

Health Partnership for Tennessee (HIP TN)

Network Interoperability Services

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HIP TN

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VERSION HISTORY

Version #	Updated By	Revision Date	Description
0.1	Lin Wan	12/20/2010	Initial Draft
0.2	Peter Martin	12/28/2010	Format and HIP TN Deliverable Chapters
0.3	Peter Martin	01/05/2011	Inserted Milestone and format
0.4	JR	01/06/2011	Cutting and pasting parts
0.5.1	Lin Wan	01/11/2011	Changes and updates
0.6	JR, Peter, Becky	01/11/2011	Changes and updates
0.6.2	JR	01/15/2011	Changes and updates
0.7	Peter	01/19/2011	Accepted previous changes and added updates
0.8	Becky	01/28/2011	Updates from Becky merged together
0.9	Peter	1/31/2011	Updates from Lin merged with v.0.8
0.9.1	Lin Wan	2/1/2011	Update based on discussions with HIP TN, DOH, QOs
0.10	Becky	2/9/11	Accept changes and make general modifications
0.10.1	Lin Wan	2/17/11	Updates on how Facility Index will be used in immunization services.
0.11	Becky	2/21/11	Review Lin's changes, add new material, post to HIP TN website
0.12	Becky	2/28/11	Accept Lin's changes, add detail to Roles & Responsibilities sections
0.13	Becky	3/1/11	Make changes to RLS Phase 1 and Trust Broker, and add test plans for QO to QO and QO to Axolotl milestones.
0.21	Becky		Minor changes
0.23	Becky	3/23/11	Make changes to Immunization Registry milestone for DoH review.
0.25	Becky	3/31/11	Changes based on DoH review meeting
0.26	Becky	7/12/11	Revisions made; link added to 45 CFR Part 170, per Operations Council
0.29	Becky	9/22/11	Copied previous version to account for editing to reflect addition of XDS
0.30	Becky	10/18/11	Removed references to XDS; Added new milestone definition language
0.31	Becky, Nathalie	11/18/11	New QO definition inserted and immunization registry edits made

Version #	Updated By	Revision Date	Description
0.32	Edward Reihaneh	12/21/11	Updated Trust Broker validation logic
0.33	Becky	1/5/12	Accept changes made by Edward.
0.34	Becky, Nathalie	1/9/12	Make changes to language, etc,.

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Overview

Purpose

The purpose of this document is to provide a consolidated view of the HIP TN Network implementation deliverables provided by Axolotl. This document will be used:

- to ensure understanding across the HIP TN stakeholders;
- to ensure commitment by the vendors, QOs and Department of Health for the work to be completed in support of the HIP TN Network project;
- for support of the milestone approval process in communicating progress; and
- for approval of milestone completion to initiate reimbursement to the vendor, Axolotl.

Structure

The structure of the document includes introductory material on HIP TN and a description of each of the milestones which are part of the implementation of the HIP TN Network. Each of the milestones are described in detail to include, where applicable, a definition of the milestone, the function of that milestone, the specifications, the roles & responsibilities in achieving the milestone, and the test results (expected and actual) for the achievement of the milestone.

The final section includes production and post go-live operational support information.

HIP TN Network Services Overview

HIP TN Network Unique Terminology

HIP TN, in an effort to effectively manage trust, connectivity, security, privacy and costs has implemented a network of networks model that is based on connecting the following:

- Qualified Organizations
- State Enterprise Services
- Value Added Solution Providers

Each of the above plays a significant and vital role in the network of networks model. HIP TN recognizes that it doesn't have all the answers to health information exchange and expects that the definitions and criteria for the Qualified Organizations, State Enterprise Services and Value Added Solution Providers must be flexible, inclusive and overtime will require revision.

Qualified Organization

The purpose of a Qualified Organization (QO) is to aggregate information across a *community or communities of care** and link with the statewide health information exchange. A QO is an organization that is capable of fulfilling the criteria associated with:

- governance,
- technical,
- legal,
- policy, and
- financial viability defined by HIP TN

The QO is willing to enter into a binding contract with HIP TN that specifies these requirements and the legal obligations entailed therein.

* A community of care is a community of unaffiliated providers who serve patients in naturally-occurring patient access patterns that would interact on behalf of common patients.

The criteria associated with a Qualified Organization are as follows:

- **Governance**
 - A QO must have the ability to contract to represent a community or communities of care
 - A QO must have an internal governance structure to support policy development for the community or communities of care.
- **Technology**
 - HIP TN connectivity with each QO must support a direction to use and adopt standards as they are adopted or approved by Department of Health and Human Services.
 - Please refer to the HIP TN Network Interoperability Services document found at www.hiptn.org for specific requirements.
- **Legal**
 - Organization must be able to sign the HIP TN data sharing agreements and legally bind its legal constituency entities and bind the ultimate end users.
 - Organization must provide proof of liability insurance with limits of liability as specified by HIP TN
- **Policy**
 - Must agree contractually to abide by the HIP TN policies and also have a documented policy for monitoring compliance with policies and taking corrective action when non-compliance with a policy is an issue.
 - Bylaws are in place documenting how the organization is governed.
- **Financial Viability**
 - Provide an annual audit report from an independent audit firm without a “going concern” qualification, disclaimer or adverse opinion(s) reflecting on the QO’s accounting procedures.
 - If an audit report does reflect any of the above, the QO must submit an action plan/timeline to remediate the issues and the plan must be approved by HIP TN.

Exception Process

HIP TN is committed to an open, transparent and inclusive environment that promotes and provides the mechanisms for health information exchange to assist in the improvement of care. The definition and criteria for a Qualified Organization imply that any organization (e.g. a RHIO) that meets both will be welcome to connect to HIP TN. - Organizations that make a compelling case, that is in alignment with HIP TN’s mission and vision, **will be allowed to apply to the HIP TN Board for an exception based on the following situations:**

1. The organization provides a compelling business case that describes their costs, software issues, technical issues, legal issues, etc. for connecting directly or becoming a QO by exception.
OR
2. The organization provides documentation regarding its approach to high risk, rural, medically underserved populations and its approach to improving the care of the populations through a mechanism that doesn't fit the QO definition or criteria.
AND in either case must meet the following:
 - The organization describes its agreement with its "local QO" on how they will collaborate on patient care. This could include, but doesn't require, a commitment to participate in the governance structure or a commitment to participate in the financial viability of a QO in which the organization might participate.
 - The organization describes alternative means for addressing criteria that the organization is unable to meet.

Core Services

The Core Services consist of the following:

Trust Broker

The Trust Broker enables transaction-based routing. The component is an index of participating entities (Qualified Organizations, or QOs) including organizational details and what else?. It will store participating entity rules (based on data sharing agreements) to enable the sharing of clinical records. Information involved in the Trust Broker transactions includes participating entity organization provisioning, entity organization de-provisioning, auditing transactions, reporting transactions, compliance with policies and procedures, and authentication of participating entities organizations and certificate authority.

Service Access Layer

The Service Access Layer consists of uniform transport and security infrastructure based on web services standards and a Service Oriented Architecture, and is responsible for mediating all access to and from other Core Services: the various registries, the Trust Broker and the NwHIN gateway. The Service Access Layer is based on the NwHIN messaging platform standard as approved by HHS. This uniform interface simplifies interoperability and shields the other Core Service components from requestors/receivers/information **providers**, while also ensuring proper basic security is enforced. The Service Access Layer handles all transactions (push/pull) to and through the Core Services. It acts as the method to transport information to/from Enterprise and Value-Added Services. It works with the Trust Broker to establish authentication and maintains statistics on users, transactions, and information traffic.

Patient Matching Service / Record Locator Service

The HIP TN Network Patient Matching service allows users to discover patients across QOs and facilitates querying and retrieval of patient clinical data across QOs and other **entities** such as the Immunization Registry. (The Patient Matching Service will not be implemented in the initial implementation, but is expected to be demonstrated and/or utilized in a subsequent phase).

In the initial phase of implementation, patient matching will occur across the QOs, using their respective algorithms and the demographic data supplied by the user at the QO (minimum first name, last name, gender and date of birth). Patient Matching will also be performed within the MPI of the Immunization Registry.

Facility Index (Need to add HIP TN Address Book and HIP TN Destination Book

This component is an index of **facilities organizations** with which the **individual (clinician (or other user) registered in Tennessee has an affiliation/relationship**. It processes additions, deletions, and updates to the Facility Index and processes requests for information from the Facility Index. Note that **individuals clinicians** may be affiliated with multiple **facilities organizations**.

The Facility Index will be populated with data on participating **providers individuals and organizations** in the QOs. It will include demographic data on the **provider individuals or organization**, NPI identifier of the **provider individuals or organization**, and the community ID (of that **provider's individual or organization's**? QO) and will be used for messages sent to the Immunization Registry.

Clinician Index

This component is an index containing all relevant information on all registered **clinicians individuals** within Tennessee. It processes additions, deletions, and updates to relevant **individual (clinician)** information. "Clinician" is broadly defined to include all certified and licensed clinicians (e.g., physicians, nurse practitioners, nurses, certified nursing assistants, medical assistants, etc).

The Clinician Index will not be utilized in the initial implementation of the HIP TN Network. An index of users and their access will be the responsibility of the QOs.

NwHIN Gateway

The NwHIN Gateway provides for a single statewide implementation of the NwHIN Connect gateway available as a web service for authorized **users individuals** and **entities organizations**. This service is the required standard for interoperability with federal agencies, and the proposed standard for the exchange of clinical information across the NwHIN. The NwHIN Gateway is expected to be implemented upon acknowledgement of readiness and

scheduling by the ONC and Axolotl. HIP TN has completed the DURSA and application process and has been approved by the ONC as of July 2011.

Enterprise Services

Procured and overseen by State government, Enterprise Services will help organizations meet the federal criteria and state requirements for the Meaningful Use of certified EHR technologies. The Enterprise Services will make a specified set of State agency data available to authorized users through HIP TN Network's Core Services.

The State has identified the requirement for three Enterprise Services to be deployed during the initial implementation:

1. **Immunization Registry**

The State will update its immunization registry to receive data through the HIP TN Network in a format as required by the final federal rule on standards and certification. Tennessee's Department of Health Immunization Registry will be capable of electronically recording, retrieving, and transmitting immunization information in accordance with national standards and specifications.

The State currently uses the following CDC implementation guides for immunization data transmissions: (1) *IM v2.3.1: Centers for Disease Control and Prevention Implementation Guide for Immunizations Data Transactions using Version 2.3.1 of the Health Level Seven Standard Protocol Version 2.2* and (2) *IM v2.5.1: Centers for Disease Control and Prevention Implementation Guide for Immunizations Data Transactions using Version 2.5.1 of the Health Level Seven Standard Protocol Version 1.0*.

