose of Use Codes

The only accepted patient role code is 116154003. This value is defined in the HITSP Clinical Document and Message Terminology Component (HITSP C80) version 2.0 found at http://www.hitsp.org/ConstructSet_Details.aspx?&PrefixAlpha=4&PrefixNumeric=80). The accepted code is defined in Table 2-155 Author Role Value Set Definition.

The expected Purpose Of Use Code for all patient initiated transactions is REQUEST to represent a request of an individual based on NHIN 3.0.1 standards.

C.7 Visit Class Code

Classification of the encounter. This value set defines its own terms in the system http://hl7.org/fhir/visit-class.

Code	Display	Definition
inpatient		A patient that stays overnight.
outpatient		
ambulatory		
emergency		
home		
field		
acute		
non-acute		
daytime		
virtual		

C.8 Identifier Use Codes

Identifies the use for an identifier, if known. This value set defines its own terms in the system http://hl7.org/fhir/identifier-use.

Code	Display	Definition
usual		The identifier recommended for display and use in real-world interactions.
official		The identifier considered to be most trusted for the identification of this item.
temp		A temporary identifier.

C.9 Name Use Codes

The value set definition for use of a human name. This value set defines its own terms in the system http://hl7.org/fhir/vs/name-use.

Code	Display	Definition
usual		Known as/conventional/the one you normally use.
official		The formal name as registered in an official (government) registry, but which name might not be commonly used. May be called "legal name."
temp		A temporary name. A name valid time can provide more detailed information. This may also be used for temporary names assigned at birth or in emergency situations.
nickname		A name that is used to address the person in an informal manner, but is not part of their formal or usual name.
anonymous		Anonymous assigned name, alias, or pseudonym (used to protect a person's identity for privacy reasons).
old		This name is no longer in use (or was never correct, but retained for records).
maiden		A name used prior to marriage. Marriage naming customs vary greatly around the world. This name use is for use by applications that collect and store "maiden" names. Though the concept of maiden name is often gender specific, the use of this term is not gender specific. The use of this term does not imply any particular history for a person's name, nor should the maiden name be determined algorithmically.

Appendix D Upload of Historical Patient Identity Data

This appendix describes the requirements for providing an initiating feed of patient historical data to the CommonWell service. As described in the main body of this specification, CommonWell provides two primary interfaces for managing Patient Identity data: 1) HL7 V2.x ADT; and 2) a REST-based service.

For each type of interface, CommonWell will provide a dedicated endpoint for this type of data feed.

D.1 PIX Historical Feed

When delivering a history of patient data to the CommonWell PIX service, the sending system should provide this data in the form of an ADT A08 message. This should also include available encounter information.

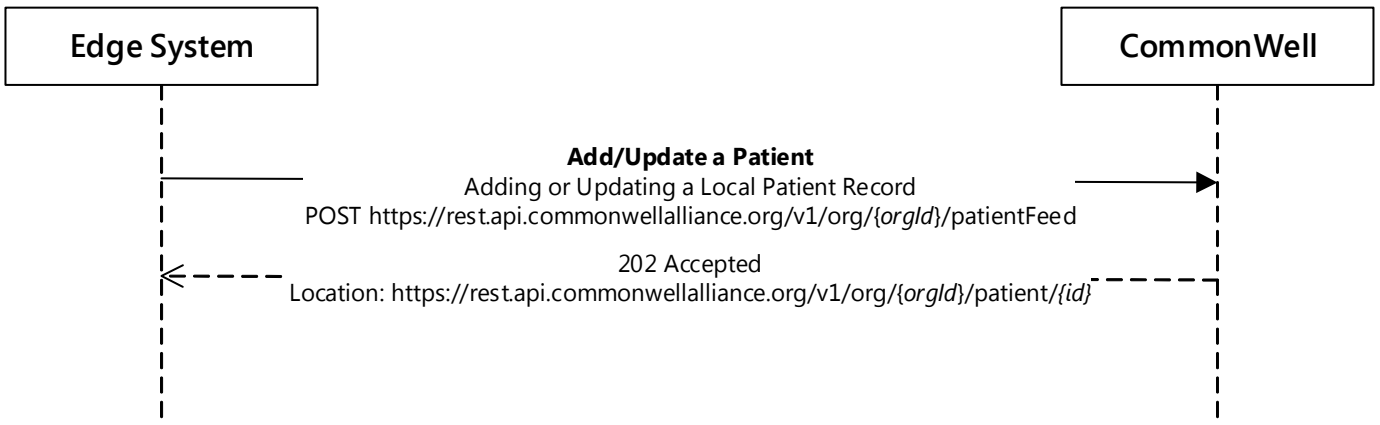
Sample Message

```
MSH|^~\&|Resonance^2.16.840.1.113883.3.13.3.3^ISO|Cli_Facility|CW_App|CW_Facility|201307080944||ADT^A08|5616|D|2
.5
EVN|A08|201202150937
PID|1||4933^^^&1.3.6.1.4.1.29928&ISO||Nolan^Frank||19450924|M|||8123 Hawthorne
Ave^^Chicago^IL^60612^US^P^042||(708)555-1234|(312)555-3456|E^ENGLISH^CLAN
PD1||||15014^Geiger^Jeffrey
PV1||O|128
~355~C~PMA^^^^^^^^^^|||15014^Geiger^Geoffrey^^^^||||||||||||201202178|||||||||||||||||||||||||201202150937||||||
1233443234
```

The CommonWell server will perform basic data validation (see Section 9.2 Message Constraints). If no errors are found, CommonWell will commit the message to safe storage and return an accept acknowledgment to the sending Edge System. This acknowledgement releases the sending Edge System from the need to resend the message.

The endpoint for the PIX Historical Feed will be different from the one used for ongoing Patient administration events. The dedicated historical feed endpoint will only accept A08 messages and will operate exclusively in PIX Enhanced mode.

D.2 REST-based Historical Feed



POST https://rest.api.commonwellalliance.org/v1/org/{*orgId*}/patientFeed

The URL template for adding patient historical data includes the Organization identifier. This identifies the Patient Identity Domain owned by the Organization represented by the Edge System.

The body of the post message is a Patient resource. In order for the patient data to be indexed in the CommonWell service, the following parameters are required.

Required Parameters

- identifier
  - key
  - system
- patient
  - details
    - name
      - family
      - given
    - birthDate
    - gender
      - code
    - address
      - zip

Sample Request

```
POST https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patientFeed HTTP/1.1
Content-Type: application/json
Host: rest.api.commonwellalliance.org
Content-Length: 363

{
   "identifier": [{
      "use": "internal",
      "label": "Oswego MRN",
      "key": "9876",
      "system": "urn:oid:2.16.840.1.113883.3.4",
      "assigner": "Oswego Health System"}],
   "details": {
      "name": [{
         "family": ["Nolan"],
         "given": ["Frank"],
         "use": "usual"}],
      "address": [{
         "line": ["511 Oswego St"],
         "city": "Chicago",
         "state":  "Il",
         "zip": "60610"}],
      "birthDate": "1945-09-24",
      "gender": {
         "code": "M"},
      "telecom": [{
         "system": "phone",
         "use": "home",
         "value": "(708) 555 6473"}]
   }
}
```

If any of the required fields are missing, the service returns an HTTP 400 (Bad Request) response code. This will also include an error resource detailing the reason the request was rejected.

Sample Error Response

```
HTTP/1.1 400 Bad Request
Content-Length: 67
Content-Type: application/json; charset=UTF-8
Date: Wed, 06 Feb 2013 20:54:59 GMT

{
   "message": "The patient resource was missing a required date of birth value.",
   "code": XXXX,
   "help": {"href": "http://rest.api.commonwellalliance.org/help/#patient"}
}
```

If the message is accepted for processing, the response from the CommonWell service will include an HTTP Location header for the URL of the resulting Patient resource. This will be based on the Patient Identifier value and the namespace provided in the posted Patient resource.

Sample Response

```
HTTP/1.1 202 Accepted
Location:
https://rest.api.commonwellalliance.org/v1/org/2.16.840.1.113883.3.4/patient/9876%5E%5E%5E2.16.840.1.113883.3.4/
Date: Wed, 06 Feb 2013 20:54:44 GMT
```

The endpoint for the REST Historical Feed will be different from the one used for ongoing Patient administration events.

Appendix E CommonWell Document Metadata

This documents the proposed set of coding systems and values to be used for document metadata by systems participating in CommonWell.

The set of document metadata attributes is documented by IHE in the IHE Technical Framework Volume 3 (http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol3.pdf) (IHE ITI TF-3:4 and, in particular, see Table 4.2.3.2-1: DocumentEntry Metadata Attribute Definition).

The table below shows those document metadata elements of Data Type Code, plus mimeType, as these are the properties that communities must define.

In selecting the proposed set of coding systems and values for each of the metadata elements, the following sources were considered:

- IHE Patient Care Coordination Technical Framework, Volume 2 (http://www.ihe.net/uploadedFiles/Documents/PCC/IHE_PCC_TF_Vol2.pdf) (see 5.1.1 Format Codes)
- HealtheWay NHIN Document Submission Production Web Service Interface Specification v 2.0 (http://healthewayinc.org/images/Content/Documents/specs/2011/nhin-document-submission-production-specification-v2-0-a.pdf)
- HITSP Clinical Document and Message Terminology Component, HITSP/C80 (http://www.hitsp.org/Handlers/HitspFileServer.aspx?FileGuid=886331bd-2eba-4ded-a1ed-24b35ecebb62) (see 2.2.3.15 DOCUMENT METADATA)
- IHE Connectathon Codes (http://ihexds.nist.gov:12080/xdsref/codes/codes.xml)
- Classifying Documents in XDS (http://motorcycleguy.blogspot.com/2013/05/classifying-documents-in-xds.html)
- What is the purpose of XDS Format Code (http://motorcycleguy.blogspot.com/2013/12/what-is-purpose-of-xds-formatcode.html)
- MIME Types (http://en.wikipedia.org/wiki/Internet_media_type)
- IHE Radiology Technical Framework, Volume 2 (http://www.ihe.net/uploadedFiles/Documents/Radiology/IHE_RAD_TF_Vol3.pdf) (RAD TF-3: 4.68 Provide and Register Imaging Document Set – MTOM/XOP)

In proposing coding systems, the use of existing, standards-based, HITSP- and IHE-documented coding systems are used.

CommonWellDocumentMetadataCodes.xml (located under Documents on the CommonWell Developers site, which is a private extranet for CommonWell members) contains entries for the values documented for all of the coded metadata properties and is the official, versioned, list of value sets.

E.1 classCode

This code specifies the high-level use classification of the document; contrast with typeCode which species the precise document type from the user perspective.

Coding System: 2.16.840.1.113883.6.1

Values: A CommonWell-selected set of LOINC codes based upon the set as specified by HITSP/C80 Table 2-144 Document Class Value Set Definition.

Example:

```
<Classification id="cl02"
   classificationScheme="urn:uuid:41a5887f-8865-4c09-adf7-e362475b143a"
   classifiedObject="theDocument"
   nodeRepresentation="34133-9">
   <Slot name="codingScheme">
      <ValueList>
         <Value>2.16.840.1.113883.6.1</Value>
      </ValueList>
   </Slot>
   <Name>
      <LocalizedString value="Summarization of episode note"/>
   </Name>
</Classification>
```

There are newer proposals for classCode with some growing momentum to use a more simple list, for example:

- Report
- Summary
- Images
- Prescribed Treatment
- Dispensations
- Treatment Plan or Protocol
- Health Certificates and Notifications
- Patient Expression and Preferences
- Workflow Management

However, there is no currently accepted, standards-based coding system and set of codes for this list. This, coupled with the current HealtheWay (NwHIN) specification that refers to HITSP, are reason to stay with the HITSP-recommended set.

For the exchange of radiology reports, the value 47045-0 ('Study report') should be used.

Value List:

From HITSP/C80 Table 2-144 Document Class Value Set Definition.

See classCode concept list in CommonWellDocumentMetadataCodes (located under Documents on the CommonWell Developers site, which is a private extranet for CommonWell members).

E.2 confidentialityCode

The code specifying the level of confidentiality of the Document.

Coding System: 2.16.840.1.113883.5.25

Values: A CommonWell-selected set of HL7 V3 Confidentiality codes based upon the set as specified by HITSP/C80 Table 2-151 Confidentiality Value Set Reference Listing.

Example:

```
<Classification id="cl03"
   classificationScheme="urn:uuid:f4f85eac-e6cb-4883-b524-f2705394840f"
   classifiedObject="theDocument"
   nodeRepresentation="N">
   <Slot name="codingScheme">
      <ValueList>
         <Value>2.16.840.1.113883.5.25</Value>
      </ValueList>
   </Slot>
   <Name>
      <LocalizedString value="Normal"/>
   </Name>
</Classification>
```

Value List:

From HITSP/C80 Table 2 151 Confidentiality Value Set Reference Listing.

See confidentialityCode concept list in CommonWellDocumentMetadataCodes (located under Documents on the CommonWell Developers site, which is a private extranet for CommonWell members).

E.3 eventCodeList

This list of codes represents the main clinical acts. It is also used in conjunction with the BPPC Profile to populate the set if Patient Privacy Identifiers that have been acknowledged within a document.

For the exchange of radiology reports, a value for each aquisition modality, shall be included. Modality values are drawn from DICOM Content Mapping Resource (DICOM PS3.16) Context Group CID 29; the schema shall be 'DCM'.

For the exchange of radiology reports, a value for each body part imaged should be included. Anatomic region values should be drawn from DICOM Content Mapping Resource (DICOM PS3.16) Context Group CID 4 (and referenced context groups). Additionally, values for body parts examined may be include, drawn from DICOM Content Mapping Resource (DICOM PS3.16) Appendix L. For both sets of values the schema shall be 'DCM'.

No additional recommendations are made at this time.

E.4 formatCode

This is the code specifying the format of the document. Along with the typeCode, it should provide sufficient information to allow any potential document consumer to know if it will be able to process the document. The code shall be sufficiently specific to ensure processing/display by identifying a document encoding, structure and template

Coding System: 1.3.6.1.4.1.19376.1.2.3

Values: A CommonWell-selected set of codes based upon the set as specified by HITSP/C80 Table 2-153 Format Code Value Set Definition. This table includes the IHE PCC-defined values, plus additional values for NwHIN.

IHE Radiology-defined values are used to identify radiology reports.

For documents based upon the Consolidated CDA (CCDA) specification, see formatCode concept list in CommonWellDocumentMetadataCodes (located under Documents on the CommonWell Developers site, which is a private extranet for CommonWell members).

Example:

```
<Classification id="cl04"
   classificationScheme="urn:uuid:a09d5840-386c-46f2-b5ad-9c3699a4309d"
   classifiedObject="theDocument"
   nodeRepresentation="urn:ihe:pcc:xds-ms:2007">
   <Slot name="codingScheme">
      <ValueList>
         <Value>1.3.6.1.4.1.19376.1.2.3</Value>
      </ValueList>
   </Slot>
   <Name>
      <LocalizedString value="XDS Medical Summaries"/>
   </Name>
</Classification>
```

Or, equivalently (because the HITSP C80 and the IHE PCC Framework are not in complete alignment on display names):

```
<Classification id="cl04"
   classificationScheme="urn:uuid:a09d5840-386c-46f2-b5ad-9c3699a4309d"
   classifiedObject="theDocument"
   nodeRepresentation="urn:ihe:pcc:xds-ms:2007">
   <Slot name="codingScheme">
      <ValueList>
         <Value>1.3.6.1.4.1.19376.1.2.3</Value>
      </ValueList>
   </Slot>
   <Name>
      <LocalizedString value="Medical Summaries (XDSMS)"/>
   </Name>
</Classification>
```

Radiology reports shall either use the XDS-I CDA-Wrapped Text Report format code, or the XDS-I PDF format code, as shown below. For XDS-I CDA-Wrapped Text Report:

```
<Classification id="cl04"
   classificationScheme="urn:uuid:a09d5840-386c-46f2-b5ad-9c3699a4309d"
   classifiedObject="theDocument"
   nodeRepresentation="urn:ihe:rad:TEXT">
   <Slot name="codingScheme">
      <ValueList>
         <Value>1.3.6.1.4.1.19376.1.2.3</Value>
      </ValueList>
   </Slot>
   <Name>
      <LocalizedString value="CDA-Wrapped Text Report (XDS-I)"/>
   </Name>
</Classification>
```

For XDS-I PDF reports:

```
<Classification id="cl04"
   classificationScheme="urn:uuid:a09d5840-386c-46f2-b5ad-9c3699a4309d"
   classifiedObject="theDocument"
   nodeRepresentation="urn:ihe:rad:PDF">
   <Slot name="codingScheme">
      <ValueList>
         <Value>1.3.6.1.4.1.19376.1.2.3</Value>
      </ValueList>
   </Slot>
   <Name>
      <LocalizedString value="PDF Report"/>
   </Name>
</Classification>
```

Value List:

From HITSP/C80 Table 2 153 Format Code Value Set Definition, with additions for CCDA and IHE Radiology-defined formats.

See formatCode concept list in CommonWellDocumentMetadataCodes (located under Documents on the CommonWell Developers site, which is a private extranet for CommonWell members).

E.5 healthcareFacilityTypeCode

This is the code representing the type of organizational setting where the clinical encounter, service, interaction, or treatment occurred.

Coding System: 2.16.840.1.113883.6.96

Values: A CommonWell-selected set of SNOMED codes based upon the set as specified by HITSP/C80 Table 2-146 Healthcare Facility Type Value Set.

Example:

```
<Classification id="cl05"
   classificationScheme="urn:uuid:f33fb8ac-18af-42cc-ae0e-ed0b0bdb91e1"
   classifiedObject="theDocument"
   nodeRepresentation="11424001">
   <Slot name="codingScheme">
      <ValueList>
         <Value>2.16.840.1.113883.6.96</Value>
      </ValueList>
   </Slot>
   <Name>
      <LocalizedString value="Ambulance-based care"/>
   </Name>
</Classification>
```

Value List:

From HITSP/C80 Table 2 147 Healthcare Facility Type Value Set

See healthcareFacilityTypeCode concept list in CommonWellDocumentMetadataCodes (located under Documents on the CommonWell Developers site, which is a private extranet for CommonWell members).

E.6 practiceSettingCode

The code specifying the clinical specialty where the act that resulted in the document was performed

(e.g., Family Practice, Laboratory, Radiology). HISTP/C80 defines this as a set of SNOMED CT concepts of clinical specialty values.

Coding System: 2.16.840.1.113883.6.96

Values: A CommonWell-selected set of SNOMED CT codes based upon the set as specified by HITSP/C80 Table 2-148 Cinical Specialty Value Set.

Example:

```
<Classification id="cl06"
   classificationScheme="urn:uuid:cccf5598-8b07-4b77-a05e-ae952c785ead"
   classifiedObject="theDocument" nodeRepresentation="394814009">
   <Slot name="codingScheme">
      <ValueList>
         <Value>2.16.840.1.113883.6.96</Value>
      </ValueList>
   </Slot>
   <Name>
      <LocalizedString value="General practice"/>
   </Name>
</Classification>
```

Value List:

From HITSP/C80 Table 2 149 Clinical Specialty Value Set Definition

See practiceSettingCode concept list in CommonWellDocumentMetadataCodes (located under Documents on the CommonWell Developers site, which is a private extranet for CommonWell members).

E.7 typeCode

This code specifies the precise type of document from the user perspective. Whereas the classCode. HITSP defines this as the set of classCode entries plus the set of LOINC codes where the SCALE is DOC in the LOINC database.

For radiology reports, the type code should indicate the performed procedure type with which the report is associated, e.g. 35991-9 ('Foot CT').

Coding System: 2.16.840.1.113883.6.1

Values: A CommonWell-selected set of LOINC codes based upon the set as specified by HITSP/C80.

Example:

```
<Classification id="cl02"
   classificationScheme="urn:uuid:f0306f51-975f-434e-a61c-c59651d33983"
   classifiedObject="theDocument"
   nodeRepresentation="34133-9">
   <Slot name="codingScheme">
      <ValueList>
         <Value>2.16.840.1.113883.6.1</Value>
      </ValueList>
```

```
   </Slot>
   <Name>
      <LocalizedString value="Summarization of episode note"/>
   </Name>
</Classification>
```

Value List:

From HITSP/C80 Table 2 145 Document Type Value Set.

See typeCode concept list in CommonWellDocumentMetadataCodes (located under Documents on the CommonWell Developers site, which is a private extranet for CommonWell members).

E.8 mimeType

Officially listed in XDS as a data type of MIME type.

IANA maintains the official list.

Coding System: n/a

Values: CommonWell adopts a small subset based primarily upon Connectathon experiences.

Example:

```
<ExtrinsicObject id="theDocument"
   mimeType="text/xml"
   objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1">
```

Value List:

From a list of commonly used and Connectathon-tested values.

See mimeType concept list in CommonWellDocumentMetadataCodes (located under Documents on the CommonWell Developers site, which is a private extranet for CommonWell members).

E.9 title

Identifies the title of the document.

For radiology reports, this attribute should contain the study description.

No additional recommendations are made at this time.

E.10 referenceIdList

This list of codes records various identifiers relevant to the shared document, such as other pertinent documents, or study identifiers.

The data type for each item in the list is CXi, as defined in IHE ITI TF-3: Table 4.2.3.1.7-2, and the specific type of reference indicated in the CXi.5 segment.

Values:

For radiology reports, this element should include the accession number of the associated imaging study. The CXi.5 segment shall be urn:ihe:iti:xds:2013:accession; the CXi.4 segment shall be an OID identifying the accession number issuer; and the CXi.1 segment shall be the accession number value.

No additional recommendations at this time.

Example:

```
<rim:Slot name="urn:ihe:iti:xds:2013:referenceIdList ">
    <rim:ValueList>
        <rim:Value>
            642356235^^^&1.2.3.4.5.6&ISO^urn:ihe:iti:xds:2013:accession
        </rim:Value>
        <rim:Value>
            STN-238432^^^&1.2.3.4&ISO^^urn:ihe:iti:xds:2013:accession
        </rim:Value>
    </rim:ValueList>
</rim:Slot>
```

Appendix F CommonWell Health Alliance Performance Targets and Timeout Settings

The CommonWell Health Alliance has agreed on standard performance targets for the main categories of services currently provided by CommonWell. Additionally, the CHA Broker has set timeouts for the document query and document retrieve functionality for both the Integration and Production environments.

F.1 Performance Targets

Pilot Performance Targets	RelayHealth (CommonWell Service Provider) Targets	CommonWell Member Targets
Non bulk-load PIX and CommonWell REST transactions	99% within 1 second	N/A
CHA Broker document query	99% within 6 seconds	99% within 3 seconds
CHA Broker document retrieve	90% within 10 seconds	90% within 5 seconds

F.2 CHA Broker Timeout Settings for Integration and Production

These timeout settings are subject to change based on member feedback and discussion. The timeout settings listed below are accurate as of this writing.

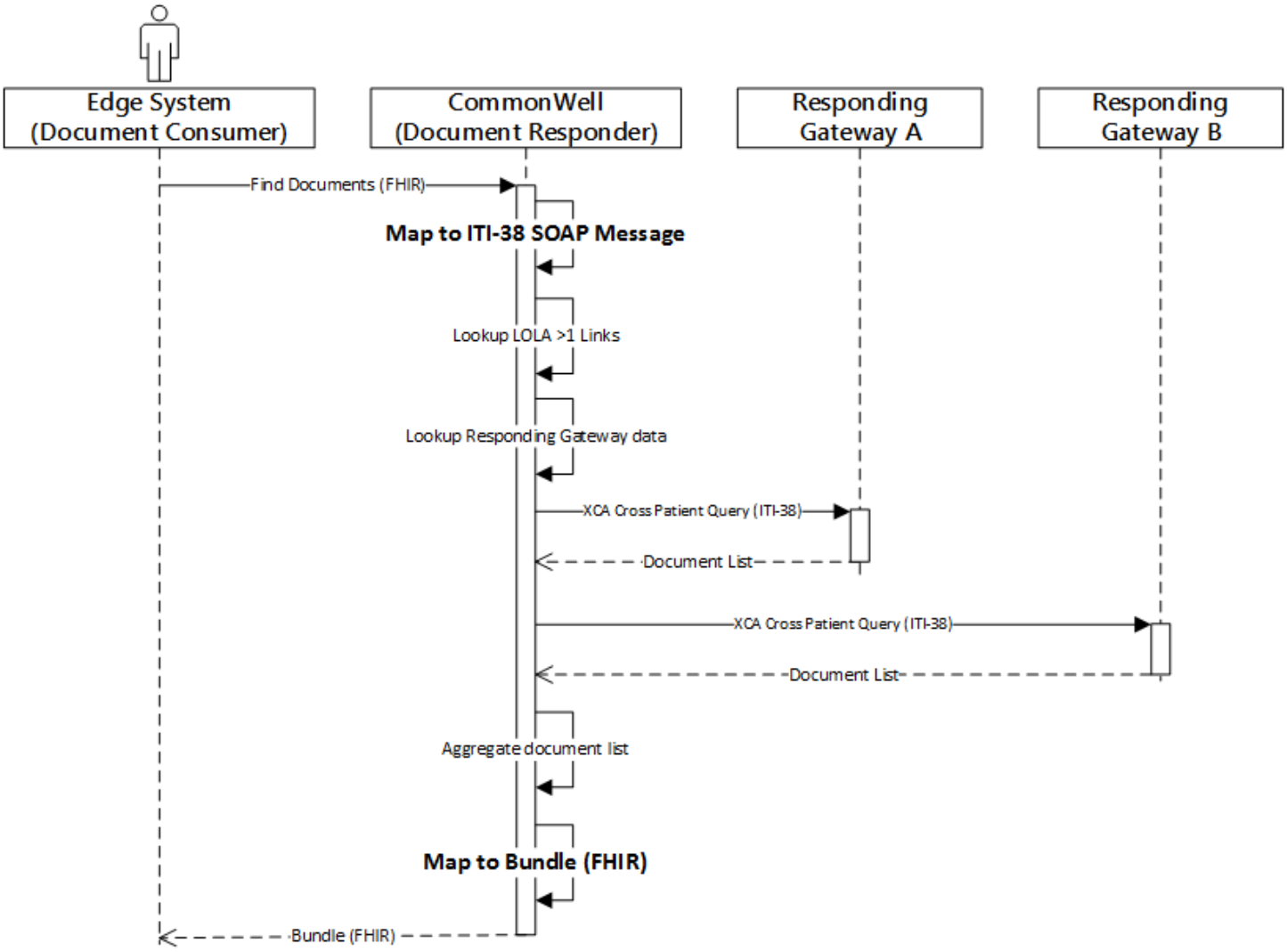
Environment	Document Query Responding Gateway Individual Request Timeout	Document Query Total Timeout	Document Retrieve Timeout
Integration	20 seconds	25 seconds	2 minutes
Production	20 seconds	25 seconds	2 minutes

Appendix G REST-based Document Query and Retrieve

CommonWell incorporates services for bridging REST-based document query and retrieve requests to XDS Responding Gateways. The purpose of the appendix is to describe the technical implementation of the façade service including an overview of the transaction flow and the field-level mappings of the SOAP-based XDS messages and the corresponding DocumentReference resource defined in the HL7 FHIR standard.

G.1 Transaction Flow

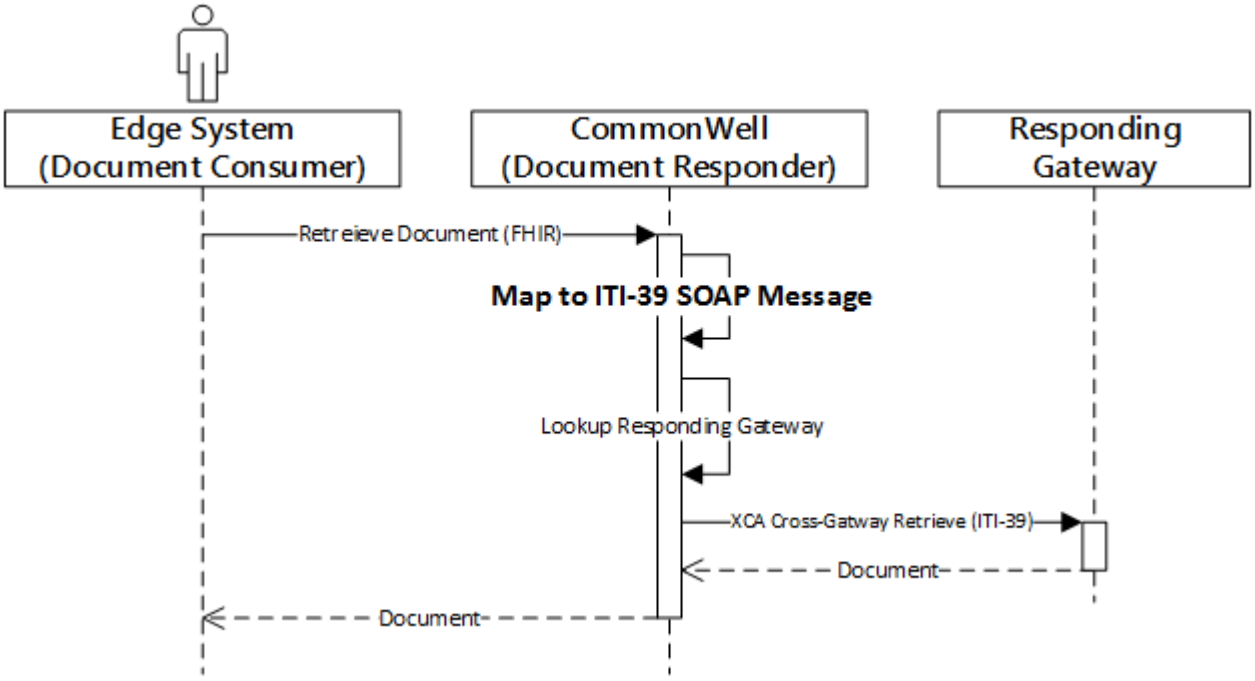
Find Documents



The REST-based *Find Documents* transaction follows the same functional flow as described in section 10.4. The additional data-mapping steps in the transaction are shown in bold in the diagram above: at the top of the transaction, building the ITI-38 SOAP message from the Find Documents query parameters; and at the end of the

transaction, converting the aggregated document list into a *Bundle* resource that is then returned to the Edge System acting as the document consumer.

Rertrieve Document



The REST-based *Retrieve Document* transaction follows the same functional flow as described in section 10.6. The additional data-mapping step, where the GET request is mapped into the corresponding SOAP ITI-39 message is shown in bold in the diagram above.

G.2 Mapping DocumentEntry Classification to FHIR CodeableConcept

Example: DocumentEntry Classification using typeCode

```
<rim:Classification classificationScheme="urn:uuid:f0306f51-975f-434e-a61c-c59651d33983"
classifiedObject="ExampleDocument" nodeRepresentation="34108-1" id="IdExample_053"
objectType="urn:oasis:names:tc:ebxml-
 regrep:ObjectType:RegistryObject:Classification">
           <rim:Name>
                     <rim:LocalizedString value="Outpatient Note"/>
           </rim:Name>
           <rim:Slot name="codingScheme">
                     <rim:ValueList>
                        <rim:Value>urn:oid:2.16.840.1.113883.6.1</rim:Value>
                     </rim:ValueList>
           </rim:Slot>
</rim:Classification>
```

Example: DocumentReference CodeableConcept using type

```
"type": {
   "coding": [
      {
      "system": "http://loinc.org",
```

```
      "code": "34108-1",
      "display": "Outpatient Note"
      }
   ]
}
```

Case 1: Coding System is well known

Coding Systems

System	OID	FHIR URI
LOINC	urn:oid:2.16.840.1.113883.6.1	http://loinc.org
SNOMED	urn:oid:2.16.840.1.113883.6.96	http://snomed.info/sct

Element Mappings

DocumentEntry Classification Path	FHIR CodeableConcept	Notes
rim:Classification@nodeRepresentation	coding.code	
rim:Classification/rim:Name/rim:LocalizedString@value	coding.display	
rim:Classification/rim:Slot[@name="codingScheme"]/rim:ValueList/rim:Value	coding.system	Use translation from Table Coding Systems

Case 2: Coding System is implementation defined, or is NOT well known

If rim:Classification/rim:Name/rim:LocalizedString@value is present and not empty then:

DocumentEntry Classification Path	FHIR CodeableConcept	Notes
rim:Classification/rim:Name/rim:LocalizedString@value	type.text	From example above, type is parent of the coding

If rim:Classification/rim:Name/rim:LocalizedString@value is not present or is empty then:

DocumentEntry Classification Path	FHIR CodeableConcept	Notes
rim:Classification@nodeRepresentation	type.text	From example above, type is parent of the coding

G.3 General Approach for Contained versus Linked Resources

Normally, the FHIR model would contain links to resources, like the author in the DocumentEntry Metadata.

```
<author>
   <reference value="Practitioner/10226"/>
</author>
```

The DocumentEntry metadata received from a Responding Gateway will not have a link, so the Author is returned as a "contained resource." Example:

```
 "contained": [
     {
        "resourceType": "Practitioner",
        "_id": "a1",
        "name": {
           "family": [
              "Dopplemeyer"
           ],
           "given": [
              "Sherry"
           ]
        },
        "telecom": [
           {
              "system": "email",
              "value": "john.doe@healthcare.example.org"
           }
        ],
        "organization": {
           "display": "Cleveland Clinic"
        },
        "role": [
           {
              "text": "Primary Surgeon"
           }
        ],
        "specialty": [
           {
              "text": "Orthopedic"
           }
        ]
     }
  ]
"author": [
 {
   "reference": "#a1"
}
]
```

- The # symbol indicates this is a local reference inside the current document.
- The reference value needs to be unique for the document.
- The reference may be used more than once in a given document.

status-availabilityStatus

FHIR	XDS
`"status": "current"`	`<ExtrinsicObject id="urn:uuid:fbeacdb7-5421-4474-9267-985007cd8855" objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1" status="urn:oasis:names:tc:ebxml-regrep:StatusType:Approved" >`

"urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1" designates XDSDocumentEntry.

FHIR Value	XDS Value
current	urn:oasis:names:tc:ebxml-regrep:StatusType:Approved
superceded	urn:oasis:names:tc:ebxml-regrep:StatusType:Deprecated
entered in error	NO EQUIVALENT VALUE
NO EQUIVALENT VALUE	urn:oasis:names:tc:ebxml-regrep:StatusType:Submitted

confidentiality-confidentialityCode

Follow mapping concepts in G.1 Mapping DocumentEntry Classification to FHIR Codeable Concept.

FHIR

```
"confidentiality": [
  {
     "coding": [
        {
           "system": "SCHEME_VALUE",
           "code": "CODE_VALUE",
           "display": "DISPLAY_VALUE"
        }
     ]
  }
  ]
```

XDS

```
<rim:Classification classificationScheme="urn:uuid:f4f85eac-e6cb-
4883-b524-f2705394840f"
              classifiedObject="ExampleDocument"
              id="IdExample_046"
              objectType="urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:Classification"
              nodeRepresentation="CODE_VALUE">
   <rim:Name>
      <rim:LocalizedString value="DISPLAY_VALUE"/>
   </rim:Name>
   <rim:Slot name="codingScheme">
      <rim:ValueList>
         <rim:Value>SCHEME_VALUE</rim:Value>
      </rim:ValueList>
   </rim:Slot>
</rim:Classification>
```

urn:uuid:f4f85eac-e6cb-4883-b524-f2705394840f designates XDSDocumentEntry.confidentialityCode.

CreationTime

FHIR

```
"created": "2005-12-24T09:35:00Z"
```

XDS

```
<Slot name="creationTime">
< ValueList>
   <Value>20051224093500</Value>
< /ValueList>
< /Slot>
```

FHIR Format	XDS Format
yyyy-mm-ddThh:nn:ss(TZ)	YYYY[MM[DD[HH[MM[SS[.S[S[S[S]]]]]]]]]+/-ZZZZ

hash-hash

FHIR	XDS
`"hash": "fbe2351a6a8ceba1a04ba3f832a12a53befeb04c"`	`<rim:Slot name="hash"> < rim:ValueList> <rim:Value>fbe2351a6a8ceba1a04ba3f832a12a53befeb04c</rim:Value> < /rim:ValueList> < /rim:Slot>`

class-classCode

Follow mapping concepts in G.1 Mapping DocumentEntry Classification to FHIR Codeable Concept.

FHIR	XDS
`"class": { "coding": [ { "system": "SCHEME_VALUE", "code": "CODE_VALUE", "display": "DISPLAY_VALUE" } ] }`	`<rim:Classification classificationScheme="urn:uuid:41a5887f-8865-4c09-adf7-e362475b143a" classifiedObject="Document01" nodeRepresentation="CODE_VALUE" objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:Classification" id="id_3"> <rim:Slot name="codingScheme"> <rim:ValueList> <rim:Value>SCHEME_VALUE</rim:Value> </rim:ValueList> </rim:Slot> <rim:Name> <rim:LocalizedString value="DISPLAY_VALUE"/> </rim:Name> </rim:Classification>`

format-formatCode

See "formatCode Coding Systems" for other well known coding systems.

FHIR	XDS
`"format": [ "urn:ihe:iti:bppc:2007" ]`	`<Classification classificationScheme="urn:uuid:a09d5840-386c-46f2-b5ad-9c3699a4309d" classifiedObject="Document01" nodeRepresentation="urn:ihe:iti:bppc:2007" objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:Classification" id="id_5"> <Slot name="codingScheme"> <ValueList> <Value>1.3.6.1.4.1.19376.1.2.3</Value> </ValueList> </Slot> <Name> <LocalizedString value="Basic Patient Privacy Consents (BPPC)"/> </Name> </Classification>`

urn:uuid:a09d5840-386c-46f2-b5ad-9c3699a4309d is the designated *XDSDocumentEntry.formatCode*.

If *nodeRepresenation* is not a valid URN, the format code cannot be mapped to DocumentReference.

formatCode Coding Systems

Coding System	OID	FHIR URI
XDS Document Format Codes	2.16.840.1.113883.6.1	urn:oid:2.16.840.1.113883.6.1

Context

healthcareFacilityTypeCode, eventCodeList, serviceStartTime, and *serviceStopTime* map to DocumentReference under the same *context* entry.

FHIR

```
"context": {
```

```
 "facilityType": {
...
},
```

```
   "period": {
      "start": "2004-12-23T08:00:00",
      "end": "2004-12-23T08:01:00"
   }
```

XDS

```
<Classification classificationScheme="urn:uuid:f33fb8ac-18af-
42cc-ae0e-ed0b0bdb91e1" ... >
      ...
</Classification>
```

```
   <Slot name="serviceStartTime">
      <ValueList>
         <Value>200412230800</Value>
      </ValueList>
   </Slot>
   <Slot name="serviceStopTime">
      <ValueList>
         <Value>200412230801</Value>
      </ValueList>
   </Slot>
```

event-eventCodeList

Follow mapping concepts in G.1 Mapping DocumentEntry Classification to FHIR Codeable Concept.

FHIR

```
"event": [
{
  "coding": [
   {
     "system": "SCHEME_VALUE",
     "code": "CODE_VALUE",
     "display": "DISPLAY_VALUE"
   }
  ]
}
]
```

XDS

```
<Classification classificationScheme="urn:uuid:2c6b8cb7-8b2a-4051-b291-
b1ae6a575ef4"
      classifiedObject="urn:uuid:a3767774-f91b-4d2c-9a17-ce8a2c96e6e2"
      id="urn:uuid:816c7010-6bc6-47e4-98f5-2c312717ec4b"
      nodeRepresentation="CODE_VALUE"
      objectType="urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:Classification">
   <Slot name="codingScheme">
      <ValueList>
         <Value>SCHEME_VALUE</Value>
      </ValueList>
   </Slot>
   <Name>
      <LocalizedString value="DISPLAY_VALUE"/>
   </Name>
</Classification>
```

facilityType-healthcareFacilityTypeCode

Follow mapping concepts in G.1 Mapping DocumentEntry Classification to FHIR Codeable Concept.

FHIR **XDS**

```
 "facilityType": {
        "coding": [
           {
              "system":
"http://snomed.info/sct",
              "code": "224687002",
              "display": "Hospital-prison"
           }
        ]
     },
```

```
<Classification classificationScheme="urn:uuid:f33fb8ac-18af-
42cc-ae0e-ed0b0bdb91e1"
      classifiedObject="Document01"
      nodeRepresentation="224687002"
      objectType="urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:Classification"
      id="id_6">
   <Slot name="codingScheme">
      <ValueList>
         <Value>urn:oid:2.16.840.1.113883.6.96</Value>
      </ValueList>
   </Slot>
   <Name>
      <LocalizedString value="Hospital-prison"/>
   </Name>
</Classification>
```

language-languageCode

FHIR **XDS**

```
"primaryLanguage": "en-US"
```

```
<Slot name="languageCode">
< ValueList>
   <Value>en-US</Value>
< /ValueList>
< /Slot>
```

mimeType

FHIR **XDS**

```
"mimeType": "text/plain"
```

```
<ExtrinsicObject id="Document01" mimeType="text/plain"
      objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1">
```

In XDS, the mime type is located at the start of the DocumentEntry metadata in the ExtrinsicObject attribute mimeType.

"urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1" designates XDSDocumentEntry.

authenticator-legalAuthenticator

Follow mapping concepts in General Approach for Contained versus Linked.

FHIR **XDS**

```
 "contained": [
{
  "resourceType": "Practitioner",
  "id": "legalAuth1",
  "name": {
   "family": [
     "Welby"
   ],
   "given": [
     "Marcus"
   ],
   "prefix": [
     "Dr"
   ],
```

```
<rim:Slot name="legalAuthenticator">
   <rim:ValueList>
      <rim:Value>^Welby^Marcus^^^Dr^MD</rim:Value>
   </rim:ValueList>
</rim:Slot>
```

FHIR **XDS**

```
   "suffix": [
     "MD"
   ]
  }
}
],
"authenticator": {
"reference": "#legalAuth1"
}
```

author-author

Follow mapping concepts in General Approach for Contained versus Linked. For FHIR coded entries, follow G.1 Mapping DocumentEntry Classification to FHIR Codeable Concept where coded entries like authorRole follow the same rules as Classifications.