2. ***Electronic Lab Reporting***

3. ***To be determined***

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High Level Architecture

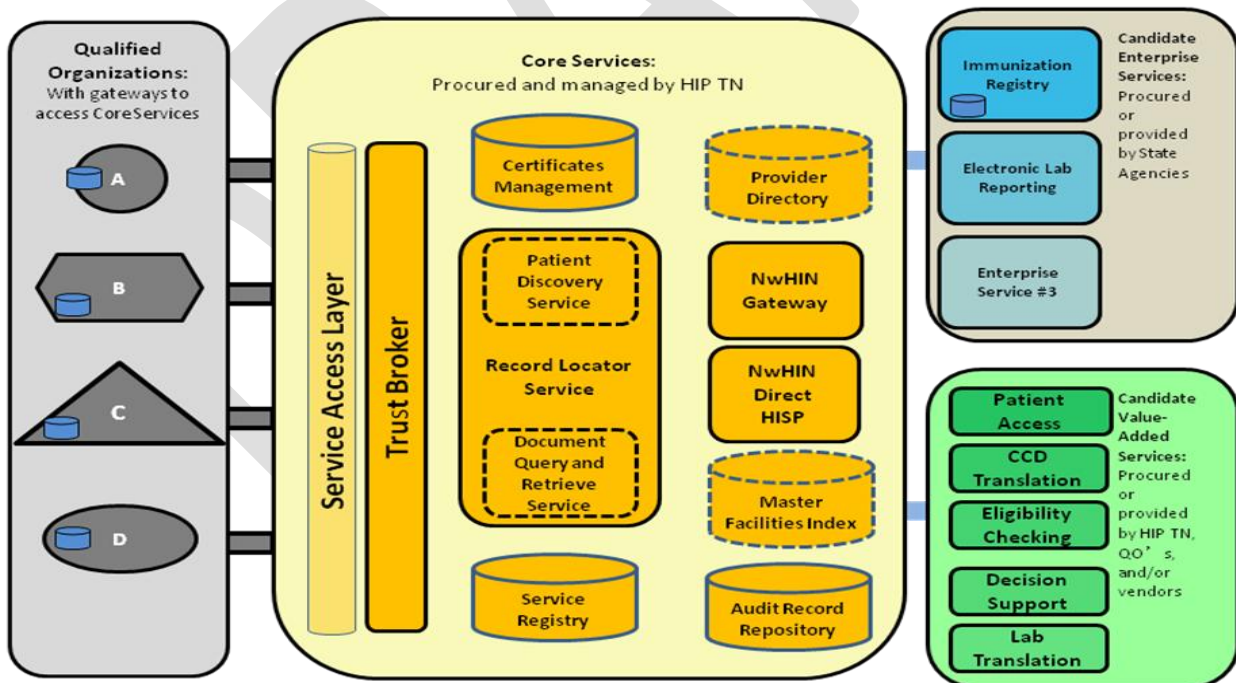
The HIP TN Network architecture is designed to support statewide health information exchange in the State of Tennessee. As a “network of networks”, or “hub of hubs”, the HIP TN Network will facilitate the exchange of information between Qualified Organizations, Enterprise Services (representing State agencies), and Value-Added Services. Although much Health Information Exchange (HIE) is local, increasing value will accrue to broader HIE, from obtaining information relevant at the point of care (like non-local encounters and analytical services, such as clinical decision support), to public health and emergency response.

The visual overview below depicts connection points between the aforementioned entities.

Visual Overview

Figure 1: HIP TN HIE Network – need to update visual? Provider Directory?

HIP TN Network Project Overview



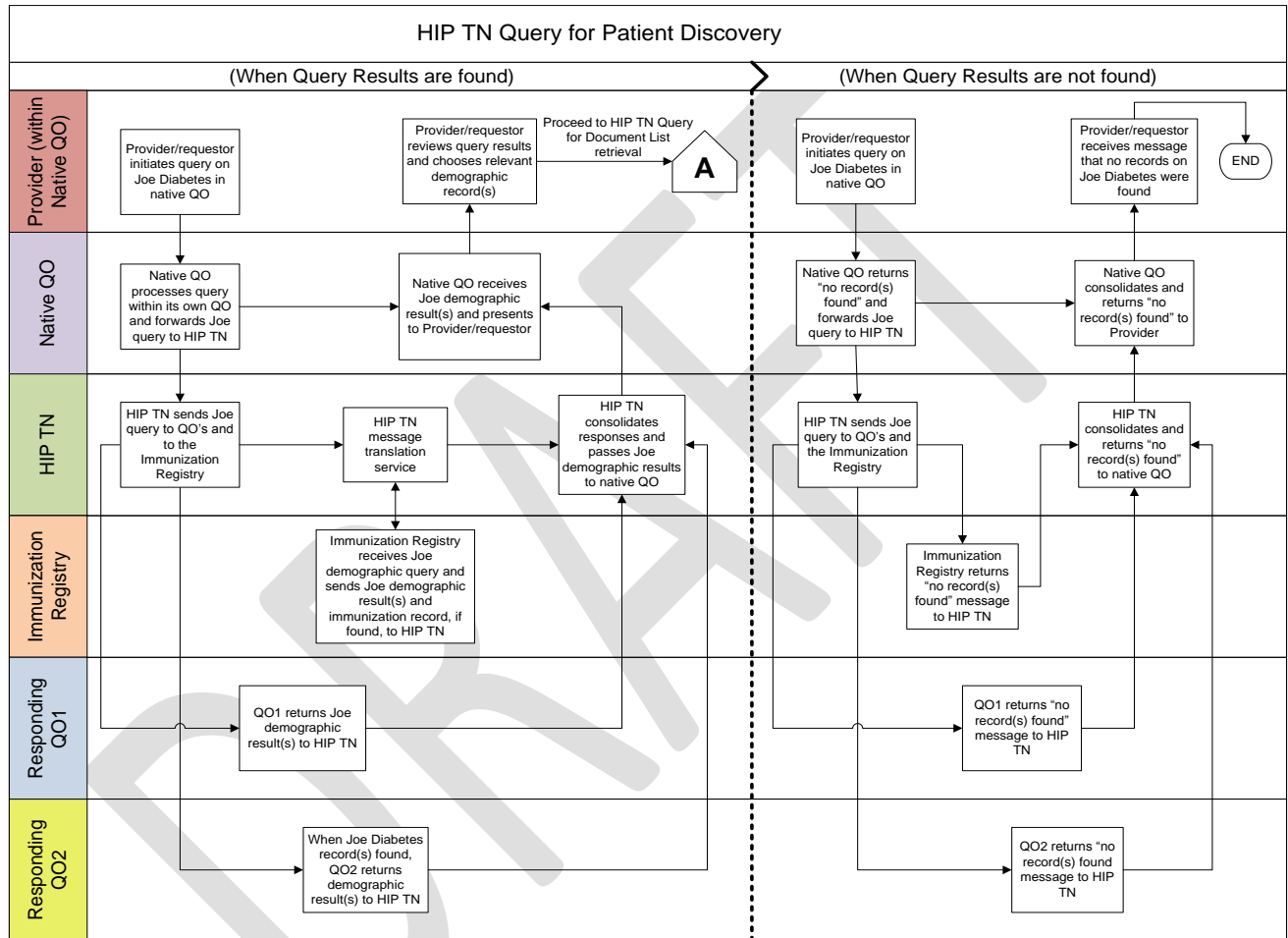
The table below lists the key HIP TN Network Interoperability Services. Standard IHE transactions each service leverages, wherever applicable, are also listed in the table.

HIP TN Services	IHE ITI #	IHE Transactions
Patient Discovery Services [Record Locator Services (RLS)]		
	ITI-55	Cross Gateway Patient Discovery
Clinical Document Query and Retrieve Services		
Query For Documents	ITI-38	Cross Gateway Query
Retrieve Documents	ITI-39	Cross Gateway Retrieve
Immunization Gateway Services		
	ITI-55 ITI-38 ITI-39	Patient immunization query will be included in the Record Locator Services using XCPQ and XCA transactions. Submission of vaccination record, query for vaccination history will be done via HL7 VXU and VXQ messages. HL7 VXR and VXX messages will be processed in response to VXQ queries to the immunization registry.
Trust Broker		
	ITI-40	Provide X-User Assertion XUA is part of the SAML assertions in messages exchanged between QOs and HIP TN.