FHIR **XDS**

```
"contained": [
   {
      "resourceType": "Organization",
      "id" : "orgRef1",
      "name": "Some Hospital",
      "identifier": [
         {
         "value": "1.2.3.5.8.9.1789.45"
         }
      ],
   },
   {
      "resourceType": "Practitioner",
      "id" : "authRef1",
      "name": {
         "family": [
            "Welby"
         ],
         "given": [
            "Marcus"
         ],
      "prefix": [
            "Dr"
         ]
      },
      "organization": {
         "reference": "#orgRef1"
      },
      "role": [
         {
            "coding": [
               {
                  "system": "AuthRoleOIDofAA",
                  "code": "AuthRoleIdNumber"
               }
            ]
         }
      ],
```

```
<rim:Classification
classificationScheme="urn:uuid:93606bcf-9494-43ec-
9b4e-a7748d1a838d"
     classifiedObject="ExampleDocument"
     id="IdExample_045"
     objectType="urn:oasis:names:tc:ebxml-
 regrep:ObjectType:RegistryObject:Classification"
    nodeRepresentation="">
   <!-- nodeRepresentation intentionally left blank-->
   <rim:Slot name="authorPerson">
      <rim:ValueList>
         <rim:Value>^Welby^Marcus^^^Dr</rim:Value>
      </rim:ValueList>
   </rim:Slot>
   <rim:Slot name="authorInstitution">
      <rim:ValueList>
         <rim:Value>Some
Hospital^^^^^^^^^^1.2.3.5.8.9.1789.45</rim:Value>
      </rim:ValueList>
   </rim:Slot>
   <rim:Slot name="authorRole">
      <rim:ValueList>

   <rim:Value>AuthRoleIdNumber^^^&AuthRoleOIDofAA&ISO<
/rim:Value>
      </rim:ValueList>
   </rim:Slot>
   <rim:Slot name="authorSpecialty">
      <rim:ValueList>

   <rim:Value>AuthSpecIdNumber^^^&AuthSpecOIDofAA&ISO<
/rim:Value>
      </rim:ValueList>
   </rim:Slot>
   <rim:Slot name="authorTelecommunication">
      <rim:ValueList>

   <rim:Value>^^Internet^john.doe@healthcare.example.o
```

FHIR	XDS

"communication": [
{
"coding": [
{
"system": "email",
"code":
"john.doe@healthcare.example.org"
}
]
}
],
}
]
 	
"author": {
"reference": "#authRef1"
},
	rg</rim:Value>
	</rim:ValueList>
	</rim:Slot>
	</rim:Classification>

DocumentEntry Author HL7 Datatypes

authorPerson (XCN)

```
<ID Number (ST)> ^ <Family Name (FN)> ^ <Given Name (ST)> ^ <Second and Further Given Names or Initials Thereof
(ST)> ^ <Suffix (e.g., JR or III)(ST)> ^ <Prefix (e.g., DR) (ST)> ^ <DEPRECATED-Degree (e.g., MD) (IS)> ^
<Source Table (IS)> ^ <Assigning Authority (HD)> ^ <Name Type Code (ID)> ^ <Identifier Check Digit (ST)> ^
<Check Digit Scheme (ID)> ^ <IdentifierType Code (ID)> ^ <Assigning Facility (HD)> ^ <Name Representation
Code(ID)> ^ <Name Context (CE)> ^ <DEPRECATED-Name Validity Range (DR)> ^<Name Assembly Order (ID)> ^ <Effective
Date (TS)> ^ <Expiration Date(TS)> ^ <Professional Suffix (ST)> ^ <Assigning Jurisdiction (CWE)> ^<Assigning
Agency or Department (CWE)>
```

FHIR	XCN	Notes

"name": {
"family": [
"FamilyName"
],
"given": [
"GivenName"
],
"prefix": [
"Prefix"
],
"suffix": [
"Suffix"
]
}
	^FamilyName^ GivenName^^Prefix^Suffix	see Section 1.13.0.12 HumanName
		
		FHIR *HumanName* limits fields from HL7 2.x that can be mapped.

authorInstitution (XON)

This type provides the name and identification of an organization. This specification restricts the coding to the following fields:

- XON.1 – Organization Name (required)
- XON.6.2 – Assigning Authority Universal Id (required if XON.10 is present and NOT an OID)
- XON.6.3 – Assigning Authority Universal Id Type (required if XON.10 is present and not an OID and shall have the value "ISO")
- XON.10 – Organization Identifier (optional)

No other fields shall be specified. The XON data type in Document Sharing metadata results in a valid encoding of an HL7 v2.5 XON encoding with the exception of length limitations. Component length restrictions are unobserved; however, the total length including delimiters shall not exceed the limit of the ebXML Slot Value. It is common for organizations to be uniquely identified by an OID. In such cases, the Organization (Identifier component 10) may contain the organization's OID. If the Organization Identifier is not an OID, the metadata use assumes that it has been assigned so that the composite Id created by combining components 6 and 10 is a unique identifier for the organization. "

Examples:

Some Hospital

Some Hospital^^^^^^^^^1.2.3.4.5.6.7.8.9.1789.45

Some Hospital^^^^^&1.2.3.4.5.6.7.8.9.1789&ISO^^^^45

authorSpecialty (CX)

This is an identifier. HL7 Identifier type CX consists of several components, but this specification restricts them to the use of two components, the Id Number and the Assigning Authority (AA). The Assigning Authority identifies the "domain" over which the Id Number represents a unique entity. Furthermore, the AA is characterized by a Universal Id and Universal Id Type. In Document Sharing profiles, ISO Object Identifiers (see OID below) must be used as Universal Id. Therefore, Universal Id Type is always ISO. The required format is:

IdNumber^^^&OIDofAA&ISO

authorRole (CX)

This is an identifier. HL7 Identifier type CX consists of several components, but this specification restricts them to the use of two components, the Id Number, and the Assigning Authority (AA). The Assigning Authority identifies the "domain" over which the Id Number represents a unique entity. Furthermore, the AA is characterized by a Universal Id and Universal Id Type. In Document Sharing profiles, ISO Object Identifiers (see OID below) must be used as Universal Id. Therefore, Universal Id Type is always ISO. The required format is:

IdNumber^^^&OIDofAA&ISO

authorTelecommunication (XTN)

XTN.3 – The type of telecommunication address. For example, e-mail addresses will have this valued with "Internet."

XTN.4 – The telecommunications address, e.g., name@example.com

No other fields shall be specified and both of these fields shall be present.

Type of Telecommunications mappings

FHIR	HL7 Table 0202 Value	HL7 Description
phone	BP	Beeper
phone	CP	Cellular Phone
fax	FX	Fax
email	Internet	
	MD	Modem
phone	PH	Telephone
phone	TDD	Telecommunications Device for the Deaf
	TTY	Teletypewriter

Extension-practiceSettingCode

"urn:uuid:cccf5598-8b07-4b77-a05e-ae952c785ead" designates XDSDocumentEntry.practiceSettingCode.

Follow mapping concepts in G.1 Mapping DocumentEntry Classification to FHIR Codeable Concept.

Case 1 - Coding System is well known

FHIR

```
"extension": [
   {
      "url": "URL_TBD",
      "valueCodeableConcept": {
         "coding": [
         {
            "system":
"http://snomed.info/sct",
            "code": "394802001",
            "display": "General Medicine"
         }
      ]
      }
   }
]
```

XDS

```
<rim:Classification classificationScheme="urn:uuid:cccf5598-
8b07-4b77-a05e-ae952c785ead"
      classifiedObject="doc1" nodeRepresentation="394802001">
   <rim:Name>
      <rim:LocalizedString value="General Medicine"/>
   </rim:Name>
   <rim:Slot name="codingScheme">
      <rim:ValueList>
         <rim:Value>urn:oid:2.16.840.1.113883.6.96</rim:Value>
      </rim:ValueList>
   </rim:Slot>
</rim:Classification>
```

Case 2 - Coding System is not well known

FHIR

```
 "extension": [
     {
```

XDS

```
<Classification classificationScheme="urn:uuid:cccf5598-
8b07-4b77-a05e-ae952c785ead"
```

FHIR **XDS**

```
        "url": "URL_TBD",
        "valueString" : "General Medicine"
      }
   }
]
```

```
         classifiedObject="Document01"
nodeRepresentation="General Medicine">
   <Name>
      <LocalizedString value="General Medicine"/>
   </Name>
   <Slot name="codingScheme">
      <ValueList>
         <Value>NotWellKnownScheme</Value>
      </ValueList>
   </Slot>
</Classification>
```

If no Name/LocalizedString@value exists:

FHIR **XDS**

```
 "extension": [
      {
      "url": "URL_TBD",
      "valueString" : "General Medicine"
      }
   }
]
```

```
<Classification classificationScheme="urn:uuid:cccf5598-8b07-
4b77-a05e-ae952c785ead"
      classifiedObject="Document01" nodeRepresentation="General
Medicine">
   <Slot name="codingScheme">
      <ValueList>
         <Value>NotWellKnownScheme</Value>
      </ValueList>
   </Slot>
</Classification>
```

Patient

Follow mapping concepts in General Approach for Contained versus Linked.

Example Field Mapping

FHIR **XDS**

```
   "contained": [
      {
         "resourceType": "Patient",
         "id": "patRef1",
         "identifier": [
            {
               "system":
"urn:oid:1.3.6.1.4.1.21367.2005.3.7",
               "value": "76cc765a442f410"
            },
            {
               "system": "urn:oid:3.4.5",
               "value": "89765a87b"
            },
            {
               "system":
"urn:oid:1.3.6.1.4.1.21367.2005.3.7",
               "value": "DTP-1"
            }
         ],
         "name": [
            {
               "family": [
                  "Chalmers"
               ],
               "given": [
```

```
<ExternalIdentifier identificationScheme="urn:uuid:58a6f841-
87b3-4a3e-92fd-a8ffeff98427"
   value="76cc765a442f410^^^&amp;1.3.6.1.4.1.21367.2005.3.7&a
mp;ISO"
   objectType="urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:ExternalIdentifier"
   id="id_9"
   registryObject="Document01">
   <Name>
      <LocalizedString value="XDSDocumentEntry.patientId"/>
   </Name>
</ExternalIdentifier>
<Slot name="sourcePatientId">
   <ValueList>
      <Value>89765a87b^^^&amp;3.4.5&amp;ISO</Value>
   </ValueList>
</Slot>
<Slot name="sourcePatientInfo">
   <ValueList>
      <Value>PID-3|DTP-
1^^^&amp;1.3.6.1.4.1.21367.2005.3.7&amp;ISO</Value>
      <Value>PID-5|Chalmers^Peter^^^</Value>
      <Value>PID-7|19650120</Value>
      <Value>PID-8|M</Value>
      <Value>PID-11|100 Main
St^^Burlington^MA^01803^USA</Value>
```

FHIR **XDS**

```
                "Peter"
             ]
          }
       ],
       "gender": {
          "coding": [
             {
                "system":
"http:\/\/hl7.org\/implement\/standards\/fhir\/val
ueset-administrative-gender.html",
                "code": "M"
             }
          ]
       },
       "birthDate": "1965-01-20",
       "address": [
          {
             "line": [
                "100 Main St"
             ],
             "city": "Burlington",
             "state": "MA",
             "zip": "01803",
             "country": "USA"
          }
       ]
    }
 ],

"subject": {
     "reference": "#patRef1"
 },
```

```
   </ValueList>
</Slot>
```

Note that if the identifiers in the XDSDocumentEntry.patientId, sourcePatientId, and sourcePatientInfo do not match, then all should be included in the JSON Identifier array.

urn:uuid:58a6f841-87b3-4a3e-92fd-a8ffeff98427 designates XDSDocumentEntry.patientId.

sourcePatientInfo

sourcePatientInfo should include values for:

- PID-3 source patient identifier list. (CX)

  Components:

  <ID Number (ST)> ^ <Check Digit (ST)> ^ <Check Digit Scheme (ID)> ^ <Assigning Authority (HD)> ^ <Identifier Type Code (ID)> ^ <Assigning Facility (HD)> ^ <Effective Date (DT)> ^ <Expiration Date (DT)> ^ <Assigning Jurisdiction (CWE)> ^ <Assigning Agency or Department (CWE)>

- A list uses the repetition separator ~, for example:

  DTP 1^^^&1.3.6&ISO~XTP1^^^&1.3.11&ISO

- PID-5 (source patient name) (XPN)

Components:

<Family Name (FN)> ^ <Given Name (ST)> ^ <Second and Further Given Names or Initials Thereof (ST)> ^ <Suffix (e.g., JR or III) (ST)> ^ <Prefix (e.g., DR) (ST)> ^ <Degree (e.g., MD) (IS)> ^ <Name Type Code (ID)> ^ <Name Representation Code (ID)> ^ <Name Context (CE)> ^ <Name Validity Range (DR)> ^ <Name Assembly Order (ID)> ^ <Effective Date (TS)> ^ <Expiration Date (TS)> ^ <Professional Suffix (ST)>

FHIR	XCN

<pre>"name": {
  "family": [
  "FamilyName"
  ],
  "given": [
  "GivenName"
  ],
  "prefix": [
  "Prefix"
  ],
  "suffix": [
  "Suffix"
  ]
}</pre>
	FamilyName^ GivenName^^Suffix^Prefix^

- PID-7 (source patient date of birth)
- PID-8 (source patient gender)

  M – Male

  F – Female

  O – Other

  U – Unknown

sourcePatientInfo should not include values for PID-2 (patient id), PID-4 (alternate patient id), PID-12 (country code), or PID-19 (social security number).

Gender Translation

FHIR	XDS (HL7 2.5)
code=M system=http://hl7.org/implement/standards/fhir/valueset-administrative-gender.html	M
code=F system=http://hl7.org/implement/standards/fhir/valueset-administrative-gender.html	F
code=O system=http://hl7.org/implement/standards/fhir/valueset-administrative-gender.html	A

FHIR	XDS (HL7 2.5)
code=UNK system=http://hl7.org/implement/standards/fhir/v3/NullFlavor/	U
code=OTH system=http://hl7.org/implement/standards/fhir/v3/NullFlavor/	O
code=NA system=http://hl7.org/implement/standards/fhir/v3/NullFlavor/	N

masterIdentifier-XDSDocumentEntry.uniqueId

FHIR **XDS**

```
 "masterIdentifier": {
   "system": "urn:ietf:rfc:3986",
   "value":
"1.2.3.4.5.6.78901.2345.6.7^123456"
 }
```

```
<rim:ExternalIdentifier identificationScheme="urn:uuid:2e82c1f6-
a085-4c72-9da3-8640a32e42ab"
     value="1.2.3.4.5.6.78901.2345.6.7^123456" id="IdExample_054"
     objectType="urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:ExternalIdentifier"
     registryObject="DocumentEntry01">
   <rim:Name>
     <rim:LocalizedString value="XDSDocumentEntry.uniqueId"/>
   </rim:Name>
</rim:ExternalIdentifier>
```

size-size

FHIR **XDS**

```
"size": 4309
```

```
<Slot name="size">
    <ValueList>
          <Value>4309</Value>
    </ValueList>
< /Slot>
```

description-title

FHIR **XDS**

```
"description": "Example Document Title"
```

```
<rim:ExtrinsicObject id="ExampleDocument"
   objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1"
   mimeType="application/pdf">
< rim:Name>
   <rim:LocalizedString value="Example Document Title"/>
< /rim:Name>
 ...
< /rim:ExtrinsicObject>
```

"urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1" designates XDSDocumentEntry.

type-typeCode

Follow mapping concepts in G.1 Mapping DocumentEntry Classification to FHIR Codeable Concept.

FHIR	XDS

"type": {
"coding": [
{
"system": "http://loinc.org",
"code": "34108-1",
"display": "Outpatient Note"
}
]
}
	<rim:Classification classificationScheme="urn:uuid:f0306f51-975f-434e-a61c-c59651d33983"
	classifiedObject="ExampleDocument"
	nodeRepresentation="34108-1"
	id="IdExample_053"
	objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:Classification">
	<rim:Name>
	<rim:LocalizedString value="Outpatient Note"/>
	</rim:Name>
	<rim:Slot name="codingScheme">
	<rim:ValueList>
	<rim:Value>urn:oid:2.16.840.1.113883.6.1</rim:Value>
	</rim:ValueList>
	</rim:Slot>
	</rim:Classification>

urn:uuid:f0306f51-975f-434e-a61c-c59651d33983 indicates DocumentEntry.typeCode

urn:oid:2.16.840.1.113883.6.1 is the OID for LOINC. FHIR uses system URI http//loinc.org.

Appendix H Use Case Specification

1 Person Enrollment

As an Edge System user, I can manage enrollment of Persons into CommonWell.

1.1 Overview

The workflow by which an individual person participates in the CommonWell system is distinguished from any Patient Records that may already exist for this person in any particular Edge System. Ideally, a fundamental requirement for enrollment is the presentation and validation of an authoritative identifier (e.g., a state-issued ID with a photograph). However, we decided that a person can enroll without a strong identifier to drive an increase in overall participation rates.

Registration clerks are often frustrated when they are asked to add new steps to their workflow without receiving any benefit from the activity. By including a point-in-time indicator of network value for a single person, registration clerks can focus on enrolling those who immediately benefit from interoperability. The service return an indicator that the patient's demographics match possible network patients inside the system. Note that the indicator does not tell the clerk the names or the provider locations where links are found as this violates HIPAA rules. These potential links with named provider organizations are only visible to the clerk after the patient has provided consent to join CommonWell.

The enrollment of a Person to CommonWell is a global attribute of the person. Once completed, all participating Organizations have access to this information by way of the Edge System Registry.

A prerequisite to enrolling Persons is that the Organization has registered itself as a participating Organization with the CommonWell network.

If a user decides to unenroll from CommonWell, some information about that unenrolled Person is retained by CommonWell. Data retained after unenrolling must be in a format that is not accessible by Edge Systems until such a time that the Person re-enrolls from a participating Organization.

1.2 Narrative

A registration clerk at a provider organization can check for the presence of potential patient matches before deciding to enroll a person into CommonWell. It is a point-in-time indicator of network value for a single person. By returning an integer instead of a Boolean value for potential links, the service will enable members to innovate around how they use this link count. This number only represents the number of unique orgs visited. It doesn't reflect how many visits happened at that organization. For example, 12 visits in the last 12 months across two organizataions returns a value of two.

A user at a participating Organization must be provided the capability to enroll a Person in CommonWell. Organizational enrollment of a Person in CommonWell allows access to Patient Records from other participant Organizations at which the Patient has been registered. Enrollment will expose an authoritative ID (if available) for use in defining links to other Patient Records accessible via CommonWell.

A user at a participating Organization must be provided the capability to unenroll a Person from CommonWell. During unenrollment, any LOLA 2 or higher links (to the Person) are removed and the Person Record is disabled. After unenrollment, CommonWell can still return the Person Record as part of a LOLA 1 Patient Match (using patient-level demographics information).

1.3 Scenario 1 – As an Edge System user, I can check for possible Patient matches prior to enrolling a Person into CommonWell.

1.3.1 Pre-conditions

The patient presents him/herself at the physical location of a participating Organization.
The Person is not yet enrolled in CommonWell.
The Patient is registered with their local Organization.
The Organization is registered with CommonWell.
At least one of the Patient's other providers is registered with CommonWell.

1.3.2 Scenario

Frank Nolan is a patient of Dr. Jeffrey Geiger, a general practitioner working in the Chicago area. During an encounter at Dr. Geiger's office, an authorized Edge System user in Dr. Geiger's office checks for possible patient matches prior to enrollment and before giving Frank any information about CommonWell.

The pre-enrollment check service uses the demographics captured by the Edge System during registration to query the CommonWell API in the background.

1.3.3 Post-conditions

The query response indicates the number of possible patient matches.

1.3.4 Alternate Flows

1.3.5 Exception Cases

1.3.6 Expected Actions

1.3.7 Transactions

Reference added to *CommonWell Services Specification* v2.1.

1.4 Scenario 2 – As an Edge System user, I can enroll a Person into CommonWell.

1.4.1 Pre-conditions

The patient presents him/herself at the physical location of a participating Organization.
See the Patient Search use case.

1.4.2 Scenario

Frank Nolan is a patient of Dr. Jeffrey Geiger, a general practitioner working in the Chicago area. During an encounter at Dr. Geiger's office, an authorized Edge System user in Dr. Geiger's office gives Frank a high-level overview of CommonWell and explains what it means to be enrolled.

Frank agrees to enrollment and provides his driver's license, which is an authoritative ID, to the Edge System user for scanning. Information related to enrollment and details from Frank's authoritative ID are sent to CommonWell.

1.4.3 Post-conditions

Frank is enrolled as a new Person in CommonWell.
The authoritative ID is consumable in CommonWell.

1.4.4 Alternate Flows

The Organization would like to enroll a population of its patients into CommonWell via an attended patient kiosk. The enrollment does not happen on the healthcare organization's premises. For instance, the patients can present an authoritative ID to the kiosk that can enroll them at the local mall. Messages are still submitted one at a time to CommonWell. Per Policy Sub Group, a human will need to validate the ID at the kiosk.

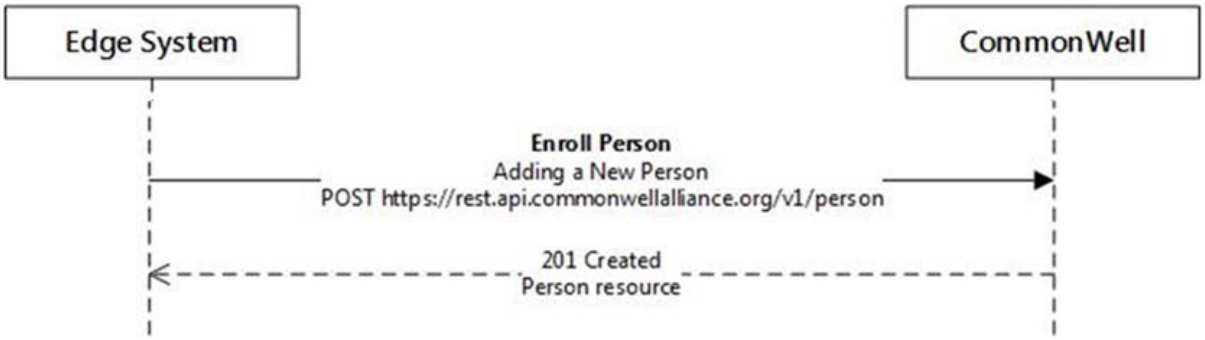
1.4.5 Exception Cases

If the Edge System enrolls a Person who is already enrolled, CommonWell gracefully handles the duplicate enrollment. This is transparent to the Edge System user. Lab systems are not allowed to enroll patients during the pilot.