End to End Processes

Query for Patient Discovery

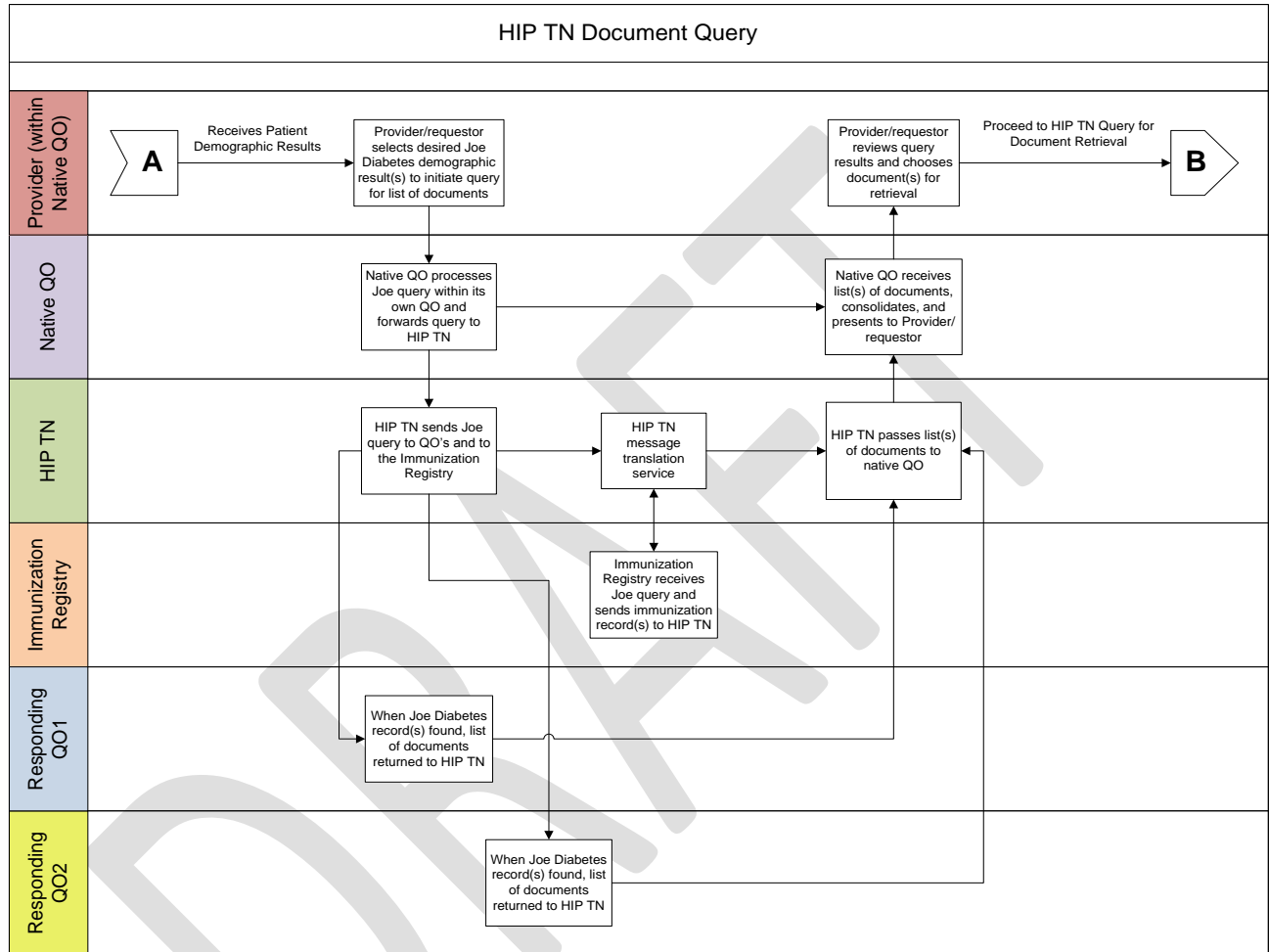
Figure 2: Patient Discovery



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Document Query

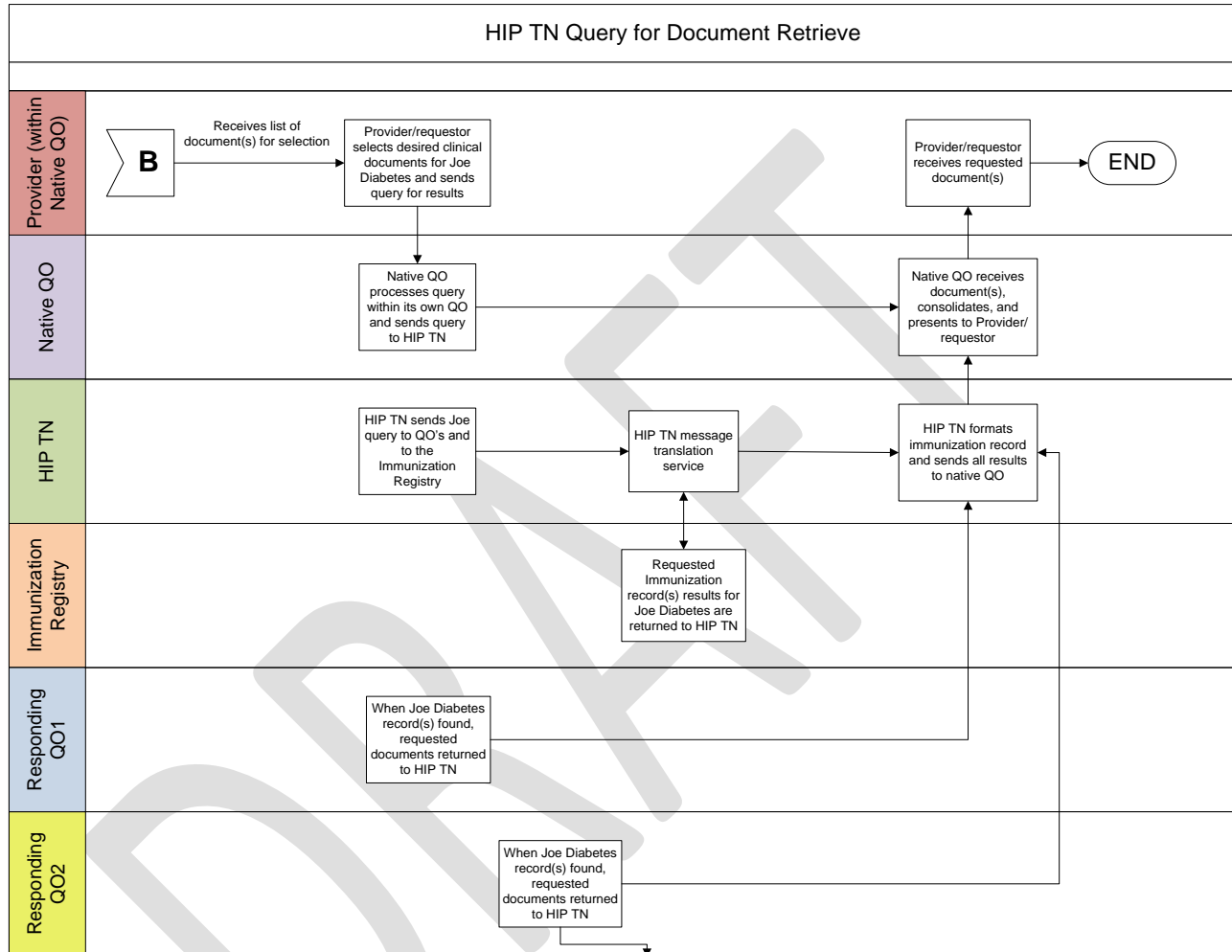
Figure 3: Document Query



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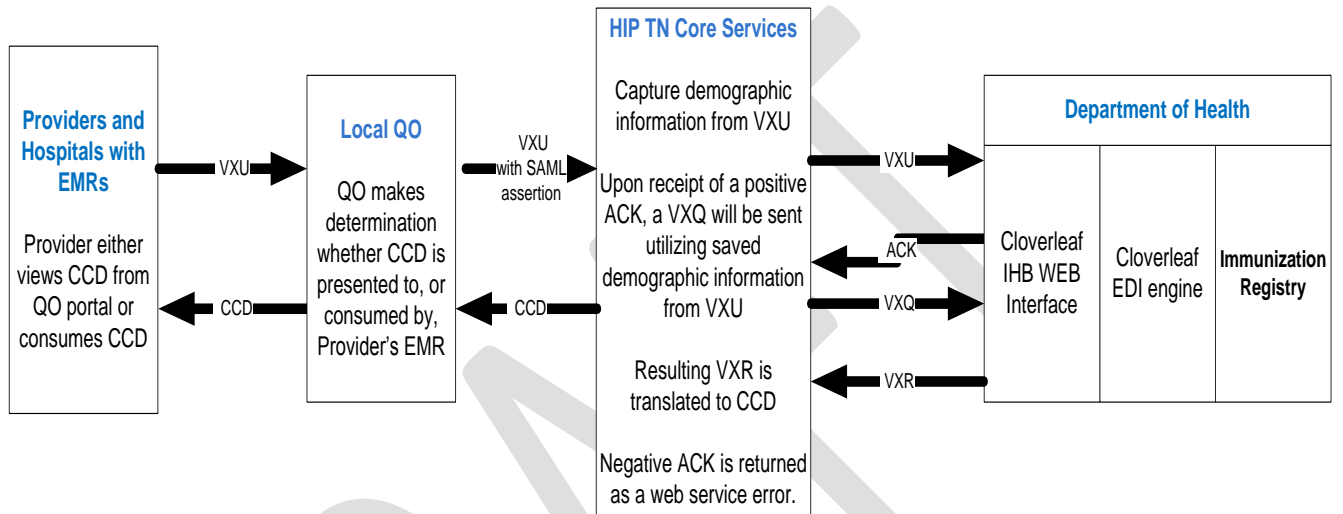
Query for Document Retrieve

Figure 4: Document Retrieve



Immunization Registry Update

Figure 5: Provider Individual or Organization sends Immunization Registry Update from EHR (HL7 VXU message)



VXU (Vaccination Record Update)
 VXQ (Patient Query)
 VXR (Patient Found with history)
 VXX (Several Patients found)
 ACK (Positive acknowledgement or negative error ACK message)

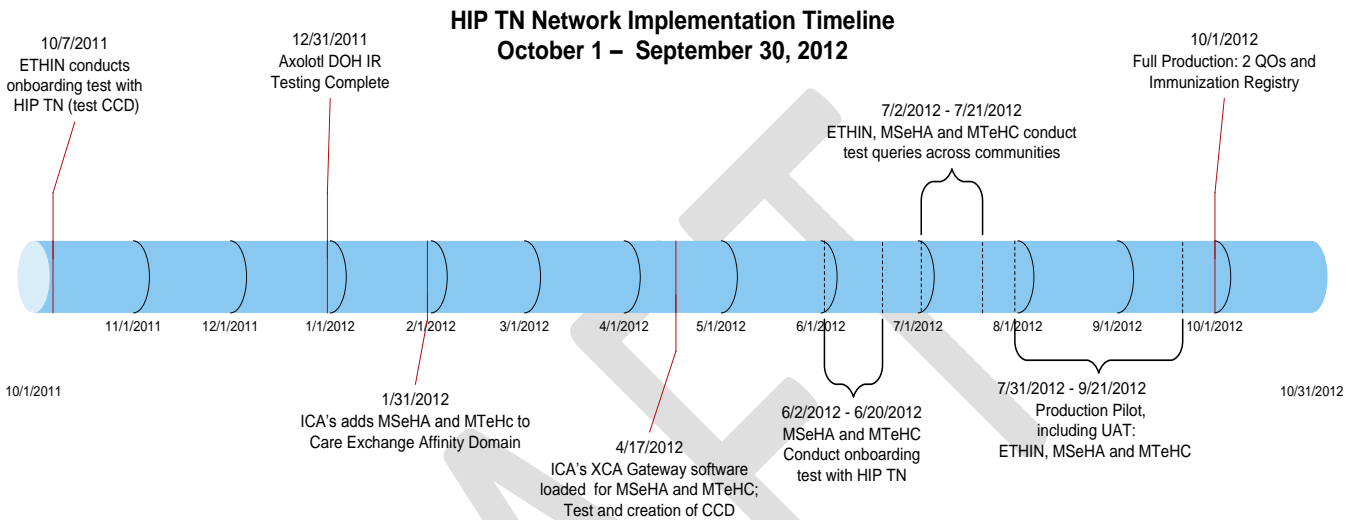
Implementation Overview

The implementation of the HIP TN Network began in late 2010 and is expected to be in pilot production on July 31, 2012. The project is dependent upon the readiness of two QOs and the Immunization Registry. Critical milestones in the implementation are pictured in the Timeline pipe chart below. These include: creation and approval of key privacy and security policies; decisions on Axolotl software components such as Record Locator Service, Facility Index, Clinician Index, and Trust Broker; the creation and execution of connectivity agreements; interoperability testing between the QOs, Axolotl (HIP TN Network) and the Immunization Registry; end-to-end user acceptance testing of the HIP TN Network environment; and approval of all milestones scheduled to be completed prior to full production.

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Schedule / Timeline

Figure 6: HIP TN Network Timeline



Assumptions:

- On July 31, 2012 ETHIN, MSeHA and MTeHC will be on-boarded/connected to HIP TN and by then will have executed a pilot with test patients between communities. Onboarding is defined as HIP TN and the QOs, in a Pilot Production stage, are connected and performing cross-community queries (on "real" patients). At least 2 of the QOs will be capable of sending a VXU message to the Department of Health
- *NOTE: The on-boarding process has not been fully defined at this time but assumes legal, policy and technical connectivity.
- The amount of time for User Acceptance Testing needs to be defined by the Qualified Organizations; the 8 weeks is a placeholder and will determine when HIP TN will be in Full Production mode.

Milestone Definition

The following milestones were contracted to be included in the HIP TN Network. The items listed below, in **bold** text, are scheduled to be in production for the Full Production of the HIP TN Network implementation. For further explanation of each milestone, see each milestone section included in this document.

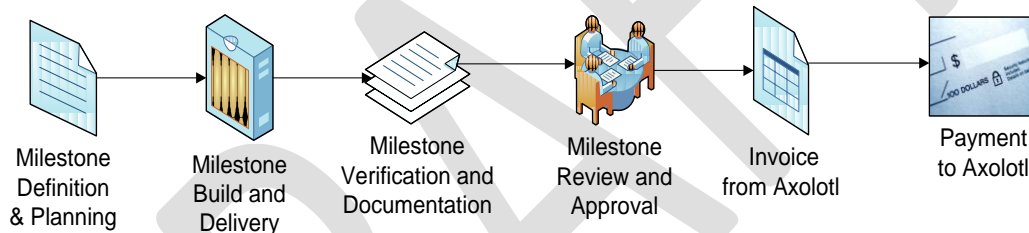
- **Base Infrastructure Environment Available and Operational**
- **Test NwHIN Gateway Connectivity**
- Patient Matching Engine / Record Locator Services
- **Trust Broker Services** (note: includes Clinician and **Facility** Indexes)
- **Inter-HIE Query between Axolotl and two Qualified Organizations (QOs)**
- **Inter-HIE Query between two Qualified Organizations (QOs)**
- **Inter-HIE Production Pilot between two Qualified Organizations**
- Full Production Inter-HIE Go-Live
- **Access to State Immunization Registry**
- Access to Electronic Laboratory Reporting
- Access to State Services (3)

Milestone Approval Process

Overview: By contract between Axolotl and Health Information Partnership of Tennessee (HIP TN) and by contract between HIP TN and the Tennessee Office of eHealth Initiatives (OeHI), documentation supporting the completion of Axolotl Implementation Milestones must be submitted and approved by HIP TN (and the OeHI). Once approval has been obtained, Axolotl will submit an invoice to HIP TN. Subsequently, HIP TN will then submit an invoice to OeHI to release funds to be applied to payment of the Axolotl invoice. Once funds have been received, HIP TN will institute payment of Axolotl invoice.

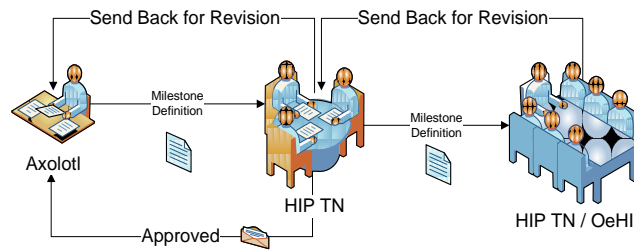
The following flowchart gives a high level view of the milestone approval and adoption process:

High Level HIP TN Axolotl Implementation Milestone Approval Process
Figure 7: Milestone Approval Process

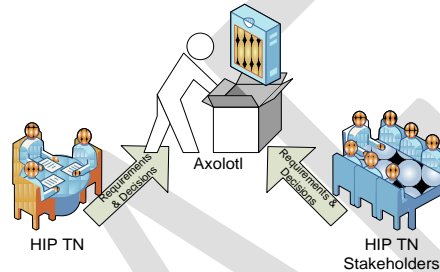


The delivery and payment of each milestone will consist of several steps. It will begin with the agreement on the Milestone Definition by Axolotl and conclude with payment for the milestone from HIP TN to Axolotl. Each milestone will be defined by Axolotl, approved by HIP TN and the OeHI, and should reflect the intent of HIP TN as defined in RFP #1001 and in Axolotl's response to this RFP.

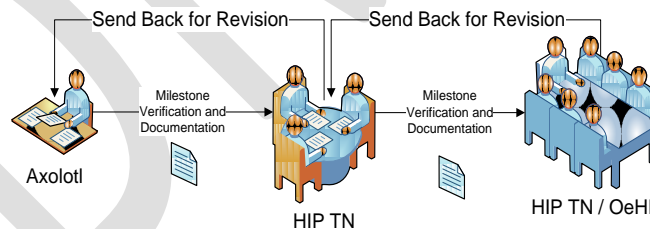
The **Milestone Definition & Planning** step, illustrated below, consists of Axolotl defining, at a high level, what will be included in the final documentation of the milestone and planning what will be built / delivered. The Milestone Definition and Plan will be reviewed first by HIP TN and HIP TN stakeholders, and subsequently by HIP TN and the OeHI. Either or both reviews may result in suggested revisions. Once the Milestone Definition and Plan are deemed to be satisfactory, the Milestone Definition and Plan will be approved by HIP TN via an email to the Axolotl Project Manager.



The **Milestone Build and Delivery** step, illustrated below, consists of Axolotl, working jointly with HIP TN and its stakeholders, to build and deliver the milestone as defined in the Milestone Definition and Planning step.

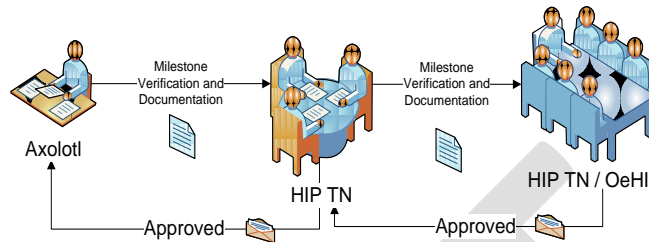


The **Milestone Verification and Documentation** step, illustrated below, consists of Axolotl and HIP TN stakeholders providing verification and descriptive documentation of the milestone as defined in the Milestone Definition step. Both HIP TN and the OeHI will review and provide feedback as to the appropriateness of the deliverable and the completeness of the documentation.

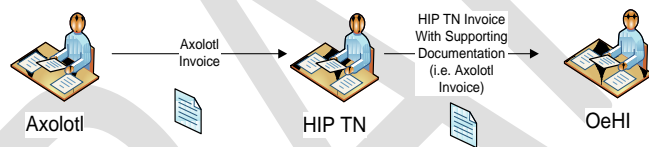


The **Milestone Review and Approval** step, illustrated below, consists of Axolotl and HIP TN stakeholders providing the final verification and description documentation of the milestone as defined in the Milestone Definition and Planning step, incorporating feedback and revisions received from HIP TN, OeHI, and, potentially, other HIP TN stakeholders. Once the submitted Milestone Verification and Documentation is deemed to be satisfactory, it will be approved by the OeHI project manager via an email to the HIP TN project manager. Once approval from the OeHI project manager is received by

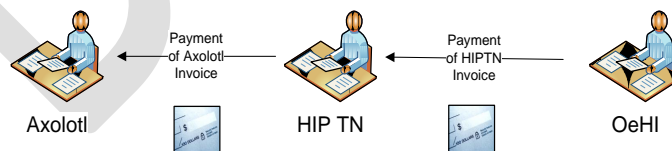
the HIP TN project manager, the HIP TN project manager will forward approval via email to the Axolotl project manager.



The **Invoice from Axolotl** step, illustrated below, consists of Axolotl submitting an Axolotl invoice for the specific milestone to HIP TN along with final Milestone Documentation. HIP TN will generate a HIP TN invoice with supporting documentation for submission to the OeHI.



The **Payment to Axolotl** step, illustrated below, consists of payment by the OeHI of milestone invoice to HIP TN within 30 days of receipt of submitted invoice. HIP TN will subsequently pay Axolotl for submitted invoice once payment has been received from the OeHI.



Implementation Guidelines

Preparing to Connect to the HIP TN Network

QOs that wish to use the HIP TN Network's Interoperability Services to query patient information from other QOs, or respond to queries from other QOs must:

- Support the IHE ATNA profile. *[page 19 of IHE ITI Technical Framework Revision 6.0 Volume 1]*
 - Exchange digital certificates and establish trust between provider and consumer.
 - Test two-way TLS connection.
- Support the IHE XUA profile *[page 20 of IHE ITI Technical Framework Revision 6.0 Volume 1]*.
 - All web services requests must include SAML for user identification. **— need more details?**
- Support the IHE XCPD profile:
 - Act as an XCPD initiating gateway and initiate Cross Gateway Patient Discovery transactions [ITI-55]
 - Act as an XCPD responding gateway and respond to Cross Gateway Patient Discovery requests [ITI-55]
- Support the IHE XCA profile
 - Act as an XCA initiating gateway and initiate Cross Gateway Document Query and Retrieve transactions ([ITI-38] and [ITI-39])
 - Act as an XCPD responding gateway and respond to Cross Gateway Document Query and Retrieve requests ([ITI-38] and [ITI-39])

Note: If a QO cannot support IHE standards, the QO needs to engage in discussions with HIP TN to determine if adapters can be built (e.g., for HL7 v.2 query transactions) in order to consume HIP TN Network services. The transport layer and the message layer security provided by the HIP TN Network Interoperability services typically do not require a VPN connection between the QO and the HIP TN Network. However, in the case where adapters may be used, the VPN can be considered for transport layer security.

Prior to using the HIP TN Network's Interoperability Services, a QO shall work with HIP TN to:

- Request and receive a digital certificate from the HIP TN Network.

- Provide information on services provided by the QO:
 - List of services (XCPD, XCA)
 - End points for all the services
 - **homeCommunity OID – is this for the QO?**
- Obtain information on services that the HIP TN Network provides:
 - List of services (XCPD, XCA)
 - End points for all the services
 - WSDLs for the services (standard IHE WSDLs with HIP TN Network end points)
- Need details for connection to IR?