Negative Test
Internal error: Respond with "500" status code for internal error; Forbidden error: Respond with "403" status code for forbidden error; Conflict error: Respond with "409" status code for conflict error; Unauthorized Access: Respond with "401" status code; Bad Request: Respond with "400" status code.

1.4.6 Expected Actions

1.4.7 Transactions



Reference pulled from *CommonWell Pilot Services Specification* v1.16.

1.5 Scenario 3 – As an Edge System user, I can unenroll a Person from CommonWell

1.5.1 Pre-conditions

The person has enrolled in CommonWell.
The person presents him/herself at a participating Organization.

1.5.2 Scenario

Barbara Hyland initially agreed to enroll in CommonWell at a kiosk in the mall near where she lives in Cincinnati, OH. When she goes to her primary care provider (PCP) the first time after she enrolls, Barbara tells one of the office staff that she is concerned about her privacy and wishes to opt out of sharing of information in the network.

The authorized Edge System user verifies Barbara's identity. The user unenrolls Barbara.

1.5.3 Post-conditions

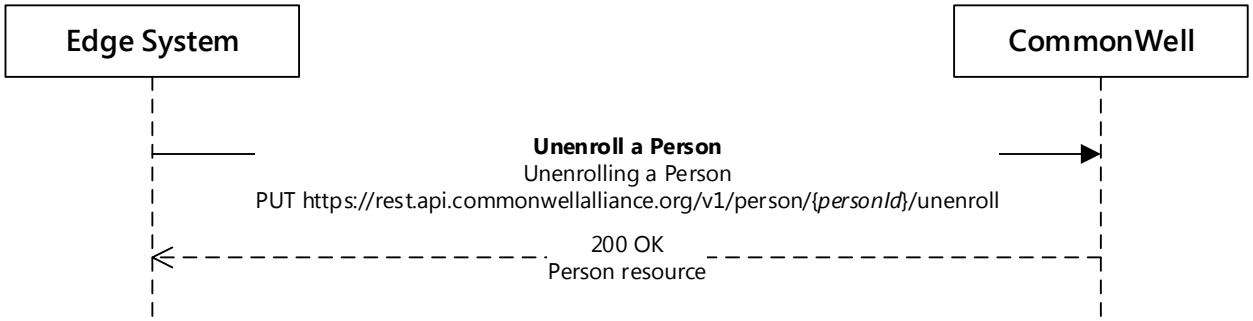
Any LOLA 2 or higher links (to the Person) are removed.
The Person Record is disabled.
The Person consent is revoked.
CommonWell retains some information about that Person (hashed/encrypted strong-id and core demographics).

1.5.4 Alternate Flows

The patient was not enrolled as a Person. CommonWell returns that the Person is not found.

1.5.5 Exception Cases

1.5.6 Transactions



Reference pulled from *CommonWell Pilot Services Specification* v1.16.

Unenrolling a Person from CommonWell will remove all links to associated Patient resources. The Person may still appear in searches, but with its *enrolled* status set to *False*.

1.6 Scenario 4 – As an Edge System registration clerk, I can enroll a Person following an enrollment directive from his or her authorized proxy

1.6.1 Pre-conditions

Patient is registered at a CommonWell-enabled facility.
Authorization for the proxy individual is verified and documented by the registering provider.
When linking visits, patient is already enrolled in CommonWell.

1.6.2 Scenario

Registration clerk verifies proxy rights of patient's proxy during registration process.
Registration clerk obtains permission to enroll patient in CommonWell network.
Registration clerk obtains proxy's full name and relationship to the patient.
Registration clerk enrolls the patient, recording the acquired proxy information.
CommonWell creates the person record, including the proxy's full name, relationship, and the date of this enrollment activity.

1.6.2.1 Narrative Example – Minor/Parent or Guardian

Child Jones is a 5-year-old girl brought to the Emergency Department for treatment of an asthma attack. She is accompanied by her mother, Susan Jones.
The ED registration clerk admits Child, documenting that Susan is her parent and has guardianship of Child.
As part of the admission process, the registration clerk asks if Child may be enrolled in CommonWell. Susan agrees and verifies links for two (2) other organizations where Child has been seen.
CommonWell creates a person record and links the three (3) patient records (two remote and one local) to Child.

1.6.2.2 Narrative Example – Incapacitated Adult:

An incapacitated adult patient is brought to the cardiology clinic for evaluation. The patient is accompanied by an individual who has been given medical power of attorney.
During the registration process, the office receptionist verifies that this proxy has legal authority to provide consent for treatment. The receptionist asks if the patient can be enrolled in CommonWell. The patient's proxy gives permission and verifies six (6) out of ten (10) potential links.
CommonWell creates a person record and links the seven (7) patient records (six remote and one local).

1.6.3 Post-conditions

The patient is enrolled in CommonWell.

1.6.4 Alternate Flows

1.6.5 Exception Cases

1.6.6 Expected Actions

1.6.7 Transactions

1.7 Scenario 5 – Self-service enrollment

As a patient of a CommonWell-connected "tethered" patient portal (TPP) associated with my care team, I can enroll myself in CommonWell in order to begin the process of allowing my providers to more efficiently share my health data.

1.7.1 Pre-conditions

The TPP is provided by a site of care where I have previously been seen.
The TPP in question has been extended to add interface elements related to this process.
In the case that the patient portal is provided by a third party, this product must be able to be extended to afford these interactions, or the CommonWell member must be capable of providing these interfaces to the patient in some other manner.
The "local" Organization is a participant in CommonWell.
The patient is not a minor and is not incapacitated.
The TPP is capable of initiating CommonWell transactions.
The TPP patient is identified and authorized to use this service by the TPP product, and no new authorization mechanism is required in the CommonWell platform.

1.7.2 Scenario

Frank Nolan is a patient of Dr. Jeffrey Geiger. Dr. Geiger's office provides patients access to a Web portal that Frank uses to find information about his care at that Organization.

Within that Web experience, Frank finds a branded control that represents CommonWell (for example, a button or tab) alongside a control that he understands to mean "information." After learning more about CommonWell, Frank returns to that interface and agrees to terms and conditions by checking a box. Frank then clicks Submit in order to enroll himself in CommonWell.

1.7.3 Post-conditions

The patient is enrolled as a new Person in CommonWell.

1.7.4 Alternate Flows

1.7.5 Exception Cases

1.7.6 Expected Actions

1.7.7 Transactions

2 Person Management

As an Edge System user, I can manage Person information (search and update).

2.1 Overview

Enables an authorized user within an Organization to search by key demographic attributes or strong ID.
The key demographics are defined as the required demographics in the enrollment use case.

2.2 Narrative

An Edge System can search for an existing Person based on demographic information and optionally a strong identifier. This is typically the first step in a Person Enrollment workflow, wherein the Edge System finds out whether or not an individual has already enrolled in CommonWell. The key value of a strong identifier is stored in CommonWell as a hashed value for use in search algorithms and never returned in search or get operations.

2.3 Scenario 1 – As an Edge System user, I can search for a Person in CommonWell

If a provider doesn't have a valid patient relationship, there is no business reason for searching for an enrolled Person inside CommonWell. However, if a new person is present in front of the provider with a strong ID, the person represents a potential patient and searching is appropriate.

2.3.1 Pre-conditions

The Organization is a member of CommonWell.
The person has a strong id available for the authorized user to access.

2.3.2 Scenario

Frank Nolan requests the authorized Edge System user in Dr. Geiger's office to confirm his enrollment status with CommonWell. The authorized Edge System verifies the identity of the patient using the strong ID. The user searches for Frank Nolan.

2.3.3 Post-conditions

CommonWell returns 0 or more Person resources.
If any Person resources are returned, each resource contains:

- Person-level demographics
- The Person CommonWell resource ID

- Date of enrollment and Organization name
- Date of last change in enrollment status

2.3.4 Alternate Flows

No strong id is available for the person.

Returns from queries without strong ID will be limited (by a security constraint) to patients who are registered to the local Organization.

Note that the use of DL card reader and scanning devices is out of scope for pilot.

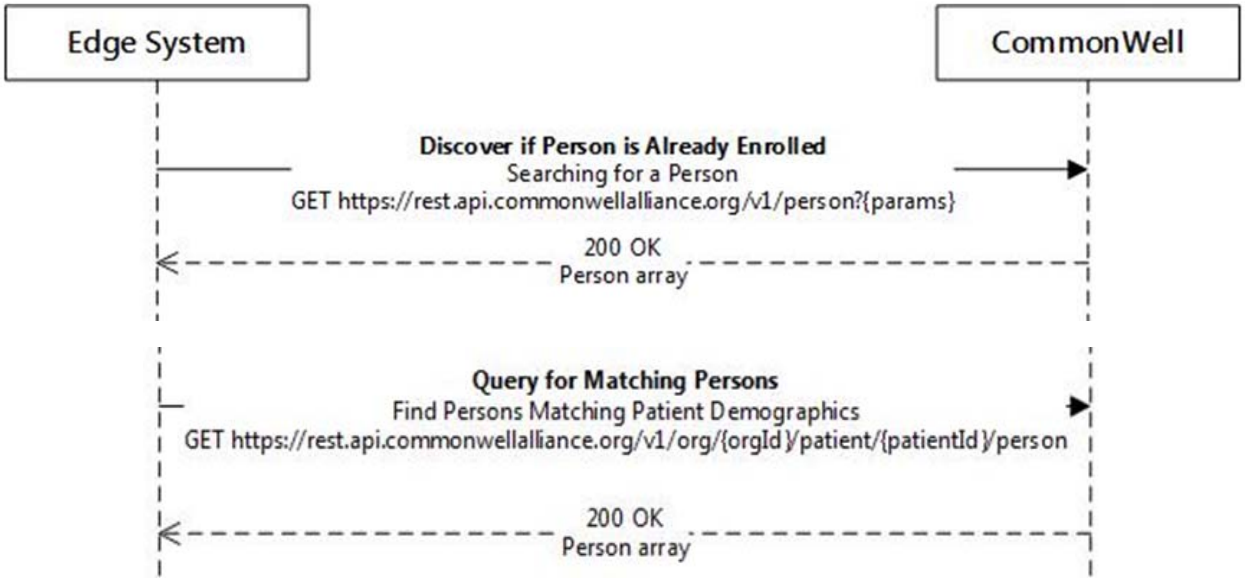
2.3.5 Exception Cases

2.3.6 Expected Actions

Negative

- Internal error: Respond with "500" status code for internal error.
- Forbidden error: Respond with "403" status code for forbidden error.
- Conflict error: Respond with "409" status code for conflict error.
- Unauthorized Access: Respond with "401" status code.
- Bad Request: Respond with "400" status code.
- Not Found: Respond with "404" status code.
- Presumed deleted: Respond with "410" status code.
- 410 (Gone) when Person has been logically deleted.
- 412 (Precondition Failed) if update is happening and eTag value of Person doesn't match with server (basically, they're working with a stale copy of the Person data).

2.3.7 Transactions



Reference pulled from *CommonWell Pilot Services Specification* v1.16.

2.4 Scenario 2 – As an Edge System user, I can update a Person resource

2.4.1 Pre-conditions

Person exists inside CommonWell.
The Edge System has the Person resource ID, for instance, using the PERSON Search use case.

2.4.2 Scenario

Juan Valdez is already registered with an authoritative identifier from California. Juan moves from California to Colorado and gets a new driver's license. Juan then presents at a CommonWell-enabled Organization in Colorado with a new address and a new driver's license.
The authorized Edge System user verifies the Person identity.
The authorized Edge System user updates Person-level demographic detail and strong ID using the Person CommonWell ID.

2.4.3 Post-conditions

Person-level detail is updated with new authoritative ID and new demographic address.

2.4.4 Alternate Flows

Person is not updated.

2.4.5 Exception Cases

Without minimum required demographics, CommonWell returns an error.

Negative Test

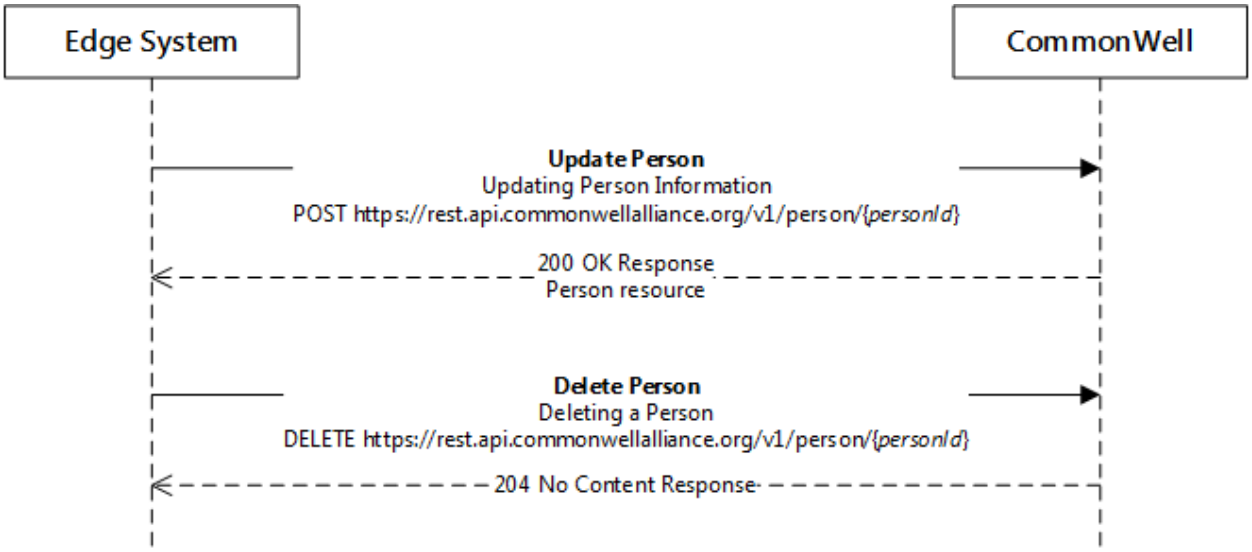
- Internal error: Respond with "500" status code for internal error.
- Forbidden error: Respond with "403" status code for forbidden error.
- Conflict error: Respond with "409" status code for conflict error.
- Unauthorized Access: Respond with "401" status code.
- Bad Request: Respond with "400" status code.

2.4.6 Expected Actions

Negative

- Not Found: Respond with "404" status code.
- Presumed Deleted: Respond with "410" status code.

2.4.7 Transactions



Reference pulled from *CommonWell Pilot Services Specification* v1.16.

3 Patient Registration

As an Edge System Organization, I can register and manage a Patient with CommonWell.

3.1 Overview

CommonWell enables an authorized user within an Organization to create, update or merge a Patient that has a unique enterpriseID assigned by their Organization. Also, CommonWell enables an Edge System organization to add, edit or remove encounter dates for that Patient.

By creating an up-to-date copy of Patient enterpriseIDs, demographics and encounter dates in CommonWell, Edge System organizations will benefit from a more accurate Patient Matching service that provides greater context about the relevancy of each Patient Record match.

As a platform for record matching across healthcare organizations, CommonWell supports acting as a clearinghouse of patient demographic and identifier information. Specifically, CommonWell acts as a service that stores encounter context for specific patients within an Edge System organization.

CommonWell exposes a publicly available service that can process patient identity feeds with patient encounter information from identity source organizations. As an outcome of this feature, CommonWell builds an exhaustive and up-to-date data store of patient encounter metadata for each of the Edge System organizations that have been registered on the CommonWell platform. The purpose of this use case is to let an Organization send to CommonWell information about its patients.

CommonWell stores the information that contains patient encounter information. Sending registration information is subject to local Edge System policies, but it is not affected by enrollment and consent values. Business Associate Agreements enable the push of encounter date information into CommonWell.

3.2 Narrative

3.3 Scenario 1 – As an Edge System user, I can register a new Patient (no Visit information)

3.3.1 Pre-conditions

Assumes the Patient does not exist in the local Organization system.
Assumes the Patient does not exist in CommonWell.
Assumes the Edge System registration system can provide the specific minimum data set to CommonWell. The minimum data set is listed below:

- Patient Demographics
  - First Name
  - Last Name
  - Date of Birth
  - Gender ←Optional for Registration
  - Home Zip Code ← Optional for Registration
- Local Patient Identifier ID
- Assigning Authority (e.g., Organization A)

3.3.2 Scenario

Patient Sean Thomas comes to Dr. Jeffrey Geiger, his primary care provider (PCP), for a first Visit. At the front desk, the authorized Edge System user looks up Sean in the local registration system. Sean is not found, so the authorized Edge System user proceeds to create the Patient. The registration system and/or Edge System send(s) the Patient information to CommonWell. The CommonWell Patient Matching service processes the information and creates a record for this patient. This is happening at each new CommonWell-enabled Organization Sean visits for patient care.

3.3.3 Post-conditions

The Patient exists in the Organization registration system and/or Edge System.
The Patient Record exists in CommonWell. The Person does not exist in CommonWell as that Person Enrollment has not occurred yet.

3.3.4 Alternate Flows

3.3.5 Exception Cases

The CommonWell service is busy, unavailable, or under maintenance.
The Edge System messaging system is busy, unavailable, or under maintenance.
The message is missing required demographic information (e.g., First name, last name, date of birth, enterpriseID, Assigning Authority).
Samples of known errors are available inside the technical spec.

3.4 Scenario 2 – As an Edge System user, I can register a new Patient (with Visit information)

3.4.1 Pre-conditions

Assumes the Patient does not exist in the local Organization system.
Assumes the Patient does not exist in CommonWell.
Assumes the Edge System registration system can provide the specific minimum data set to CommonWell. See demographic information below:

- Patient Demographics
    - First Name
    - Last Name
    - Date of Birth
    - Gender ← Optional for Registration
    - Home Zip Code ←Optional for Registration
- Local Patient Identifier ID
- Assigning Authority (e.g., Organization A)

Assumes the Edge System registration system can provide the Visit required data set to CommonWell:

- Start Date: The date the patient started to receive care.
- Organization: The location where the service was provided.

3.4.2 Scenario

Patient Anya Stark decides to see a podiatrist that her PCP recommended for lingering foot pain. At the front desk, the authorized Edge System user looks up Anya in the registration system. Anya is not found in the local system. The authorized Edge System user proceeds to create the Patient and her Visit. This activity is happening at each new CommonWell-enabled Organization Anya visits for patient care.

3.4.3 Post-conditions

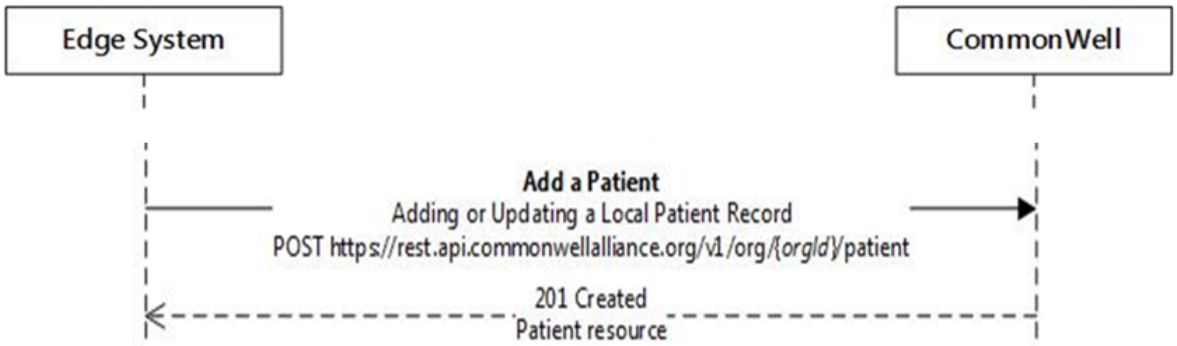
The Patient exists in the Organization registration system and/or Edge System.
The Patient Record exists in CommonWell.
The Person does not exist in CommonWell as that Person Enrollment has not occurred yet.
The Patient has an encounter date inside CommonWell.

3.4.4 Alternate Flows

3.4.5 Exception Cases

The CommonWell service is busy, unavailable, or under maintenance.
The Edge System messaging system is busy, unavailable, or under maintenance.
The message is missing required demographic information.
Samples of known errors are available inside the technical spec.
The sending system did not provide the minimum set of Visit information. The receiving system sends a negative Acknowledgement.

3.4.6 Transactions



Reference pulled from *CommonWell Pilot Services Specification* v1.16.

3.5 Scenario 3 – As an Edge System user, I can merge two Patient Records that exist in the Organization and CommonWell

Misspelling of key demographic details and name change activities (such as marriage) drive the need to merge patients over time. In this scenario, the merge message results in a survivor and non-survivor pair of patient records. Merge transactions are generated exclusively via HL7 ADT interfaces.

Assumptions

- CommonWell will not be responsible for merging demographic/encounter details. This decision is controlled by local EHR. Survivor demographics will be updated with the details of the A40 from PID3 and may be subsequently updated with an A08.
- Edge System cannot reuse the local patient ID of the non-surviving patient.
- Downgraded links will carry forward from non-surviving patient to surviving patient unless surviving patient has an active link to the remote patient.