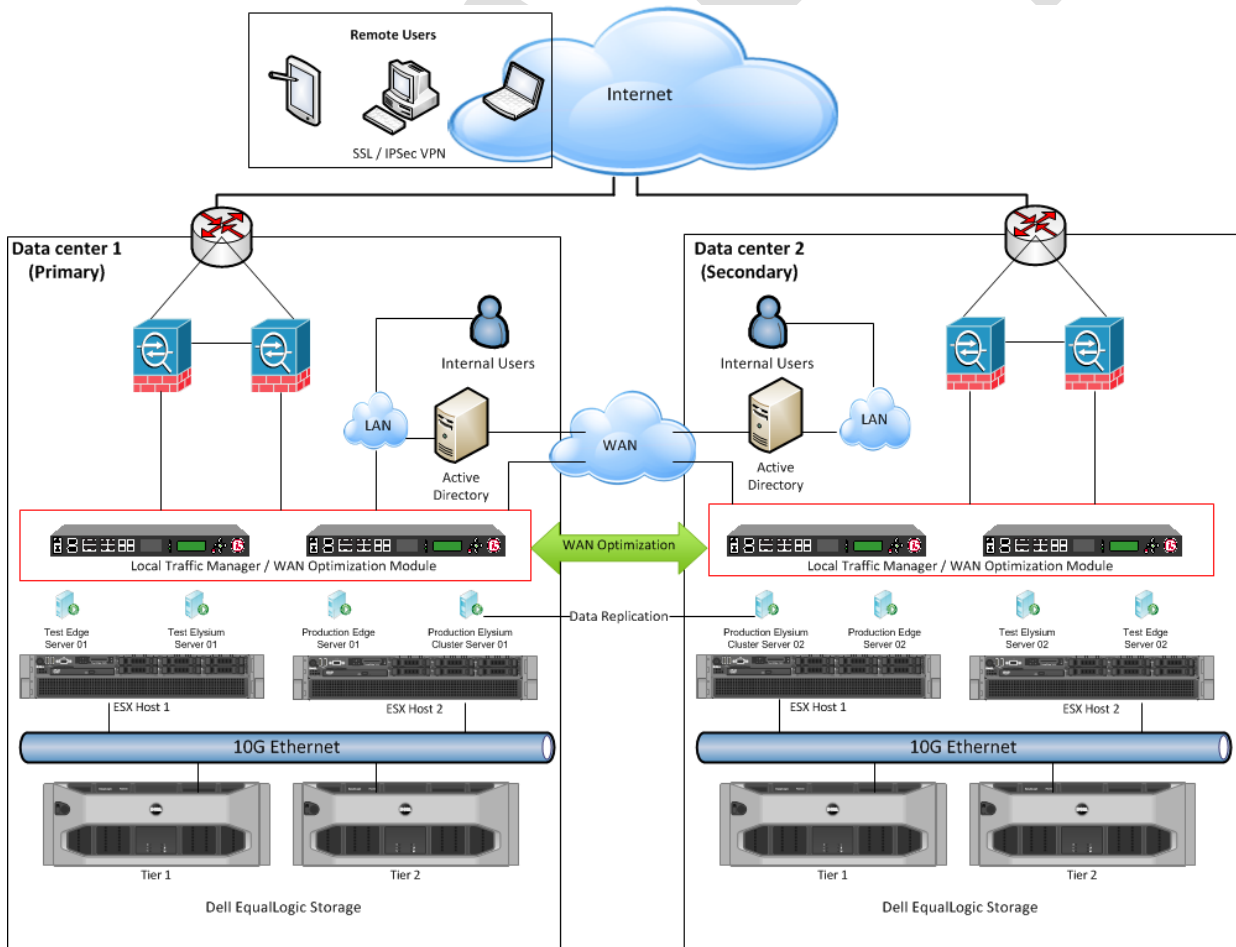
DRAFT

Milestone: Base Infrastructure Environment Available and Operational

The base infrastructure environment was demonstrated to members of the HIP TN Technology Workgroup on November 23, 2010. The Data Center failover test was also conducted during this demonstration. The Workgroup participated in the testing and the test was deemed successful.

The base infrastructure environment includes the Customer Test and Customer Production environments. The Demo environment will be set up after the Record Locator Service and Trust Broker services have been configured and populated with test data.

HIP TN Network Base Infrastructure
Figure 8: HIP TN Network Infrastructure



Milestone: Patient Matching Engine / Record Locator Service (RLS) - Phase 1

Definition

The Record Locator Service, Phase 1, facilitates the discovery of patients and patient information across the State of Tennessee (from entities organizations connected to the HIP TN Network).

Function

The HIP TN Network Record Locator Service (RLS) is designed to help providers in QOs locate relevant clinical information from all HIP TN Network QOs.

Using the HIP TN Network RLS, a provider in a QO will be able to locate if a patient has a record in other QOs, including the State's Immunization Registry (IR), and query for clinical information, including the patient's immunization record from the IR.

In the initial phase, the RLS consists of the following services:

1. Patient Discovery (QOs and Enterprise Services)
2. Clinical Document Query (return list of documents for selected patient, per QO and Enterprise Services)
3. Clinical Document Retrieve (return relevant clinical documents, such as CCD, per QO and Enterprise Services)

These key services are described in the sections below.

Specifications

Patient Discovery Service (XCPD)

In order to share patient data among qualified organizations (QOs), it is necessary to have mechanisms to match patient identities across communities. The HIP TN Network Patient Discovery Service, also known as Record Locator Service (RLS), is designed for QOs to discover patients and locate patient records.

Currently, there will be no patient identity feeds from QOs to the HIP TN Network. A

federated model will be used in the initial phase of the HIP TN Network's Record Locator Service (RLS). A later phase with a patient demographic registry at the HIP TN Network level with improved work flow is described in the section "Record Locator Services (RLS) Phase 2".

For QOs that currently provide a patient discovery service, the patient demographic registry will remain in the QO's local Master Patient Index (MPI) and the HIP TN Network's RLS will leverage the QO's patient discovery service at run time. The Department of Health has an MPI, and has an HL7 v2 query interface that will return patient demographics as part of the response.

IHE's Cross-Community Patient Discovery (XCPD) profile is leveraged in the HIP TN Network's RLS. It supports the means to locate communities that hold relevant health information for a patient and to cross-reference the patient identifiers of that patient across communities. For the Immunization Registry, the HIP TN Network will provide an adapter to convert IHE XCPD queries to HL7 v2.3.1 VXQ queries into the Immunization Registry's MPI, and then convert the response in to XCPD query responses.

The following section describes how the HIP TN Network RLS will work.

Interaction Overview

1. When a provider serviced by a QO wishes to locate a patient in other communities, the QO should initiate an XCPD query to the HIP TN Network on behalf of the provider system (such as an EHR).

Clarify use of "facility"

2. The HIP TN Network's RLS will determine which QOs should be queried, using a service registry maintained by the HIP TN Network, and launch XCPD queries to those QOs. For the Department of Health MPI (Immunization Registry), the HIP TN Network will convert the XCPD query into a HL7 V2 VXQ message to the Immunization Registry. The Facility Index in Trust Broker will be used in this step to validate an individual's or organization's facility's required ID in order to construct the VXQ message. – The Trust Broker will use the following process to validate the Facility:
 - a. Look in SAML for the Facility's strong identifier which might be one of the following attributes: UserOrganization, UserOrganizationOID, or NPI.
 - b. If none exists, reject the XCPD query.
 - c. Otherwise, use the first available SAML attribute found above, in the order listed, to locate the NPI associated with the facility.
 - d. If no entry was found in the Facility index, then reject the XCPD query (qualify that this is for IR, but not for QO to QO?).

e. Otherwise, use the found NPI above to construct the VXQ message.

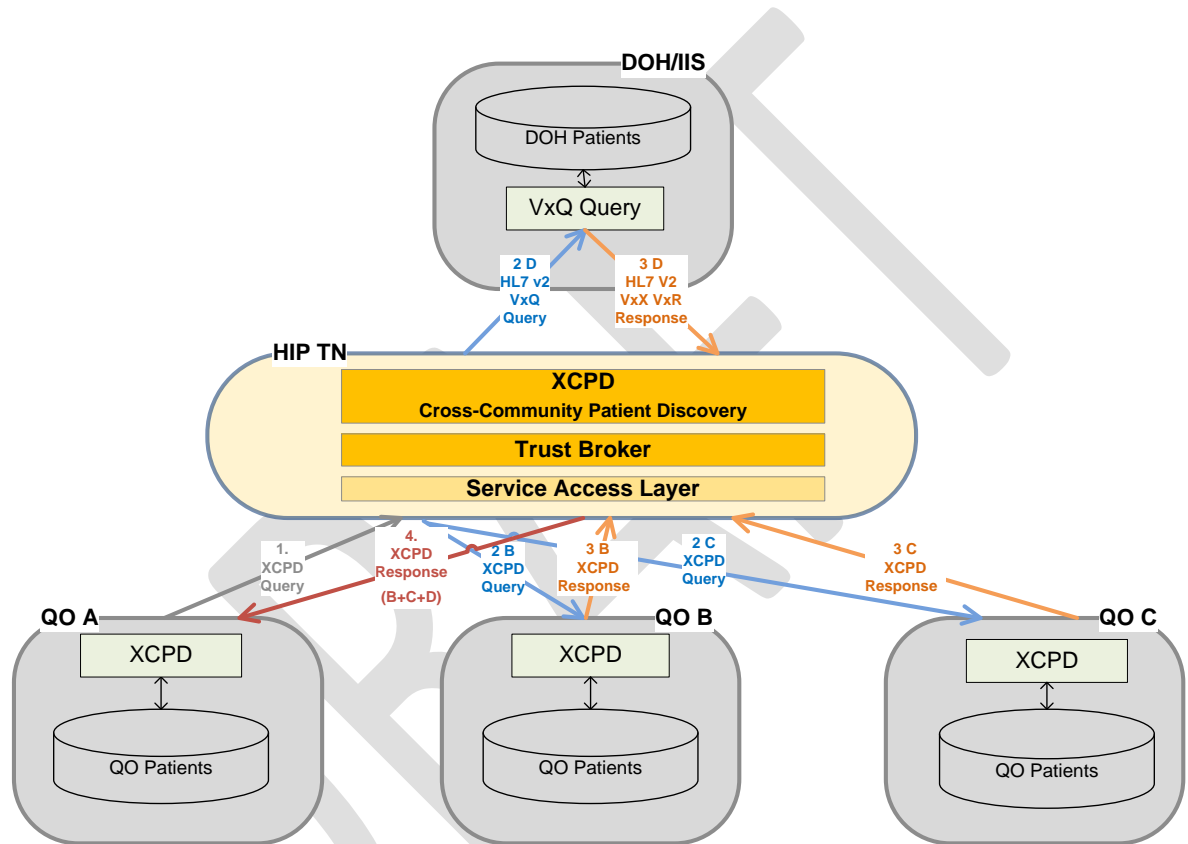
3. Upon receiving the XCPD query from the HIP TN Network, each QO will locate matching patients in its domain using local patient matching algorithms, and return the appropriate results to the HIP TN Network. The returned demographics shall include the patient's unique ID in the QO's domain, along with enough key demographic data to allow the service consumer to determine the quality of the match. For patients from the DOH's MPI, the Immunization Registry will respond with VXR / Vxx responses, which will be converted to XCPD responses by the HIP TN Network.

Note: the Immunization Registry requires a user's organization to have a valid trading partner relationship with it before patient's data can be queried. The HIP TN Network will check the user's organization entry (NPI) as defined in the **Facility Index** to determine if a query can be sent to the Immunization (The Department of Health will not send a response if the NPI of the provider is not in the DOH table).

4. The HIP TN Network RLS receives all of the XCPD query results, aggregates them into one response, and returns the unified response to the original service consumer. No attempt will be made at the HIP TN Network level to correlate candidate patients returned from different QOs and the Immunization Registry. In the case that one or more of the QOs or Enterprise Services return an error or do not respond within the timeout limit, the HIP TN Network RLS will return all available results along with an indication that some sources returned an error.
5. The QO receives the aggregated patient candidate list from the HIP TN Network. It can either relay the list back to the end user (provider) as it is, or further attempt to identify common patients returned by different QOs and the Immunization Registry using local patient identification mechanisms, such as a local Patient Identifier Cross-Reference (PIX) Manager.
6. It is up to the QOs to determine how to consume the patient candidate list returned from the HIP TN Network. Using the demographic data returned in the response, automated processes or manual processes with end-user interaction could be used to identify the matching patient. The matching patient corresponds to one or more entries from different QOs and the Immunization Registry, each with a unique ID from the QO's and Immunization Registry's domain. Once the matching patient is identified from the returned Patient Demographic Query (PDQ), the IDs returned from the QO's and Immunization Registry's domains can be used subsequently to request clinical documents relating to that patient. (See details in the section on Patient Clinical Information Sharing).

The diagram below depicts the interactions among the QOs and the HIP TN Network.

Figure 9: Cross-Community Patient Discovery (XCPD)



Constraints

To ensure proper patient matching, a common set of required demographic data will be sent across the HIP TN Network (to other QOs) in any XCPD query, including:

- First Name
- Last Name
- Date of birth
- Gender

It is strongly recommended that other patient demographic parameters also be sent in XCPD queries to improve matching accuracy, including:

- Address (zip, city, state, address)
- Other IDs (SSN, Driver's License Number, MRNs, etc.)
- Mobile phone #
- Alias

Due to the nature of an XCPD query, the number and accuracy of results returned is directly dependent on the amount of demographic data supplied. Thus, query parameters should always include as much demographic data as allowed by policy. A complete listing of parameters can be found in the PDQ specifications provided by IHE.

A QO responding to an XCPD query (or the Immunization Registry) shall only return candidates whose privacy policy (opt-in or opt-out) allows such disclosure. At a minimum, the following pieces of demographic data shall be returned:

- Name
- Date of Birth
- Gender
- Address (Street Address, City, State, Zip Code)
- Patient ID in the QO's domain

The QO or Immunization Registry shall return as much demographic data as allowed by policy.

It is highly recommended that additional identifiers (i.e. Social Security Number, Driver's License Number, etc.) be specified in both the XCPD query and response. These identifiers could be transferred and handled by automated processes without ever being exposed to end users. Including these identifiers could greatly increase the accuracy of patient matching.

Security: Patient Discovery

The XCPD query initiator is responsible to ensure the querying user is authorized to initiate such a query and receive the query response.

The XCPD query initiator shall include a valid SAML assertion in the request with all required user information for security and audit purposes. XCPD queries from the HIP TN Network to QOs will also include proper SAML assertions.

The SAML assertion from the initiating QO shall contain user's organization information as well as user QO information (see SAML section under the "Security" section for details on user attributes). The HIP TN Network will check the **Facility Index** to determine if the organization has the required ID (NPI identifier) for initiating a VXQ query and only initiate a VXQ query to the Immunization Registry if the NPI identifier is present. The Immunization Registry will determine if the initiating organization has a valid trading partner relationship with the Immunization Registry and send the appropriate response based on that.

QOs and the Department of Health (Immunization Registry) are responsible for ensuring that only patients whose information can be disclosed based on all applicable policies as well as patient privacy directives (opt-in or opt-out) are returned in their XCPD query responses. If a patient "opts out," the Department of Health will return a demographic record with an indication that the patient has opted out. The HIP TN Network will not return to the initiating QO any response from the DoH response to the Patient Discovery query.

The QOs shall log auditable events in XCPD transactions according to IHE ATNA profile requirements. The HIP TN Network will log all auditable events in its Audit Record Repository according to ATNA standards.

(See Security section for more information)

Sample Queries and Responses

Cross Gateway Patient Discovery

Sample 1: XCPD Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope">
  <soap:Header/>
  <soap:Body>
    <PRPA_IN201305UV02 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:h17-org:v3
../../../../schema/HL7V3/NE2008/multicacheschemas/PRPA_IN201305UV02.xsd" xmlns="urn:h17-org:v3"
ITSVersion="XML_1.0">
      <id root="1.2.840.114350.1.13.0.1.7.1.1" extension="35423"/>
      <creationTime value="20070428150301"/>
      <interactionId root="2.16.840.1.113883.1.6" extension="PRPA_IN201305UV02"/>
      <processingCode code="T"/>
      <processingModeCode code="I"/>
      <acceptAckCode code="AL"/>
      <receiver typeCode="RCV">
        <device classCode="DEV" determinerCode="INSTANCE">
          <id root="1.2.840.114350.1.13.999.234"/>
          <telecom value="http://servicelocation/PDQuery"/>
        </device>
      </receiver>
    </PRPA_IN201305UV02>
  </soap:Body>
</soap:Envelope>
```

```

</receiver>
<sender typeCode="SND">
  <device classCode="DEV" determinerCode="INSTANCE">
    <id root="1.2.840.114350.1.13.999.567"/>
  </device>
</sender>
<controlActProcess classCode="CACT" moodCode="EVN">
  <code code="PRPA_TE201305UV02" codeSystem="2.16.840.1.113883.1.6"/>
  <queryByParameter>
    <queryId root="1.2.840.114350.1.13.28.1.18.5.999" extension="18204"/>
    <statusCode code="new"/>
    <initialQuantity value="2"/>
    <initialQuantityCode value="RD"/>
    <statusCode code="new"/>
    <responseModalityCode code="R"/>
    <responsePriorityCode code="I"/>
    <matchCriterionList>
      <minimumDegreeMatch>
        <value xsi:type="INT" value="75"/>
        <semanticsText>Degree of match requested</semanticsText>
      </minimumDegreeMatch>
    </matchCriterionList>
    <parameterList>
      <livingSubjectAdministrativeGender>
        <value code="UN"/>
        <semanticsText>LivingSubject.administrativeGender</semanticsText>
      </livingSubjectAdministrativeGender>
      <livingSubjectBirthTime>
        <value value="19260405"/>
        <semanticsText>LivingSubject.birthTime</semanticsText>
      </livingSubjectBirthTime>
      <livingSubjectName>
        <value>
          <given>Mary</given>
          <given>Roger</given>
          <suffix>Jr.</suffix>
          <prefix>Dr.</prefix>
          <family>O'Hare De La Cruz</family>
        </value>
        <value>
          <given>Pamela</given>
          <family>Davis</family>
        </value>
        <semanticsText>LivingSubject.name</semanticsText>
      </livingSubjectName>
      <livingSubjectId>
        <value root="1.2.840.114350.1.13.99997.2.3412" extension="1234"/>
        <semanticsText>LivingSubject.id</semanticsText>
      </livingSubjectId>
      <livingSubjectId>
        <value root="1.2.840.114350.1.13.99997.2.2345" extension="12345"/>
        <semanticsText>LivingSubject.id</semanticsText>
      </livingSubjectId>
      <patientAddress>
        <value>
          <streetAddressLine>8407 MCLELLAN ROAD</streetAddressLine>
          <streetAddressLine>apt 2</streetAddressLine>
          <city>Santa Anna</city>
          <state>CA</state>
          <postalCode>95076</postalCode>
        </value>
      </patientAddress>
      <patientTelecom>
        <value value="tel:+1-795-555-4745" use="HP"/>
      </patientTelecom>
      <mothersMaidenName>

```

```

        <value>
          <family>Jones</family>
        </value>
      </mothersMaidenName>
      <livingSubjectBirthPlaceAddress>
        <value>
          <streetAddressLine>123 Street</streetAddressLine>
        </value>
        <semanticsText>LivingSubject.birthPlaceAddress</semanticsText>
      </livingSubjectBirthPlaceAddress>
      <livingSubjectBirthPlaceName>
        <value>
          <given>SomePlace</given>
        </value>
        <semanticsText>LivingSubject.birthPlaceName</semanticsText>
      </livingSubjectBirthPlaceName>
      <otherIDsScopingOrganization>
        <value root="1.2.840.114350.1.13.99997.2.3412"/>
        <semanticsText>OtherIDs.scopingOrganization.id</semanticsText>
      </otherIDsScopingOrganization>
      <otherIDsScopingOrganization>
        <value root="2.16.840.1.113883.4.1"/>
        <semanticsText>OtherIDs.scopingOrganization.id</semanticsText>
      </otherIDsScopingOrganization>
      <otherIDsScopingOrganization>
        <value root="1.2.840.114350.1.13.99998.8734"/>
        <semanticsText>OtherIDs.scopingOrganization.id</semanticsText>
      </otherIDsScopingOrganization>
    </parameterList>
  </queryByParameter>
</controlActProcess>
</PRPA_IN201305UV02>
</soap:Body>
</soap:Envelope>

```

Cross Gateway Query

Sample 2: XCA Request

```

<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:CrossGatewayQuery</a:Action>
    <a:MessageID>urn:uuid:def119ad-dc13-49c1-a3c7-e3742531f9b3</a:MessageID>
    <a:ReplyTo>
      <a:Address>http://www.w3.org/2005/08/addressing/anonymous</a:Address>
    </a:ReplyTo>
    <a:To s:mustUnderstand="1">http://localhost/service/IHEXCARespondingGateway.svc</a:To>
  </s:Header>
  <s:Body>
    <query:AdhocQueryRequest xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
      xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0">
      <query:ResponseOption returnType="true" returnClass="LeafClass"/>
      <rim:AdhocQuery id="urn:uuid:14d4debf-8f97-4251-9a74-a90016b0af0d">
        <rim:Slot name="$XSDDocumentEntryPatientId">
          <rim:ValueList>
            <Value>'d8420442513945d^^^&amp;1.3.6.1.4.1.21367.2005.1.1&amp;ISO'</Value>
          </rim:ValueList>
        </rim:Slot>
        <rim:Slot name="$XSDDocumentEntryStatus">
          <rim:ValueList>
            <rim:Value>('urn:oasis:names:tc:ebxml-regrep:StatusType:Approved',
              'urn:ihe:iti:2010:StatusType:DeferredCreation')</Value>
          </rim:ValueList>
        </rim:Slot>
      </rim:AdhocQuery>
    </query:AdhocQueryRequest>
  </s:Body>
</s:Envelope>

```