3.5.1 Pre-conditions

Tyrel Lannister is Patient A in the local Organization and CommonWell.
Tyrell Lannister is Patient B in the local Organization and CommonWell.

3.5.2 Scenario

Patient Tyrel Lannister comes to Peachtree Hospital for a spider bite that occurred on a weekend. At the front desk, the authorized Edge System user looks up Tyrel in the registration system. Tyrel is found in the local Edge System but his first name is incorrectly spelled with two “l” letters. The authorized Edge System user initiates a patient merge activity within the registration system and selects Patient A. Now the demographic data for Tyrell Lannister is replaced with the name Tyrel Lannister. The merge request updates data in the local Edge System and the merge request is propagated to CommonWell.

3.5.3 Post-conditions

Tyrel Lannister is Patient A in the local organization and CommonWell.
Patient B no longer exists in the local organization and CommonWell.
Any network link request that previously returned the non-surviving Patient will no longer return the Patient because the non-surviving Patient ID is no longer valid.

3.5.4 Alternate Flows

Multiple local Patients linked to a single CommonWell Person. The two Patients intended for merge already contain Person links, and they point to the same CommonWell Person Record. Person index links are updated (carried-forward) to surviving patient ID (all found from MRG-1 segment).

Multiple local Patients linked to multiple CommonWell Persons. The two Patients intended for merge already contain Person links, and they point to different CommonWell Person Records. Person index link does not get carried forward to surviving patient ID.

Two local Patients merged; survivor is not linked to a Com

monWell Person. Of the two Patients being merged, the Patient intended to survive does not have a Patient link relationship to a CommonWell Person Record, but the non-surviving Patient Record does have a link to a CommonWell Person Record. Person index links are updated (carried-forward) to surviving patient ID (all found from MRG-1 segment).

3.5.5 Exception Cases

The merge process fails inside CommonWell due to a missing required data field, or an incorrect data type is passed in. A negative acknowledgement is returned to the sender (verified).

One of the identifiers is not registered.

4 Historical Data Backload

As an Edge System vendor, I can backload historical Patient and Visit information into CommonWell.

4.1 Overview

Batch loading a pool of data from prior Visits into CommonWell will seed the patient population for an Organization in CommonWell. As such, it will “kick-start” the matching of Patients and accelerate the time-to-value of the service. CommonWell provides two primary interfaces for managing patient identify data: (1) HL7 V2.x ADT and (2) a REST-based service. For each type of interface, CommonWell will provide a dedicated endpoint for this type of data feed.

4.2 Narrative

4.3 Scenario 1 – As an Edge System Organization, I can upload and register a batch of new Patient Records with Visit information.

4.3.1 Pre-conditions

Organization has registered inside CommonWell.
The Organization has identified the population of Patients to upload to CommonWell based on policies.

4.3.2 Scenario

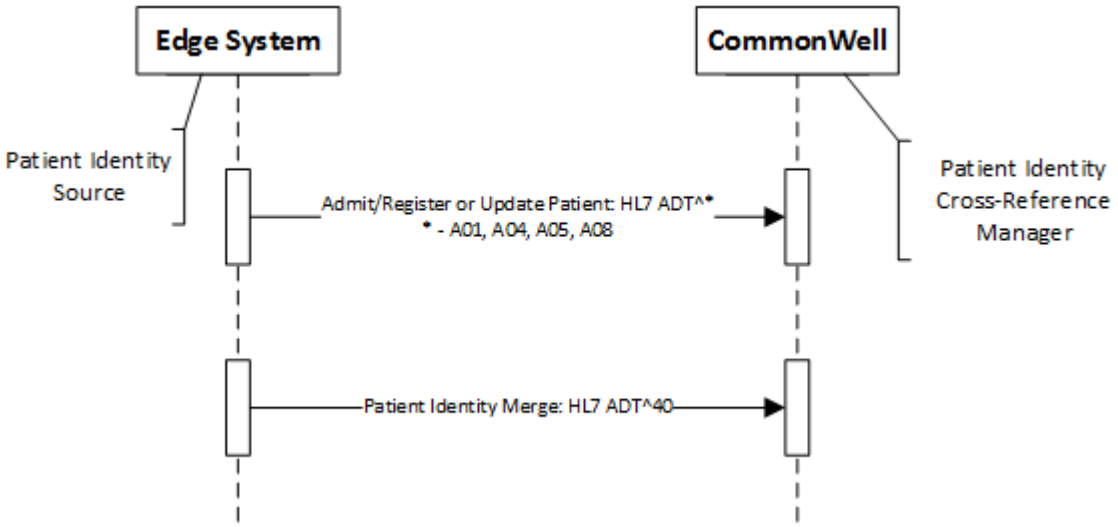
Edge System vendor would like to backload their existing Patient Records data into CommonWell.

4.3.3 Post condition

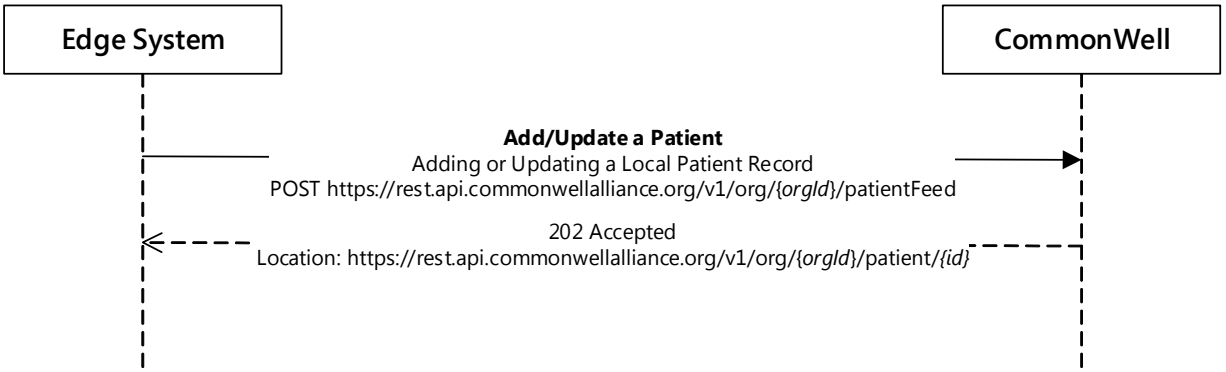
CommonWell accepts the backloaded data from the Organization and makes the data available in the network.
Patients are registered inside CommonWell.

4.3.4 Transactions

PIX-based Historical Feed



REST-based Historical Feed



Reference pulled from CommonWell Pilot Services Specification v1.16.

5 Demographics Patient Update

5.1 Overview

The purpose of this use case is to let Organizations update existing Patient information in CommonWell. This information contains Patient demographics as well as encounter information.

5.2 Narrative

This is a separate workflow from updating a Person Record. There is a separate API for update of a Person resource via FHIR. This workflow is specific to the demographics associated with the Local Patient Record.

5.3 Scenario 1 – As an Edge System user, I can update Patient demographics for a registered Patient in CommonWell

5.3.1 Pre-conditions

The Patient exists in the local organization system.
The Patient is registered in CommonWell for the local Organization.

5.3.2 Scenario

Patient Anya Stark comes to her PCP for a scheduled Visit. At the front desk, the authorized Edge System user looks up Anya in the registration system. Anya is found, so she proceeds to review the patient information. The authorized Edge System user updates her home address and phone number. The Edge System sends the demographics to CommonWell. The CommonWell Patient Identity Service processes the information and updates the Patient information for this Organization.

5.3.3 Post-conditions

The Patient Record in CommonWell for this Organization is updated with new demographic data

5.3.4 Alternate Flows

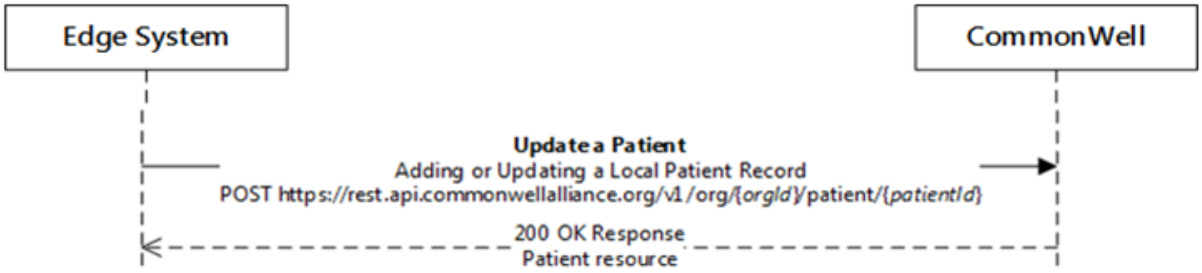
If the Patient does not exist in CommonWell (e.g., the registration message did not get processed), CommonWell would process it as a new registration. This scenario falls in the Patient registration use case from an infrastructure perspective.

5.3.5 Exception Cases

The Patient does not exist in CommonWell. The message is treated as a registration message and follows the registration use case.

5.3.6 Transactions

Use the same technology as the Patient Registration use case.



Reference pulled from CommonWell Pilot Services Specification v1.16.

6 Level of Link Assurance (LOLA) Management

As an Edge System Organization, I can manage the Level of Link Assurance in CommonWell.

6.1 Overview

The concept of LOLA is to leverage the innate power of the human network to improve the matching of Patient Records across encounters and over time. When a person has been enrolled into the CommonWell network, that same person may benefit from the linkage of future encounters. The concept of upgrading and downgrading a Patient Link directly improves the value of the CommonWell network.

6.1.1 Correlated Linking

Correlated Linking (section 6.7) supports the automated linking of patients to Organizations from whom they need to receive care but that they may not visit. The proposed approach is to create these links by sharing and comparing patient identifiers from an already-linked Organization, which is initiating an order or referral, and from the destination Organization that now needs access to the patient's clinical data. If the identifier can be sent by both systems and validated along with a demographic match, CommonWell dynamically creates a level 2 link between the acting systems.

Correlated Linking is intended to allow CommonWell-connected Organizations that do not routinely interact face-to-face with patients to obtain data via the CommonWell network. Many HIT workflows require providers to access clinical data although the patient has not yet (or will not) be present at their facility to authorize a CommonWell link.

For example, in a retail pharmacy context, pharmacists can be required to acquire additional clinical data points prior to filling a prescription, in order to be compliant with regulatory and payer requirements or to facilitate additional healthcare services to improve patient outcomes.

This is a separate use case from existing Patient-to-Person linking and relies on reliable and available patient identifiers to correlate a patient to a person in an automated fashion.

6.1.2 EnterpriseID Auto-linking

EnterpriseID Auto-linking (section 6.8) is an automatic confirmation of a patient link for patients that have already been validated by other endpoints within a large health organization. The larger health organizations in the country have many different clinical systems deployed across many facilities.

Large health systems typically have an enterprise/corporate MPI service that acts as the patient identifier "source of truth." Revenue cycle systems are typically assigned this duty. New enterprise identifiers are passed downstream via ADT interfaces to different vendor systems within the large health organization. This use case enables auto-confirmation of patient links that match enterprise/corporate MPI numbers and patient demographics.

This approach eliminates the need for manual linking of patients by registration clerks within the same enterprise. The unique identifier assigned by the enterprise is easy to validate and to correlate.

6.2 Narrative

LOLA refers to an integer value expressing CommonWell's level of confidence in a Network Link (the relationship between Patient Records across Organizational boundaries). These links will, in most cases, carry a LOLA level of 1, 2, or 3. A level 0 link is established only after a patient's explicit denial of the existence of a link between his or her Person and a given Patient entity.

Level 0: Identifies a false-positive match between a Local Patient Record and a Remote Patient Record. This level can only be established by user interaction, downgrading a higher LOLA (e.g., a registration clerk confirms with an individual that a presumptive LOLA 1 Network Link is NOT the same person. The clerk then initiates a command message from the Edge System to CommonWell to downgrade the Level 1 Network Link between the two Patient Records to a LOLA 0). Once a Network Link is demoted to LOLA 0, the Remote Patient Record referenced by that link will no longer appear in the Local Patient Record's list of Network Links in any Edge System.

Level 1: Established by CommonWell's probabilistic matching algorithm, this identifies a presumptive match between a Local Patient Record and a Remote Patient Record. Network Links with LOLA 1 cannot be used for document query and retrieval. Edge System users may either validate this as a match (promoting the Network Link to LOLA 2 or LOLA 3 with strong ID) or confirm this is a false positive (demoting the Network Link to LOLA 0).

Level 2: Identifies a network relationship between Patient Records that has been validated using demographic information. Validation MUST be confirmed by an authorized user of an Edge System (e.g., a registration clerk verifies with an individual that his or her street address in the Local Patient Record is the same as the one found in a Remote Patient Record. The clerk then initiates a command message from the Edge System to CommonWell to create the Level

2 link between the two Patient Records). This is a virtual, transitive link established from one Patient entity to another through a shared Person.

Level 3: Identifies a network relationship between Patient Records that has been validated using demographic information and an authoritative ID. A positive verification based on a person already known to an Organization, in addition to validation of demographic information, can also achieve a level 3. This is a virtual, transitive link established from one Patient entity to another through a shared Person.

Level 4 (not yet implemented): Identifies a network relationship between Patient Records that have been validated using biometric data.

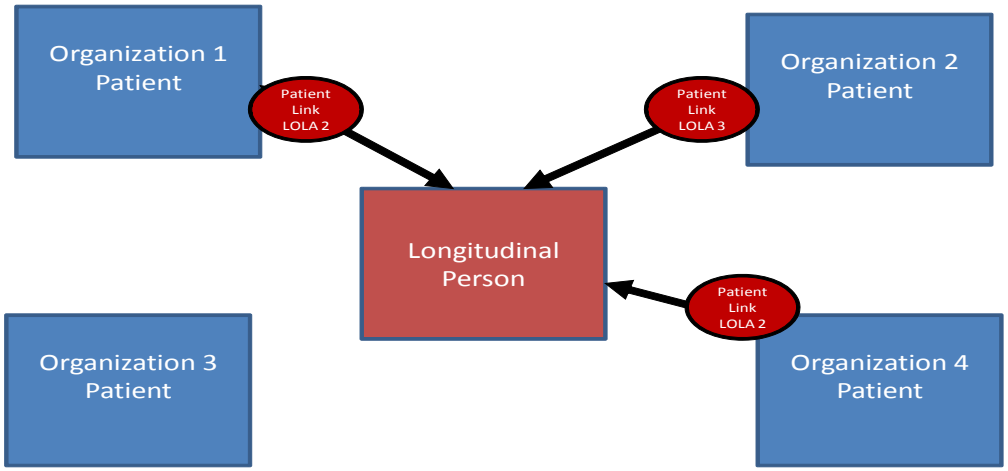
Organization: A healthcare system that interacts with the CommonWell services as a provider of Patient Identity information and as a consumer of the CommonWell Patient discovery and record location services. This term is used interchangeably with Community. An Organization's Edge System acts as a source of Patient Record data to CommonWell. An Organization's Responding Gateway maintains publicly available service endpoint(s) for query and retrieval of clinical data related to Patients maintained by the Organization. An Organization may represent a single healthcare facility or a Health Information Exchange (HIE) entity.

Patient Link: A Patient Link represents a relationship between a Person and a Patient Record. The existence of a Patient Link implies the acquisition of patient consent to establish the link. The level of confidence of this link is represented by its Level of Link Assurance (LOLA) value.

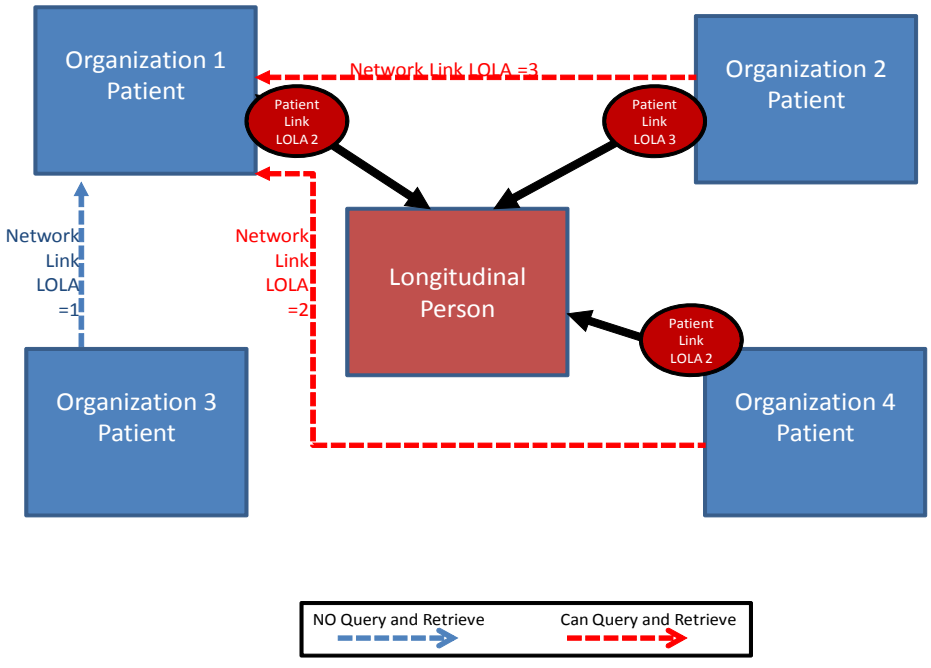
Network Link: A Network Link represents a transitive relationship between Patient Records that reference the same Person within CommonWell. The level of confidence of this link is represented by the Level of Link Assurance (LOLA) value.

Working Example: Assume Organization 1 has a LOLA 2 Patient Link; Organization 2 has a LOLA 3 Patient Link; Organization 3 has no Patient Link; Organization 4 has a LOLA 2 Patient Link. Network Links are defined by these Patient Links. These next diagrams define the World View of each Organization.

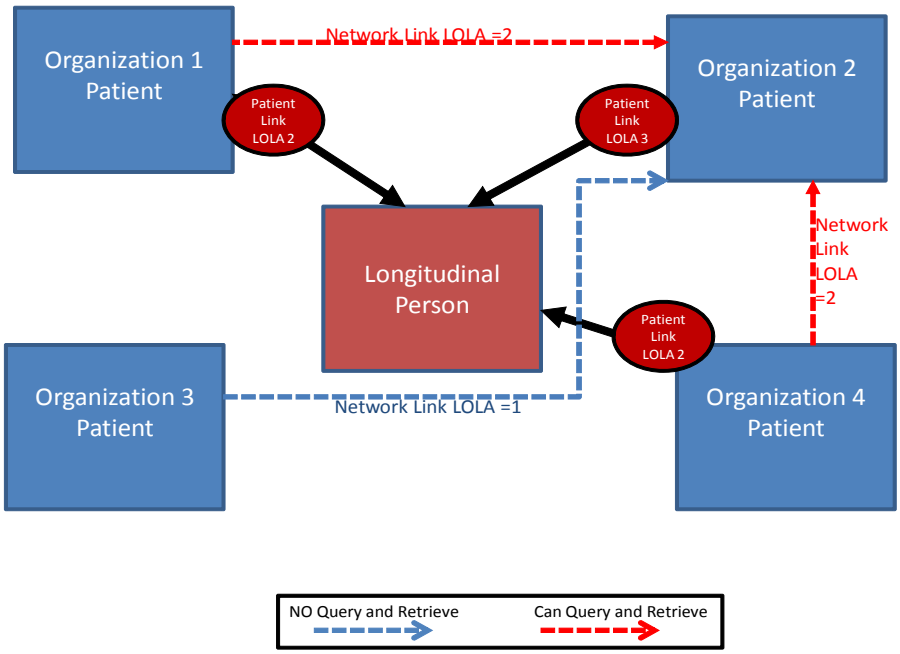
Person to *Patient Link* LOLA Defines Future Patient to Patient *Network Links*