```

        </rim:ValueList>
      </rim:Slot>
    </query:AdhocQuery>
  </query:AdhocQueryRequest>
</s:Body>
</s:Envelope>

```

Cross Gateway Retrieve

Sample 3: XCA Request

```

<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:ReplyTo>
      <a:Address>http://www.w3.org/2005/08/addressing/anonymous</a:Address>
    </a:ReplyTo>
    <a:To s:mustUnderstand="1">http://localhost:2647/XcaService/ITHEXCAGateway.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>

```

Clinical Document Query and Retrieve Services (XCA)

For each patient returned by the HIP TN Network's RLS to the initiating QO, there will be the patient's ID in the responding QO's domain as well as the homeCommunityId for the responding QO or Immunization Registry.

With that information, the initiating QO can initiate queries to the HIP TN Network to obtain patient clinical information. IHE's Cross-Community Access (XCA) profile is leveraged for this sharing of patient clinical information. The Cross Gateway Query transaction (ITI-38) can be used to request lists of available documents satisfying given query parameters for the patient. The Cross Gateway Retrieve transaction (ITI-39) can be used to retrieve the actual documents. The initiating QO's gateway functions as an XCA Initiating Gateway and gateways for other QOs function as XCA Responding Gateways. Should there be a reference to ITI-40?

The initiating QO can choose different modes to query the HIP TN Network for patient information. For example, if multiple patients from multiple communities are returned in the previous XCPD transaction, the initiating QO can allow users to choose one patient at a time and initiate XCA queries for each patient selected. Alternatively, the initiating QO can allow users to choose multiple patients at once and launch multiple, simultaneous XCA queries to the HIP TN Network and aggregate the response. The HIP TN Network does not prescribe which mode the initiating QO will use to query for clinical information.

The HIP TN Network will wrap the patient's immunization record returned by the Immunization Registry in XCA query responses, so that the query initiator can use the same interface to receive all relevant clinical information on the patient.

Interaction Overview

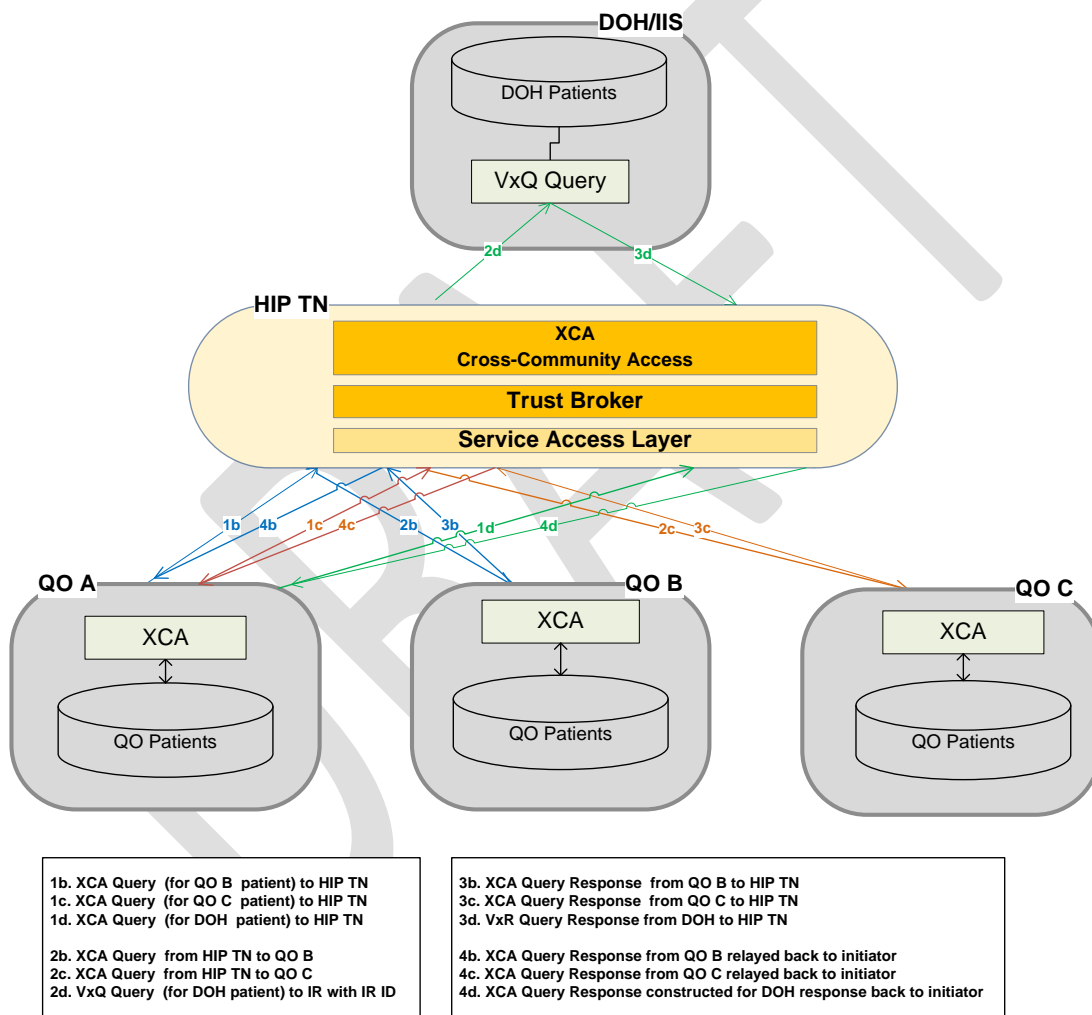
1. Based on the patient selected from the XCPD query response, either through an automated process or end-user interaction in the UI of the initiating QO's gateway, the initiating QO's gateway determines
 - a. **which home communities' XCA queries should be sent to** (fix to make sense), and
 - b. what patient ID to use in the XCA queries.
2. For each **home community-QO?** identified, the initiating QO's gateway shall create an XCA query with the corresponding patient identifier from that home community and initiate a Cross Gateway Query transaction to the HIP TN Network XCA query endpoint. Note that the initiating gateway does not need to maintain a **homeCommunityId**-to-XCA-endpoint mapping since the HIP TN Network will maintain that correlation.
3. The HIP TN Network's XCA gateway will process the XCA queries from the initiating gateway and forward them to the appropriate responding QO's XCA gateway. For the Immunization Registry, the HIP TN Network will construct the VXQ query to the Immunization Registry, or use the query response in a previous XCPQ transaction if the response is a VXR response and it's still in cache. Note that if a VXQ query is initiated to the Immunization Registry, it should not result in Vxx responses since the query will contain a patient ID from the Immunization Registry as determined in step 1.
4. The responding QO's XCA gateway processes the Cross Gateway Query with the patient ID relayed from the HIP TN Network and sends back the appropriate XCA query response, which includes
 - a. the document unique ID,

- b. the repository unique ID, and
 - c. the homeCommunityId attribute.
5. The HIP TN Network's XCA gateway will process the XCA query response from the responding QO's XCA gateway and relay it to the initiating QO's XCA gateway. For the Immunization Registry, the HIP TN Network will construct the appropriate XCA response for VXR responses from the Department of Health.
6. The initiating QO's XCA gateway collects the responses that are relayed back by the HIP TN Network. For each response, it shall verify that the homeCommunityId is present in each appropriate element.
7. The HIP TN Network does not prescribe how the initiating QO's XCA gateway uses the Cross Gateway Query response to proceed to the next step of retrieving documents. The initiating gateway can consolidate response data into one response to the initial document consumer (such as an EHR system), in which case the same homeCommunityId attribute values that it received in the XCA query responses shall be returned to the document consumer. Alternatively, the initiating gateway may present end user meta-data returned in the XCA query responses and let the user choose which documents to retrieve. These transactions occur within the QO and are outside the scope of this document.
8. When the initiating QO's XCA gateway is ready to retrieve documents from other QOs or the Immunization Registry on behalf of an authorized user, it should use the Cross Gateway Retrieve transaction to retrieve the actual documents. For each homeCommunityId with documents of interest, the initiating gateway shall initiate a Cross Gateway Retrieve transaction to the HIP TN Network's XCA endpoint. Note that the initiating gateway does not need to maintain a homeCommunityId-to-XCA-endpoint mapping since the HIP TN Network will maintain that correlation.
9. The HIP TN Network's XCA gateway will process the Cross Gateway Retrieve request from the initiating gateway and forward it to the appropriate responding QO's XCA gateway. For the patient immunization record from the Immunization Registry, the HIP TN Network will either query the Department of Health, or use the query response in a previous transaction for the patient if it's still in cache.
10. The Responding Gateway in each responding QO processes the Cross Gateway Retrieve request and retrieves documents from the Document Repository identified by the repository unique ID within the request. If the Cross Gateway Retrieve requests multiple documents with different repository unique IDs, the Responding Gateway shall contact multiple Document Repositories and consolidate the responses.

11. The Responding Gateway sends the response to the HIP TN Network which in turn relays the response to the initiating gateway.

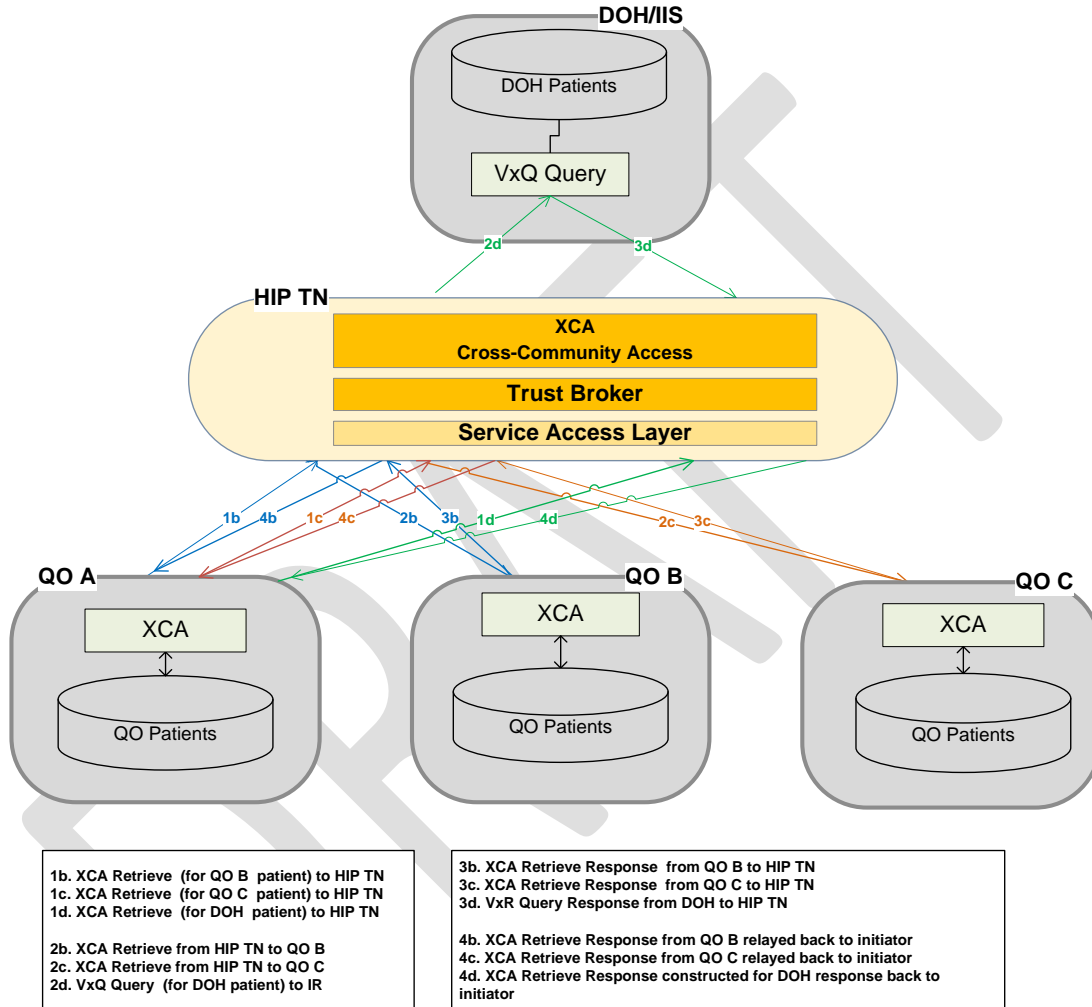
The following diagram depicts how the **Cross Gateway Query** through the HIP TN Network functions.

Figure 10: Cross Gateway Query (XCA)



The following diagram depicts how the **Cross Gateway Retrieve** through the HIP TN Network functions.

Figure 11: Cross Gateway Retrieve (XCA)



Document Query Parameters

When an end user queries other communities through the HIP TN Network XCA service, it can use query parameters to target the appropriate documents of interest. The key parameters that it can use are listed below. For a complete list, see the IHE specification for the XDS FindDocuments transaction.

If a parameter is not specified, it is considered that there is no constraint on that attribute and the responding gateway will return all documents that match the rest of the query constraints.

Parameter	Attributes	Opt	Mult	Notes
\$XDSDocumentEntryPatientId	XDSDocumentEntry.patientId	R	--	The patient's Id in the responding community.
\$XDSDocumentEntryClassCode	XDSDocumentEntry.classCode	O	M	Use to constrain type(s) of data of interest: CCD, lab, consent
\$XDSDocumentEntryClassCodeScheme	XDSDocumentEntry.classCode	O	M	
\$XDSDocumentEntryCreationTimeFrom	Lower value of XDSDocumentEntry.creationTime	O	--	Use to constrain results to documents created in a particular period
\$XDSDocumentEntryCreationTimeTo	Upper value of XDSDocumentEntry.creationTime	O	--	
\$XDSDocumentEntryServiceStartTimeFrom	Lower value of XDSDocumentEntry.serviceStartTime	O	--	Use to constrain period for which data is of interest
\$XDSDocumentEntryServiceStartTimeTo	Upper value of XDSDocumentEntry.serviceStartTime	O	--	
\$XDSDocumentEntryServiceEndTimeFrom	Lower value of XDSDocumentEntry.serviceEndTime	O	--	