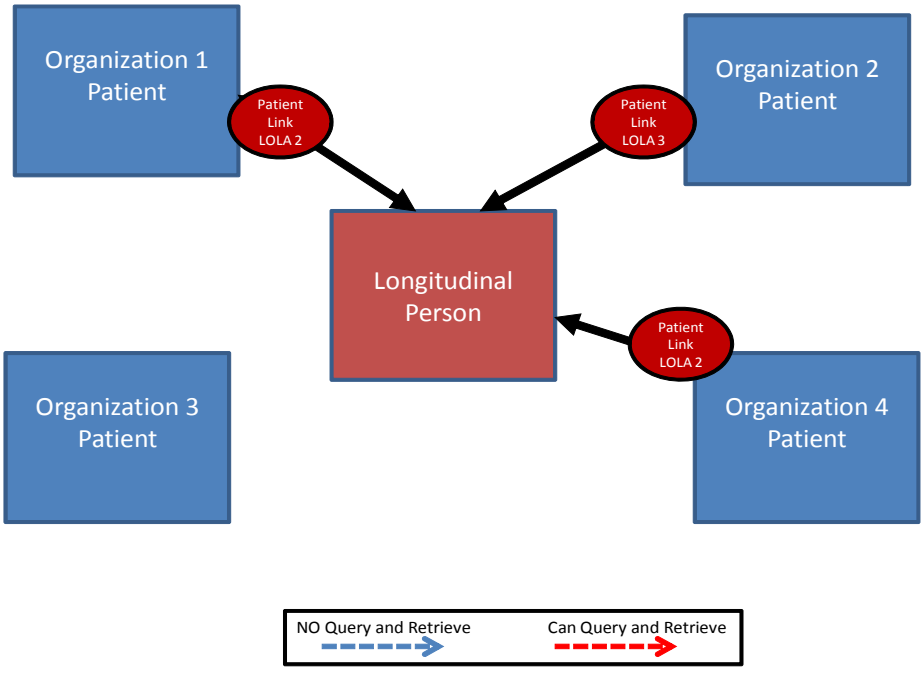
World View from Organization 1



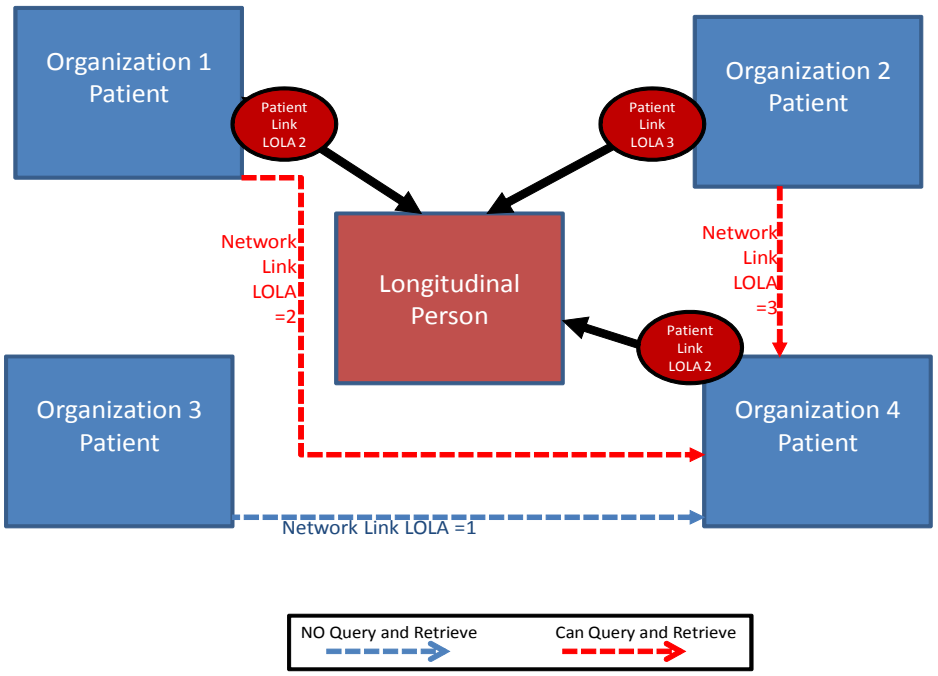
World View from Organization 2



World View from Organization 3



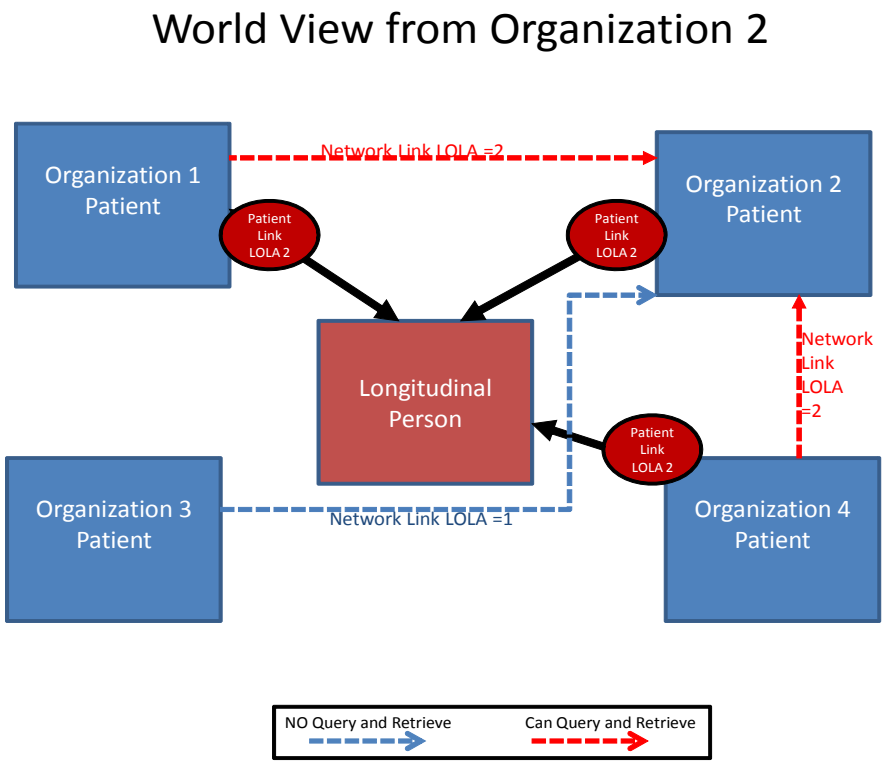
World View from Organization 4



6.3 Scenario 1 – As an Edge System user, I can add a link (linking Patient to Person)

6.3.1 Pre-conditions

Organization 1, 2, 3 4 are members of CommonWell.
The Patient was enrolled in CommonWell in Organization 1 without a strong ID.
A Person resource exists in CommonWell.
The Patient exists in Organization 3, and Organization 3 sent a registration message to CommonWell.

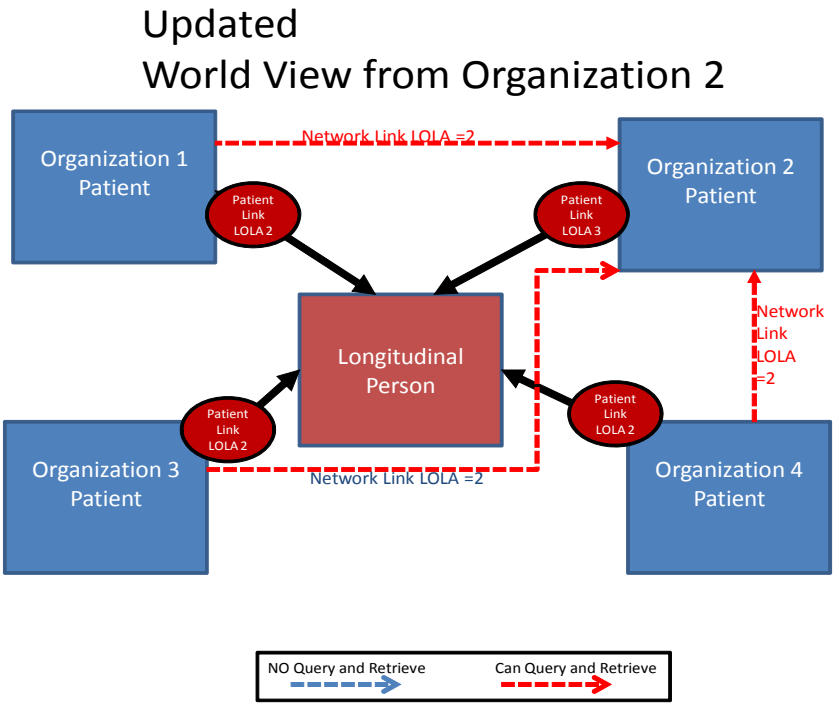


6.3.2 Scenario

The user at Organization 2 searches CommonWell for a matching Person.
CommonWell returns the Network Link (LOLA 1) from Organization 3 that matches the Patient.
The Edge System authorized user at Organization 2 verifies the patient identity.
The Edge System authorized user issues a command to link the Organization 3 Patient to the Person returned by the Patient Identity Service.

6.3.3 Post-conditions

Patient for Organization 3 has a new LOLA 2 Patient Link to the Person Record.
The Network Link from Organization 3 to Organization 1 is upgraded from LOLA 1 to LOLA 2.



6.3.4 Alternate Flows

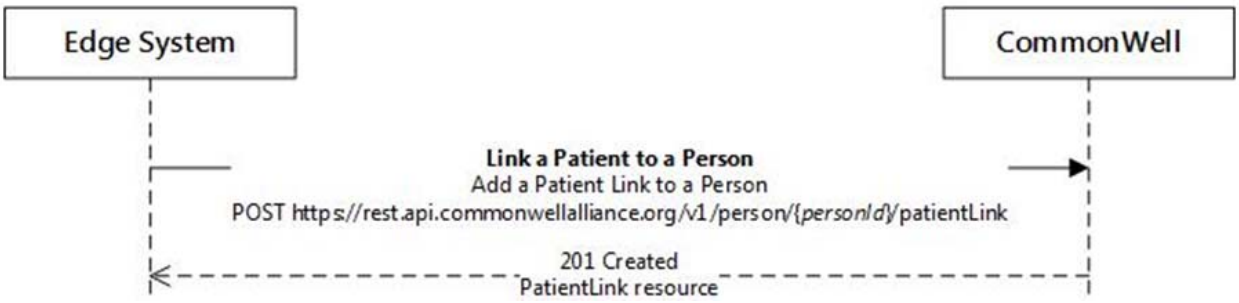
6.3.5 Exception Cases

Unauthorized access: CommonWell finds that the Edge System user is NOT authorized
Structural error:

- Incorrect formatting
- Missing required fields

System unavailable, Internal error, Conflict error in link request

6.3.6 Transactions:

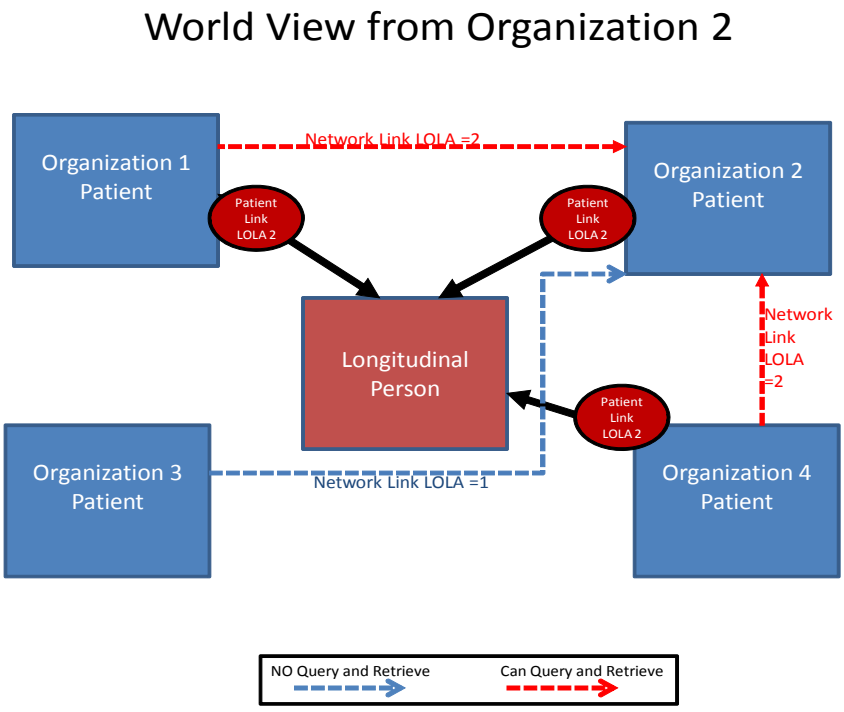


6.4 Scenario 2 – As an Edge System user, I can upgrade a Patient Link.

If an Organization registers patients into the CommonWell network, then they must accept that other Organizations can upgrade their LOLA network and Patient Links without their input. (Mental health operations should be careful not to register their patients with CommonWell).

6.4.1 Pre-conditions

Organization 2 is a member of CommonWell.
Person is enrolled in CommonWell.
Patient visited Organization 2 without a strong ID and was registered.
Authorized user verified demographic and Visit information during prior Visit.



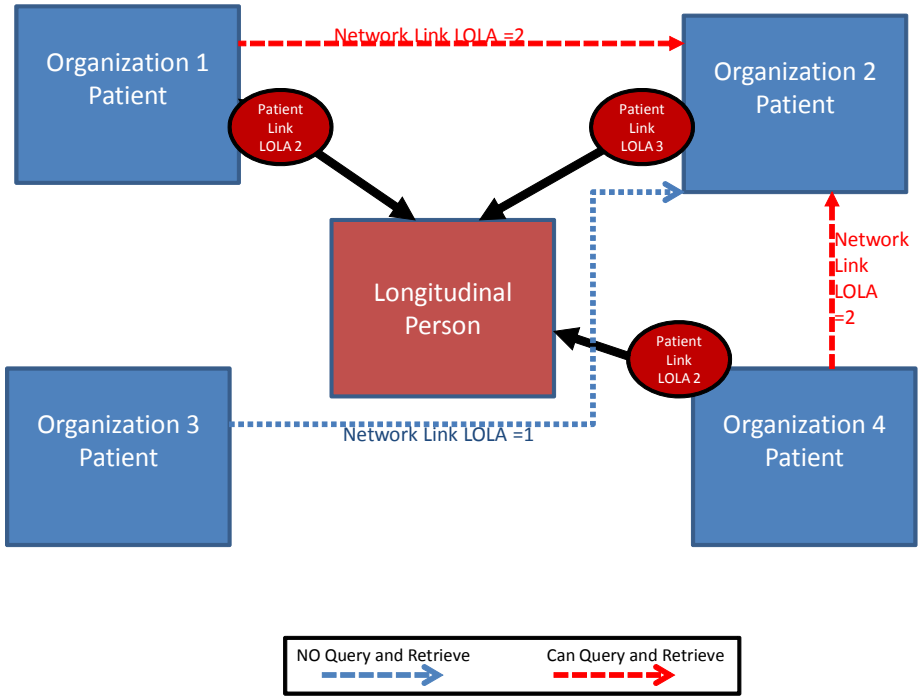
6.4.2 Scenario

Patient walks into Organization 2 again but with an authoritative ID.
The user at Organization 2 searches CommonWell for a Patient Match using demographics data that the person provides.
The Organization 2 user verifies the Visit information (Organization & date) along with the authoritative picture ID and upgrades the Person to Patient Link from LOLA 2 to LOLA 3.

6.4.3 Post-conditions

The Patient Link between Person and Organization 2 is upgraded from LOLA 2 to LOLA 3.

Update 2
World View from Organization 2

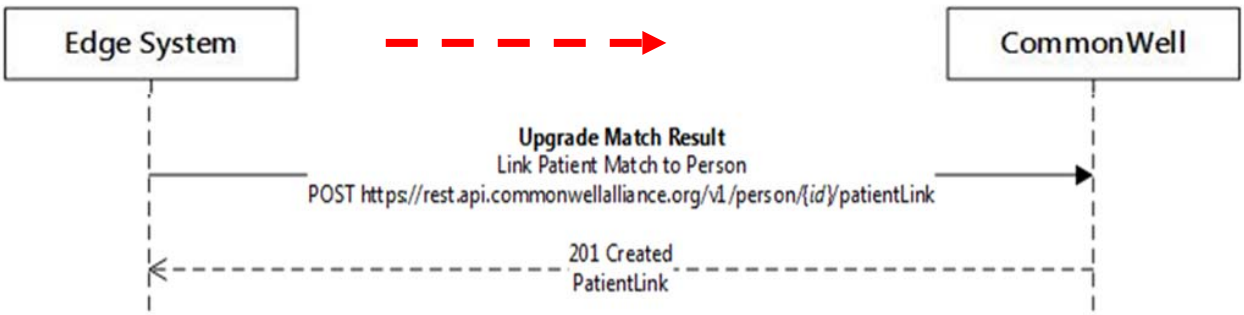


6.4.4 Alternate Flows

6.4.5 Exception Cases

Same as Scenario 1.

6.4.6 Transactions

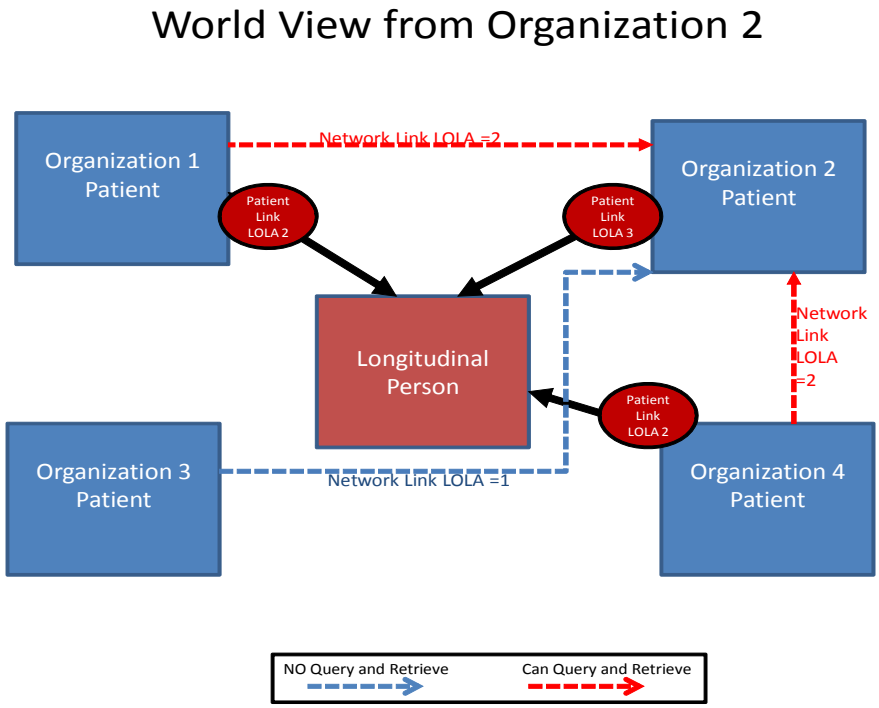


6.5 Scenario 3 – As an Edge System user, I can downgrade a link (linking Person to Patient)

6.5.1 Pre-conditions

Person is enrolled inside CommonWell and registered at Organization 2.
Patient is registered at Organization 1.

Patient came to Organization 1 impersonating Person at prior encounter.
The user at Organization 2 linked (LOLA 3) Patient to Person after verifying the authoritative ID.

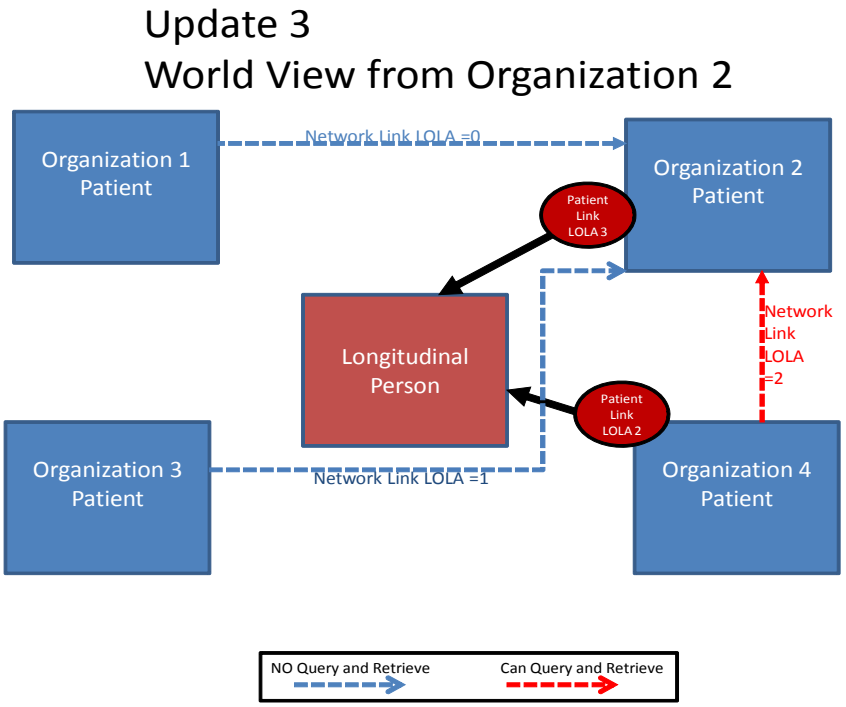


6.5.2 Scenario

The user at Organization 2 identifies the fraud from Organization 1 and downgrades the Patient Link from 2 to 0.

6.5.3 Post-conditions

The Network Link from Organization 1 to Organization 2 is downgraded from LOLA 2 to LOLA 0.

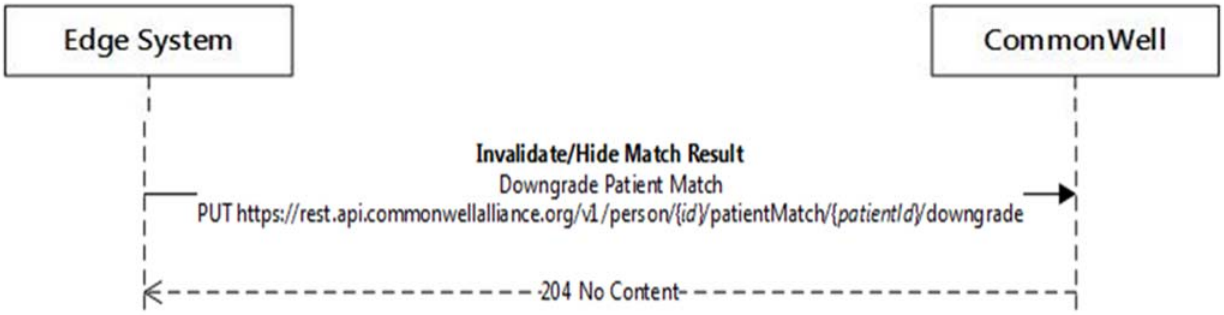


6.5.4 Alternate Flows

6.5.5 Exception Cases

Same as Scenario 1.

6.5.6 Transactions

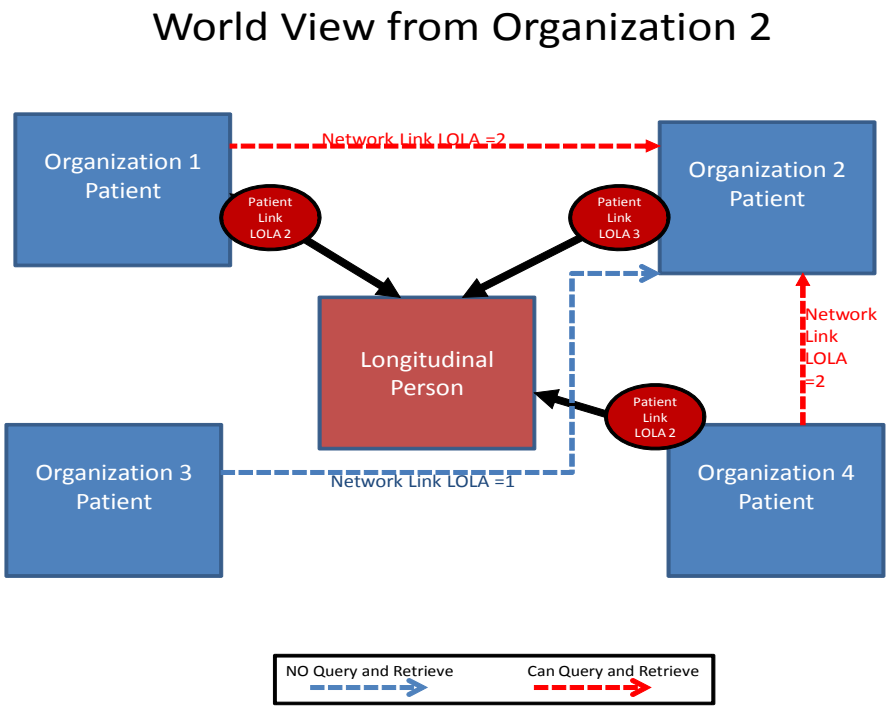


Reference pulled from CommonWell Pilot Services Specification v1.16.

6.6 Scenario 4 – As an Edge System user, I can remove a Patient from probabilistic matching (inactivate Patient)

6.6.1 Pre condition

Organizations 2 and 3 are members of CommonWell.
Demographic detail was entered incorrectly at Organization 3.



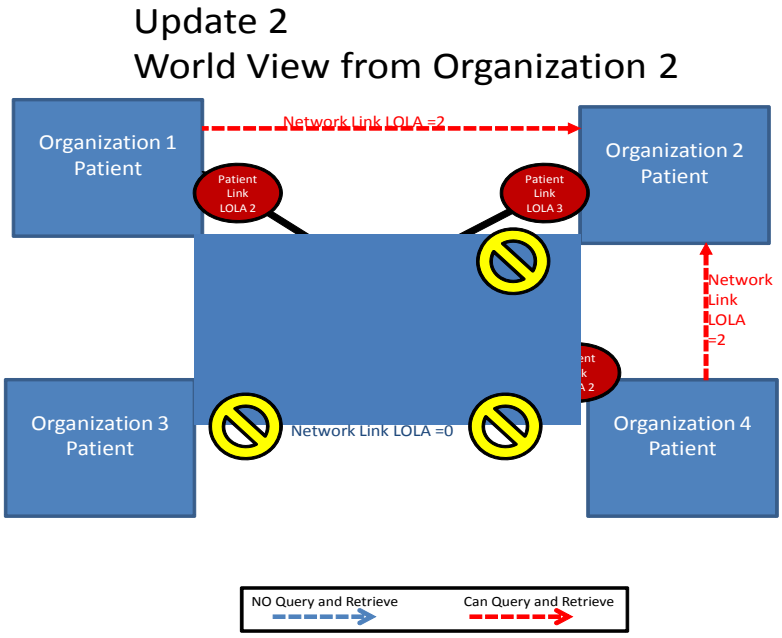
6.6.2 Scenario

Patient Record displays in matching because demographic was entered incorrectly.

Network Link needs to be removed (Level 1 to 0). An Edge System may delete a link relationship between a Person and a Patient. This action will indicate to CommonWell that the individual represented in the Person resource is not the same individual represented in the Patient resource, and CommonWell will downgrade the LOLA of this Patient to 0 for all subsequent match queries associated with the Person. This includes Patient match requests from the Person, as well as any Network Link requests originating from another Patient resource that is linked to this Person.

6.6.3 Post-conditions

Network Link from Organization 3 is no longer visible to Organization 2.

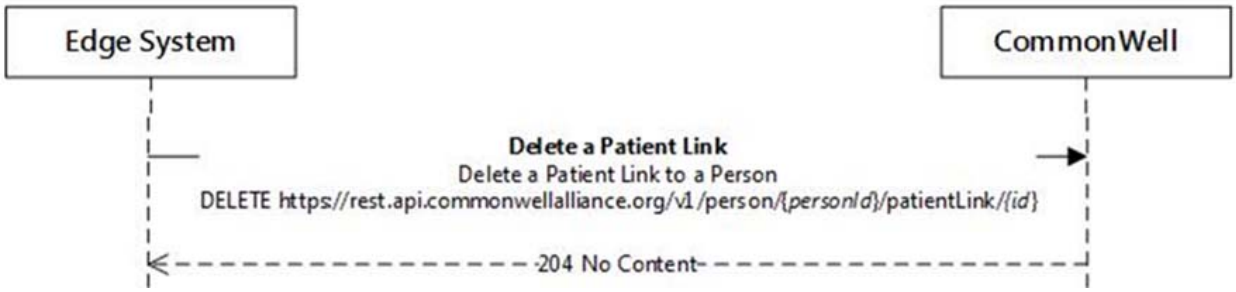


6.6.4 Alternate Flows

Patient wants to be inactivated from CommonWell (one of the 3 steps involved in unenrolling a Person).

6.6.5 Exception Cases

6.6.6 Transactions



Reference pulled from CommonWell Pilot Services Specification v1.16.

6.7 Scenario 5 – Automatic Correlated Linking

6.7.1 Pre-conditions

- The Patient is enrolled in CommonWell.
- The Patient is present in the upstream system.
- Both the upstream and downstream systems are running CommonWell-enabled services.
- The upstream system can include (within an order or referral) the necessary additional data elements to support Correlated Linking.

- The downstream system can consume the necessary data elements to enable Correlated Linking.
- The downstream system can transmit these data element(s) and identifiers to CommonWell.

6.7.2 Scenario

A referral or order is sent to a known downstream system. In the message associated with this order, the upstream system includes its local patient ID.

This same identifier is then sent to CommonWell from the downstream system along with its local patient ID within a PIX message. The upstream local ID, now as a shared identifier having been sent by both systems, can be used to validate the identity of the patient as the same person. To accomplish this, CommonWell validates that:

- These patient identifiers are the same.
- The demographic match meets current match criteria.

6.6.2.1 Workflow

An order or referral is created for a patient (either electronic or written).
The ordering system's local patient ID is sent to the downstream system within the order or referral.
This same unique identifier for the patient is then sent to CommonWell from the downstream system within a PIX registration message. This shared identifier can be used to correlate the identity of the patient as the same person.
CommonWell validates the patient identifiers between the initiating and receiving Organizations.
CommonWell validates that the demographic match meets current match criteria.
CommonWell creates a LOLA 2 link between the two acting systems.

6.7.3 Post-conditions

- A LOLA 2 link is created between the upstream and downstream patient records.
- Downstream system has access to CommonWell document query and retrieval services.
- Other CommonWell Organizations will be able to query for documents from the downstream system.
- Query and retrieval actions that traverse correlated links are logged distinctly.
- Correlated link creation is logged distinctly from normal link creation.
- Correlated links are flagged as such.

6.7.4 Alternate flows

If no match to an enrolled person is found in CommonWell for the patient that is submitted, the registration message will be treated as a typical registration message and follows the Registration use case.

If a correlated link is incorrectly created, the existing 'downgrade' use case will support correcting the error.

Persons will not always be enrolled at the first provider encountered. The patient's registration details will still flow into CommonWell even when the person has not yet enrolled. These patient identifiers will flow into CommonWell via PIX, as well as in the order or referral. These values will still be available if the patient enrolls at the downstream system.

6.7.5 Exception Cases

6.7.6 Expected Actions

6.7.7 Transactions

6.8 Scenario 6 – EnterpriseID Auto-linking

6.8.1 Pre-conditions

- Patient is enrolled in CommonWell
- Patient is present in the enterprise MPI
- Both the upstream and downstream systems are running CommonWell-enabled services

6.8.2 Scenario

As a departmental EHR system, I can reuse an enterprise MPI number (already known to CommonWell) to automatically link a patient's records.

6.8.3 Workflow

0-Inpatient Provider Org A and Ambulatory Org B are both owned by Healthcare Corporation C. This parent organization assigns the EMPI identifiers for A and B systems.

1-Patient presents first at the outpatient pavilion and is registered with local EHR system A. The EMPI number from the enterprise registration system is generated for the patient and sent to EHR system A. Then EHR system A sends this EMPI to CommonWell via PIX/REST along with the patient's demographics. The patient has a provider visit where tests and observations are performed and then leaves. (STEPS 1-3 in diagram)

2-The patient presents next at an Ambulatory Care provider B in the same building complex. This provider shares the same enterprise MPI engine but not the same EHR software. The provider attempts to register the patient locally into system B and notices that an EMPI is already generated for the patient. The registration of the patient into EHR system B generates a new PIX/REST transaction to CommonWell along with the existing EMPI number. (STEPS 4-6 in diagram)

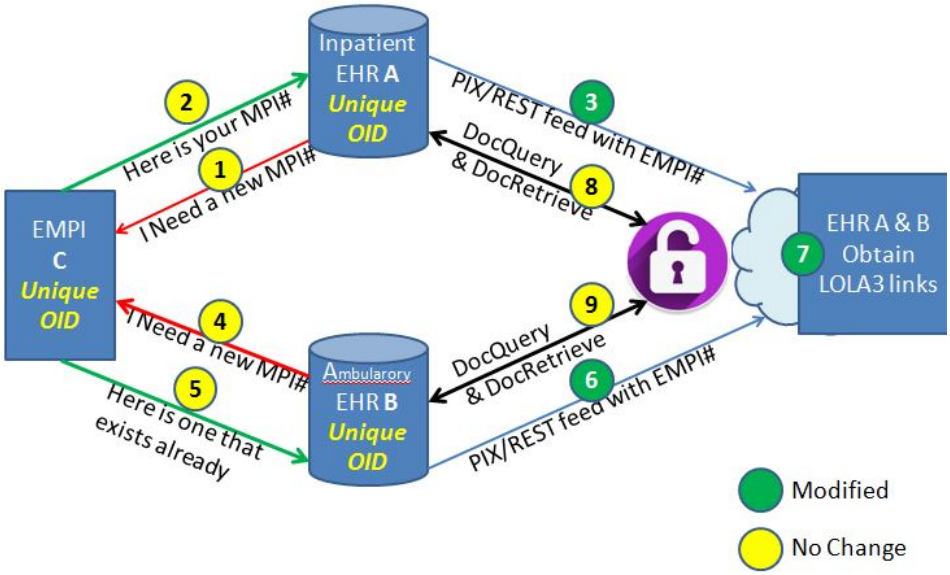
3-CommonWell receives both sets of demographics and matching EMPI numbers from the registration systems. The system compares the patient demographics from both providers and then compares the EMPI numbers. IF they match, a LOLA equivalent link from the second provider is automatically processed and the provider can begin Query & Retrieve activities. (These links will be tracked independently) (STEPS 7-9 in diagram)

Historical backload model would automatically batch link the All PATIENTS with a new EMPI number.

6.8.4 Post-conditions

A LOLA2+ equivalent link is created for EHR B and the provider can begin query and retrieve capabilities. A LOLA2+ equivalent link is created for EHR B and the provider can begin query and retrieve capabilities.

Enterprise AutoLinking Workflow



6.8.5 Alternate flows

An alternative to our core workflow is to require the Service Provider to return foreign identifiers every time a LOLA 1 match is found. This response to a probabilistic match could include a list of likely identifiers which can be used later to drive automated linking. This empowers the vendors to decide for themselves if they want to pursue auto-linking.

6.9 Scenario 7 – As an Edge System user, I can view and restore downgraded (LOLA0) links

6.9.1 Overview

If links are downgraded in error or there is a change in the patient's intent for a given organization to share data after a link has been upgraded, there may be a need to restore these links to their original algorithmically-assigned state.

6.9.2 Preconditions

- Patient is enrolled in CommonWell
- Patient has at least one potential link
- One or more algorithmic matches that were suggested in the past have been downgraded to LOLA0
- There is a legitimate reason for reviewing and restoring these downgraded link(s)

6.9.3 Scenarios

A) Registration staff downgrades an algorithmic match in error and wishes to correct the mistake

1. Patient presents at ambulatory center for care
2. As part of the routine registration workflow, the registration clerk accesses a list of all potential patient links

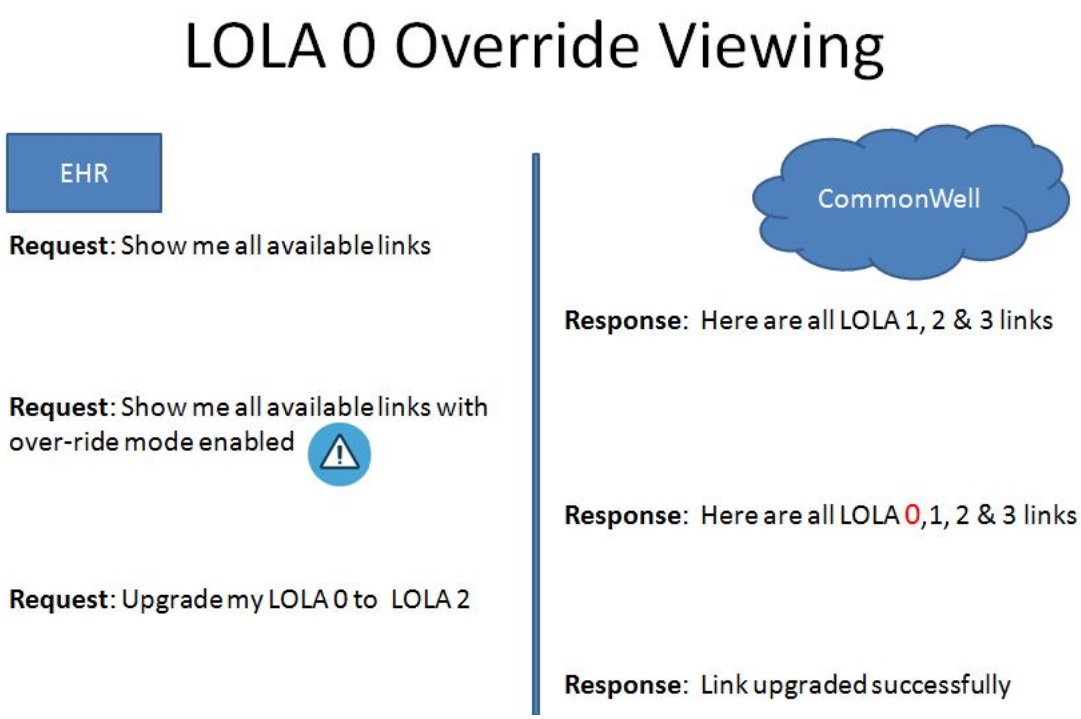
3. Patient reviews list and verifies that some potential matches are correct
4. Registration clerk selects the first of the 2 matches and hits 'confirm' option before selecting the second record.
5. CommonWell records the downgrade of 2 of the 3 records and no longer displays these records as potential matches
6. Registration clerk realizes the error and wishes to access those downgrades to accurately link patient records
7. Registration clerk selects option to recall all potential matches regardless of LOLA level
8. Registration clerk records the reason for his or her request by choosing "erroneous downgrade" from a list of selections
9. Registration clerk finds correct link and upgrades it to the appropriate LOLA level

B) Patient changes their mind about allowing access to a remote Organization's data after having previously downgraded the link

1. Patient presents at ambulatory center for care
2. During interaction with care provider, the patient decides that it would be beneficial to share data associated with a previously downgraded match with their care provider
3. Patient tells care provider about the available record
4. Care provider accesses a CommonWell matching interface and selects an option to view a restored algorithmic match list
5. Patient verifies the link that they wish to confirm
6. Care provider selects record for appropriate LOLA upgrade
7. Care provider records the reason for his or her request by choosing "patient directive" from a list of selections
8. CommonWell upgrades the link to the selected remote Organization

6.9.4 Postconditions

- Previously downgraded links are now set to an appropriate LOLA
- All previously downgraded links not manipulated during this process remain at a LOLA0
- The action is recorded in application logs and is available for reporting



6.10 Scenario 8 – Patient-Directed Link Management

6.10.1 Pre-conditions

- Person is already enrolled in CommonWell.
- Person has a relationship with a portal vendor who is a member of CommonWell.
- Person had visits at one or more CommonWell-enabled provider sites.
- Person has authenticated to a member-provided Portal solution and this authentication meets NIST 800-63 standard level 3.

6.10.2 Scenario

In order to support patient-directed interoperability, CommonWell provides a "choose-ahead" approach for patient-initiated establishment of links. This model requires the patient to pre-select Organizations where they have been seen from a list of CommonWell-enabled facilities. After selecting these locations, live registration messages resulting from subsequent visits provide final confirmation and establishment of these patient-initiated links.

- Person selects points of care which they have visited from a list that does not include indication of potential matches. The endpoint will be responsible for supporting the and selecting the organizations. CommonWell already has an API supporting Organization management which can be queried to return a list of provider Organizations.
- CommonWell receives these link upgrade requests from the person. CommonWell already has received a PIX registration message from these provider Organizations for that person.
- The two lists are compared by CommonWell for overlap.

6.10.3 Workflow

Patient has already enrolled in CommonWell from within a connected Portal solution.

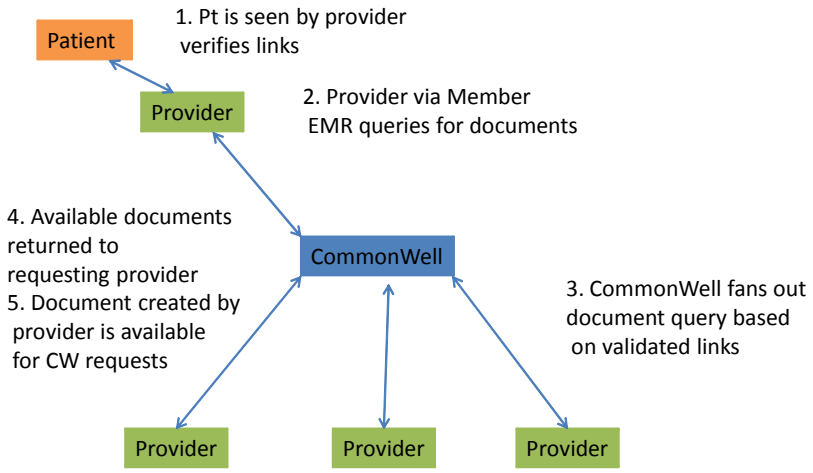
Patient's demographics can be used to identify a local geography to begin the search for potential providers.

Enrolled person flags both prior and future sites to engage. LOLA 2 links are created for prior visits where the demographic match is 100% (90% if PHR supports additional matching criteria such as cell phone, e-mail, etc.).

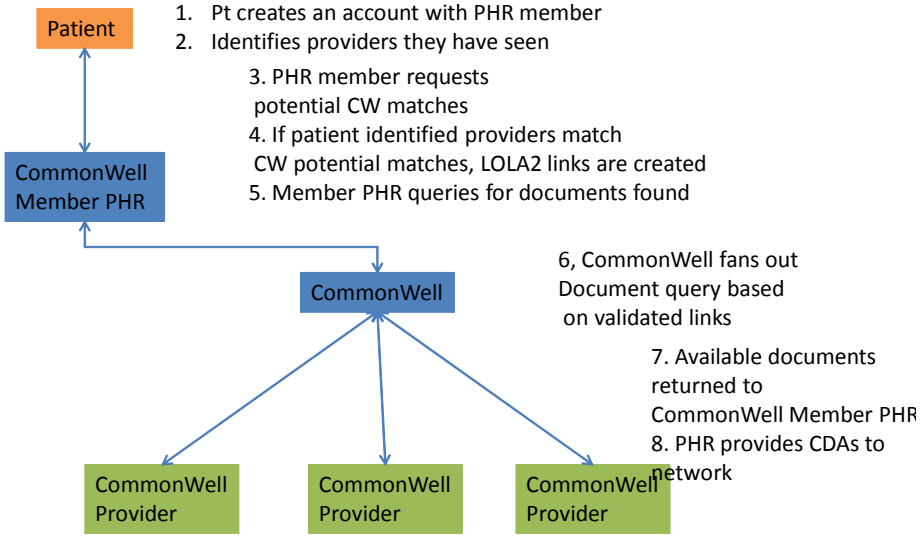
Patient visits their provider and registers normally.

PIX messages are sent to CommonWell as an outcome of these encounters.

Links are confirmed for these new care locations automatically.



Current data flow



Proposed PHR data flow

6.10.4 Post-conditions

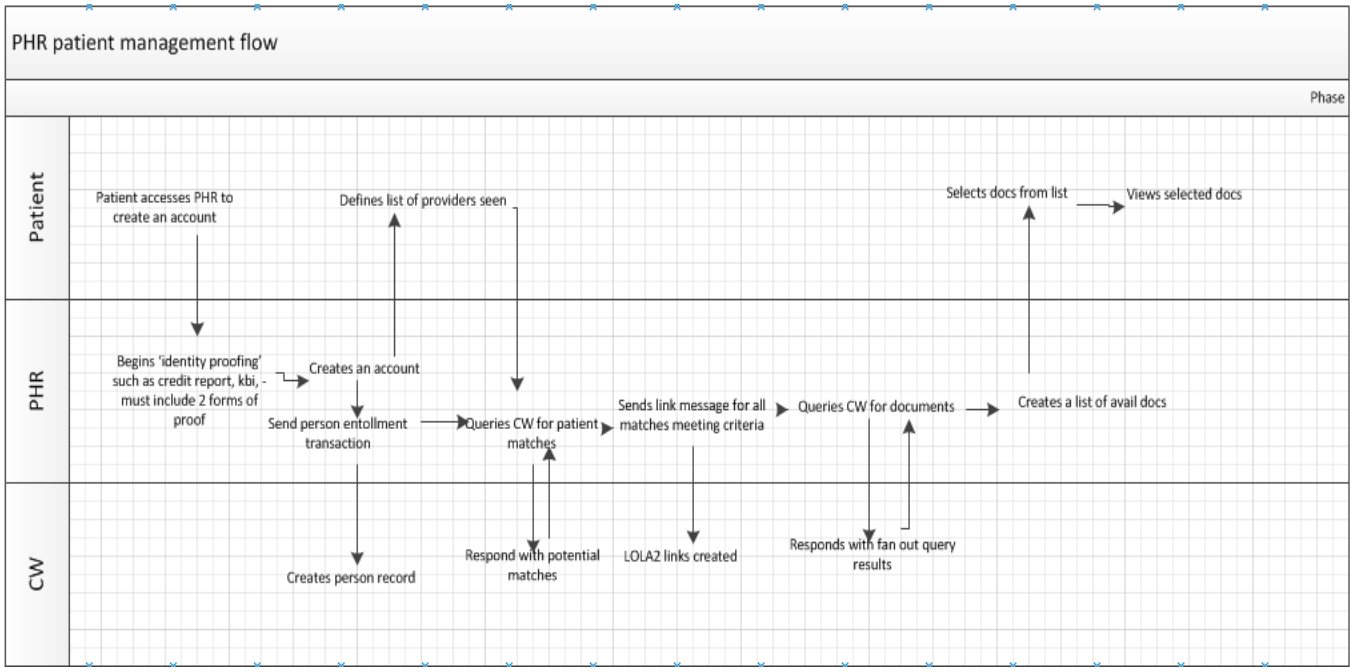
- LOLA 2 links are created for the facilities chosen by the patient which align with these registration messages. Points of care chosen by the patient which do not have a registration message will be ignored.
- Query and Retrieve capabilities are then activated for these facilities.

6.10.5 Alternate flows

6.10.6 Exception Cases

6.10.7 Expected Actions

6.10.8 Transactions



7 Patient Matches

As an Edge System organization, I can get a list of Patient matches.

7.1 Overview

Patient matching is the process of ensuring that entities on disparate systems both refer to the same individual. The ability to deliver high-assurance Patient Match results is the cornerstone of safe and effective document exchange. Participants must be able to understand how matches are established and their degree of reliability in order to trust the information that is obtained via the match.

7.2 Narrative

7.3 Scenario 1 – As an Edge System user, I can search for Patient matches (Patient is registered)

7.3.1 Pre-conditions

The Organization is registered with CommonWell.

The Patient is registered with CommonWell for this Organization.

7.3.2 Scenario

As an Edge System user, I can get Patient Matches using demographic and Visit attributes to help me identify the Patient.

Attributes include LOLA, Organization Name, Organization Location (optional), and Visit Date (optional).

7.3.3 Post-conditions

All possible matches for that Patient within the CommonWell network are returned along with key attributes.

7.3.4 Alternate Flows

No Match – In the event that the patient has no records in any other CommonWell Organization's repository, no matches will be returned.

Known CommonWell ID – In the event that the Patient's CommonWell ID is known, the participant may skip Patient Discovery and proceed to Patient Locator Query.

7.3.5 Exception Cases

Ambiguity – In the event that conflicting records or links to records result in a match ambiguity, no matches should be returned, and an alert should be raised to indicate a data integrity issue.

Unauthorized access: CommonWell finds that the Edge System user is NOT authorized.
Structural error:

- Incorrect formatting
- Missing required fields
- System unavailable
- Internal error

Conflict error in link request

8 Organization Management

As an Edge System vendor, I can manage my Organization.

8.1 Overview

Enables an Edge System vendor to create, edit, delete, and view their registered Organizations on the CommonWell network. By making this business workflow self-service, an Edge System vendor can more efficiently set up its participating Organizations, thus saving both time and money. (This will be done manually for the pilot.)

Edge System	An Edge System vendor is a business entity that sells clinical software services to

vendor	healthcare providers and/or Organizations.
Organization	An Organization is a Repository and Registry of Patient information that acts as an assigning authority for a specific patient population. An Organization can only be created by an Edge System vendor that has a contractual business relationship with the hospital, health system, or group of health systems to manage its patient population.

8.2 Narrative

8.3 Scenario 1 – As an Edge System user, I can register my Organization

8.3.1 Pre-conditions

Organization doesn't yet exist in CommonWell.
Required data is available for completion of registration.

8.3.2 Scenario

As an Edge System organization, I can provide the identifying information necessary to create an Organization on CommonWell, including:

- R: Organization name
- R: Organization type
- R: Assigning Authority of Organization
- R: Organization location (i.e., city, state)
- R: Edge System vendor name
- R: XCA Gateway HomeCommunityID (e.g., OID)
- R: XCA Gateway endpoint for Document Query
- R: XCA Gateway endpoint for Document Retrieve
- R: Technical support lead name, title & contact information (e.g., email and phone)
- R: X509 Client certificate w/ thumbprint

8.3.3 Post-conditions

Successful addition of the Organization to the CommonWell network.

8.3.4 Alternate Flows

8.3.5 Exception Cases

8.4 Scenario 2 – As an Edge System user, I am able to edit information about my Organization in CommonWell.

8.4.1 Pre-conditions

Organization exists inside the CommonWell network.

8.4.2 Scenario

A source system within an Organization requests that their Edge System vendor add another gateway to CommonWell.
–OR- Organization A changes its operating name from A to B.

8.4.3 Post-conditions

Edge System vendor is able to modify the profile of the source system and add a gateway to the Organization and/or change their name. Pilot scope requires this to be done manually.

8.4.4 Alternate Flows

8.4.5 Exception Cases

8.5 Scenario 3 – As an Edge System user, I can disable my Organization from CommonWell.

8.5.1 Pre-conditions

The Organization is in the CommonWell network.

8.5.2 Scenario

An Organization goes out of business.

8.5.3 Post-conditions

The Organization is flagged as disabled in the Edge System Registry.
The Organization is no longer solicited in document queries.
All Patient Records in the Patient Identity Service are disabled for that Organization. The Organization's Patient Records are not available for use (e.g., Patient Matching).

8.5.4 Alternate Flows

8.5.5 Exception Cases

Cleanup of PIX feed Patient flows into CommonWell could be a challenge. If a resource disables an Organization, this doesn't automatically disable the PIX feed. Human intervention would still be needed to stop the flow. Scripted cleanup would be necessary to ensure compliance to privacy/security expected by members.

9 Document Query and Retrieval

As an Edge System user, I can query and retrieve medical records from other CommonWell member Organizations.

9.1 Overview

Enables an Edge System (or authorized user within that Organization) to get a list of the documents that exist for a specific Patient from another Organization. Document Query should result in a response that includes *zero or more* document names, each with a minimum set of attributes: document name, document type (e.g., CCDA, radiology report, radiology image), document creation date, and document source. By providing this document list (and additional document context), Organizations will benefit from more informed and more targeted data access (i.e., tell me what data exists, so I can decide what data I actually want to retrieve).

Upon viewing the list of documents returned, the Edge System (or authorized user within that Organization) selects the documents they would like to retrieve. The CommonWell Health Alliance (CHA) Broker, a mechanism used to securely broker the exchange, executes the request and returns the document(s). CommonWell will only return Patient documents if the Patient at this Organization has established a LOLA 2 link or higher with other Organizations.

9.2 Narrative

9.3 Scenario 1 – As an Edge System user, I can use CommonWell to query for documents

9.3.1 Pre-conditions

The Organization is already an active CommonWell-registered Organization.
The Person is enrolled.
The Organization has been granted rights internally to access CommonWell.
Pilot-only: The provider is issuing the query for direct treatment purposes.

9.3.2 Scenario

The patient presents him/herself for an episode of care. The Edge System user opens the patient's chart. The user queries CommonWell for documents.

9.3.3 Post-conditions

Provider is able to view a list of documents created by responding Organizations along with associated metadata.

9.3.4 Alternate Flow:

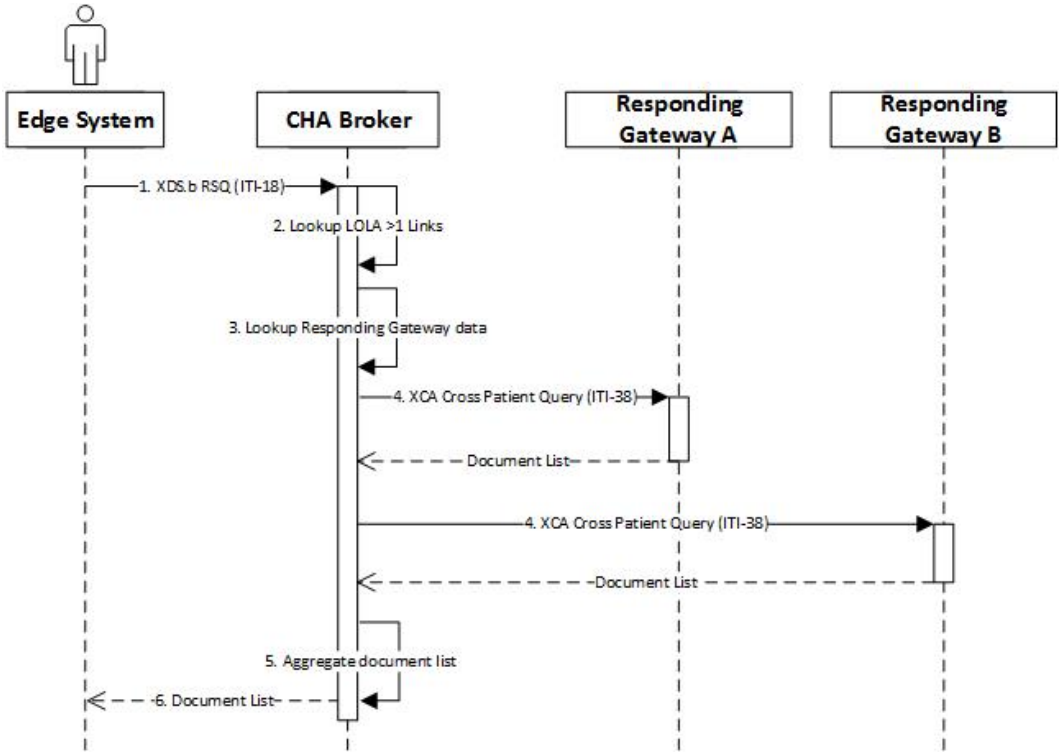
The person has not enrolled. The CommonWell services return an exception that the person is not enrolled.

As a clinical user, I need to find the clinical discharge summary documents for my patient. **[Document TypeCode]**

As a clinical user, I need to find any documents that are relevant to the patient and created after a given date. (e.g. last query date) **[Doc Creation Date]**

As a clinical user, I need to find any documents that are relevant to the patient pertaining to treatment after a given date. (e.g. last local visit date). **[Service Start/Stop Dates]**

9.3.5 Transactions



Reference pulled from *CommonWell Pilot Services Specification* v1.16.

1. The Edge System sends a FindDocuments Registry Stored Query (ITI-18) message to the CHA Broker. The request message contains the Local Patient Identifier for the patient.

2. The CHA Broker uses the Local Patient Identifier to lookup the Remote Patient Records with LOLA 2 or higher.

3. The CHA Broker references the Responding Gateway configuration for the Organizations corresponding to each of the Remote Patient Records.

4. The CHA Broker sends a Cross-Gateway Query (ITI-38) request to each of the Responding Gateways.

5. The CHA Broker aggregates the document lists returned by each of the Responding Gateways.

6. The CHA Broker returns the aggregated document list to the Edge System.

9.4 Scenario 2 – As an Edge System user, I can retrieve a patient document via CommonWell

9.4.1 Pre-conditions

The Edge System user has performed the query use case.

9.4.2 Scenario

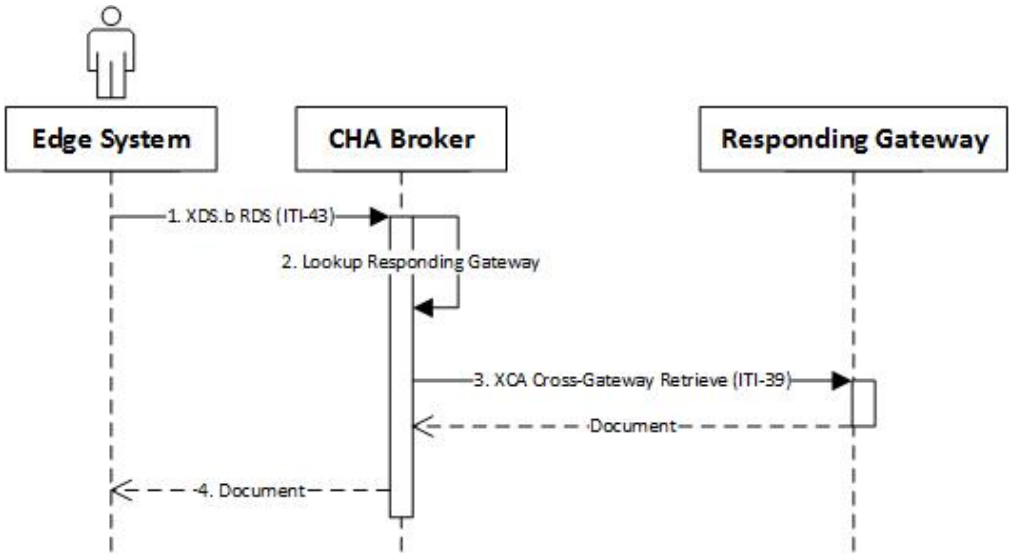
As an Edge System user, I can retrieve a Patient document via CommonWell.

9.4.3 Post-conditions

The Initiating Gateway retrieves the Patient document from the source and returns it to the Edge System user (document consumer).

9.4.4 Alternate Flow

9.4.5 Transactions



Reference pulled from *CommonWell Pilot Services Specification* v1.16.

1. The Edge System sends the CHA Broker a Retrieve Document Set (ITI-43) request message which includes the required identifiers: *HomeCommunityId, RepositoryUniqueId,* and *DocumentUniqueId*.

2. The CHA Broker looks up the Responding Gateway configuration for the Organization corresponding to the requested document.

3. The CHA Broker sends a Cross-Gateway Retrieve (ITI-39) request to the XCA Community's Responding Gateway service endpoint.

4. Once the document is received from the Responding Gateway, the CHA Broker forwards the response to the Edge System.

9.5 Scenario 3 (LAB) – As a source system for CommonWell, I can fulfill the request for documents via query and retrieve transactions.

9.5.1 Pre-conditions

The Edge System has registered as an Organization within the CommonWell network.
The person has been enrolled. The patient has provided consent for query and retrieval.

9.5.2 Scenario

As a Responding Gateway, I can fulfill the request for documents for a patient known to my Organization and to CommonWell.

9.5.3 Post-conditions

The Document Query returns a list of documents with metadata.

The Document Retrieve returns a document set to the CHA Broker.

9.5.4 Alternate Flows:

No documents available.

9.5.5 Error Conditions:

Organization is no longer a member of CommonWell.

Patient has revoked consent. Document is corrupted. Endpoint is offline.

9.6 Scenario 4 – As a patient, I can find and consume documents via a connected Portal web application

9.6.1 Pre-conditions

- Person has already been enrolled in CommonWell
- Patient has an active account to a provider's patient web portal
- Portal vendor is a contributing member of CommonWell
- Patient has established an elevated LOLA with more than one provider
- Documents exist for that patient at the other provider locations in the network
- Documents have met the Member's 'delayed delivery' criteria

9.6.2 Scenario

The design of the CommonWell platform has always been explicitly patient-centric. Today, our patients are interrogated for their consent to join the network and for link validation, but although they make these care-enhancing contributions of time and information, patients see little immediate benefit from enrollment.

With this use case, the Alliance improves the tangible value of CommonWell participation to the patient by allowing them to retrieve and view their own information within the existing web portal experiences that are offered by their providers.

This patient engagement solution enables enrolled patients to finally access the clinical data payload which has historically been only available to the provider. This use case applies only to portals which already manage patient access and identity.

9.6.3 Workflow

- The connected patient portal product leverages the existing links within CommonWell to find and display a list of available documents from linked providers.

- The available metadata helps the patient identify the document she wants to retrieve.
- The patient selects a document from a list.
- The patient portal's server-side software initiates the transaction to retrieve the specified document through CommonWell, in the same manner that a conventional Retrieve transaction is initiated.

9.6.4 Post-conditions

- The portal processes the content within the CDA and renders a patient-friendly version for viewing

9.6.5 Alternate Flows

9.6.6 Exceptions / Negative Flow

The patient is deemed incapable of comprehending their own medical information.

The information remains provisionally viewable for the patient portal, but it can be viewed by a Proxy of record.

Its provisional status will persist until the patient is authorized by the source provider to view the document within the patient portal.

The standard flow of documents across providers remains unchanged by any of these suggested workflows.

9.6.7 Error Conditions

10 Ambulatory Appendix

This appendix to the specification provides guidance for members who deploy CommonWell only to the ambulatory care space.

10.1 Person Enrollment

Patient will be in person. Registration clerk will not always have access to their Electronic Health Record (EHR). Access to the Enrollment Application would be expected. Clerks will be able to engage the person directly (locally defined) for informed consent. The local Practice Mgmt system would typically capture the strong ID/driver's license (DL) as part of their existing workflow. A desk resource at the physician office would absorb an additional step in patient registration to capture Person Enrollment info. Streamlining workflow is critical to ambulatory adoption of the CommonWell solution. There is limited resource availability for data capture in the ambulatory space compared to acute care registrations. To minimize disruption, we will leverage the probability that a DL is already on file in the Practice Mgmt system. So, when a patient appointment is scheduled, person demographics are already known to the clerk to accelerate enrollment. Many physician offices are not currently engaged with HIE workflows, and this additional need for consent may not be a known capture process.

10.2 Person Unenrollment

Any resource within the office setting should be able to quickly unenroll a Person from CommonWell. This activity should not be limited to the registration clerk. Unenrollment in the acute care space would be handled typically via the registration/ business office. This drives a need for multiple user types to have access to the Enrollment Application. Simplicity in access and workflow for unenrollment is more important to the ambulatory space than acute care space.

10.3 Person Management

There is a separation of duties within the non-acute care space which is more pronounced. The ability to query for available documents is valuable to the registration workflow, but the ability to retrieve documents should be limited to the clinicians and not registration personnel.

10.4 Demographic Patient Update

These updates would not be coming from a registration system in the outpatient space. The feed would be coming from the Edge System itself.

10.5 Level of Link Assurance (LOLA) Management

If we don't have service dates tied to a patient demographic record, there may be less detail per encounter. This would create challenges for assigning LOLA values for Network Links. The outpatient space doesn't always populate the PV1 segment in the PIX feed while the acute space typically does. (A04 for first Visit and A08 for subsequent Visits). These segments are not always triggered unless the demographics actually change. Depending upon the staffing levels of the Organization, LOLA modifications in the acute space may be performed by different roles than the ambulatory space.

10.6 Patient Matches

Note that the absence of service dates coming from ambulatory systems creates uncertainty in the matching process. A04 transactions will typically only be sent by ambulatory systems when new patients arrive. The A08 transactions will be sent only when a change of demographics is captured. (This includes changes to spelling.) There can be a significant time gap between pre-registration and actual clinical content creation. Thus retrieval would be impossible.

10.7 Organization Management

Since there is an assigning authority built at the Organization level, this typically aligns with the registration system. In the ambulatory care space, we have a similar concept, but it aligns with the OID. We expect to see multiple Organizations operating within a single Edge System. We also expect to see multiple Edge Systems operating within a single Organization.

10.8 Document Query and Retrieval

Front desk resource in front of patient/person will not have the workflow task to initiate a query. These resources may not have access to the EHR role which would enable a query. This could require a change to the workflow for the front office resource. For returning patients, the query could be pre-initiated or pre-retrieved before their upcoming Visit. This user may not be a clinical resource but would have knowledge of the medical records process. The user could simply generate the Document Query but hold the returned metadata for the clinician to review. Then the retrieval decisions would take place at different times by different user roles. How long should we hold the metadata for retrieval? Ambulatory would typically be run as a real-time activity but not always.

Info contained within Ambulatory EHRs is generated at a point in time. Some documents available in the systems are captured from external sources. These documents are often not owned by the local Ambulatory system (document source systems) and may belong to other CommonWell endpoints. This could create duplicate documents in the network. Sharing of this content could create confusion. This concern is not focused on the core CCD/CDA documentation. Surgical summary notes and other physician notes are documents that are attached to the patient's chart, but shouldn't be included in the sharable list of documents. Their retrieval should be deferred to their original source (responding system).