\$XDSDocumentEntryServiceEndTimeTo	Upper value of XDSDocumentEntry.serviceEndTime	O	--	
\$XDSDocumentEntryHealthcareFacilityTypeCode	XDSDocumentEntry.healthcareFacilityTypeCode	O	M	Use to constrain the type(s) of facility's data of interest
\$XDSDocumentEntryHealthcareFacilityTypeCodeScheme	XDSDocumentEntry.healthcareFacilityTypeCode	O	M	
\$XDSDocumentEntryPracticeSettingCode	XDSDocumentEntry.practiceSettingCode	O	M	
\$XDSDocumentEntryPracticeSettingCodeScheme	XDSDocumentEntry.practiceSettingCode	O	M	
\$XDSDocumentEntryAuthorPerson	XDSDocumentEntry.authorPerson	O	M	Constrain to particular author(s)
\$XDSDocumentEntryStatus	XDSDocumentEntry.status	R	--	Query for active data

The transaction initiator should use optional parameters such as \$XDSDocumentEntryClassCode, \$XDSDocumentEntryServicesStartTimeFrom, XDSDocumentEntryServicesStartTimeTo, to limit query results to the types of documents and to the service period that interest the user.

Examples

To query for Continuity of Care Documents (CCDs) only, use the query parameter \$XDSDocumentEntryClassCode with a value of "34133-9" (the LOINC code that represents a CCD).

To query for dynamic documents, set the XDSDocumentEntry objectType equal to "urn:uuid:34268e47-fdf5-41a6-ba33-82133c465248".

Security

The XCA transaction initiator is responsible to ensure the querying user is authorized to initiate such a query and receive the query response.

The XCA transaction initiator shall include a valid SAML assertion in the request with all required user information for security and audit purposes. XCA query and retrieve requests from the HIP TN Network to QOs will also include the proper SAML assertion.

Responding QOs are responsible for ensuring that patient documents returned conforms with all applicable policies as well as patient privacy directives (opt-in or opt-out). If a patient "opts out", no record shall be returned to or through the HIP TN Network.

The QOs shall log auditable events in XCA transactions according to IHE ATNA profile requirements. The HIP TN Network will log all auditable events in its Audit Record Repository according to ATNA standards.

(See Security section for more information on security)

Roles & Responsibilities

Organization	Role	Responsibility
HIP TN	Test Planning	Create test plan(s) for all tests to be conducted for this milestone
	Test Coordination	Ensure all parties involved in the test of this milestone are in a readiness state to perform the required test(s). This includes the set-up of all test data in the test environments.
		Set up a conference call and webinar for the test for communication and to resolve any issues that may arise real time.
	Test Execution	Ensure that the test is performed on the agreed-

		upon date.
		Participate in the testing by reviewing the plan and monitoring the test.
	Defect Tracking	Defect management via Axolotl Salesforce application for defects unresolved in real time
	Test Validation	Ensure that the test performed meets the stated Expected Test Results.
		Capture and document the Actual Test Results in the Interoperability Services document.
Axolotl	Development	Ensure the RLS – Phase 1 is configured to meet the Specifications as listed in this Milestone.
	Test Preparation	Set up a “QO Test” area within the Axolotl system.
		Enter patient demographic and results data needed to perform the test.
		Provide patient test data to QO(s).
	Test Execution	Conduct test with the QO(s) and HIP TN, capture logs.
	Test Validation	Provide test results documentation (screen prints if applicable, log reports, etc.) to HIP TN.
QO / QO Vendor(s)	Test Planning	Participate in the test planning for scheduling of test and logistics (what and how to test-read and understand the test plan). Ensure QO readiness for test.
	Test Preparation	<ul style="list-style-type: none"> • Ensure queries and responses are ready for test. • Ensure vendor(s) make changes, if necessary, to be able to execute complete test. • Ensure test is ready to be performed in QO test environment.
	Test Execution	Participate in the Test, capture all screen prints and logs, and provide feedback (via conference call facilitated by HIP TN).
	Test Validation	Provide test results documentation (screen prints, log reports, etc.) to HIP TN.
<u>Immunization Registry</u>	<u>Testing</u>	<u>Elaborate on what they need to do</u>

Test Results (Expected and Actual)

Expected

No TLS will be required for Phase 1 testing of RLS (a url will be provided by Axolotl). Security testing will be covered under Trust Broker testing.

Axolotl will provide a QO testing environment (QO Test) for QO(s) to begin testing XCPD, Cross Community Patient Discovery, and XCA, Cross Community Access. The QO Test environment will consist of Interoperability Services to return a patient list and a CCD for document retrieval.

RLS Phase 1 will not test transport security with two way TLS certificate exchange, message level security with encryption and digital signature, or application level security with SAML verification. These will be tested in the Trust Broker milestone.

Test Case 1: Patient Discovery

1. Axolotl will provide test patient demographic data to the QOs to create and send an XCPD query to the Axolotl QO Test.
2. QO will send an XCPD query for a patient to the Axolotl QO Test.
3. QO Test will return two patients for the QO to select from.
Note: The aggregation of a patient candidate list from different QOs will not be tested in RLS Phase 1 due to having only one QO Test. Record aggregation will be tested with the addition of another QO or the DoH Immunization Registry.
4. QO selects a patient, which effectively selects the patient ID that will be used for query for records.
5. QO will be able to validate the XCPD query process, and store the patient ID for the XCA record query.

Test Case 2: Document Query

1. QO sends an XCA query to QO Test using the patient ID returned in the XCPD query, to query for records.
2. QO Test will return an XCA query response listing one CCD for the patient with appropriate metadata.
QO will validate that the XCA query response from QO Test conforms to standard.

Test Case 3: Document Retrieve

1. Using the document unique ID and repository ID return in the XCA response in the Document Query, the QO will send an XCA retrieve request to retrieve the CCD from QO Test.

2. The QO will validate that the XCA retrieve from QO Test conforms to standards, and display or consume the returned CCD as needed.

Actual

(Actual test results will be documented via screen prints and logs after tests described above, ["Expected Results"], are performed).

Axolotl

- Logs

QO

- Logs
- Screen Prints
- Printed result sets

DRAFT

Milestone: Trust Broker Services (includes Facility Index)

Definition

The Trust Broker is a service that enables transaction-based routing. The component is an index of participating entities (Qualified Organizations, or QOs) including organizational details, a certificate management system to manage certificates for participating entities, as well as application security brokering services at the HIP TN Network level.

Function

The purpose of Trust Broker is to ensure that trust is maintained from the QO's and other participating entities (i.e., Enterprise Services) through the HIP TN Network.

Trust Broker

The HIP TN Network will only authenticate QOs. Trust Broker will serve as the common trust route. The QO will act as a service to its stakeholders; it will hold the trust document and HIP TN Network will trust it. There will be one SSL Socket connection to the Immunization Registry from HIP TN Network. Each QO will need a VPN to the HIP TN Network.

QOs will pass user information to the HIP TN Network using a SAML assertion when requesting a service. The HIP TN Network will verify the SAML assertion passed by the QOs by checking required attributes and by verifying the assertion is produced by a trusted identity provider (IdP), which in this case is the QO. The HIP TN Network will not validate user or organization attributes against central Clinician or Facility Indexes to begin with, nor will policy decisions be made at the HIP TN Network level at this time.

The HIP TN Network will issue and manage digital certificates for trusted QOs, which will be used to establish trust among the HIP TN Network participants. All QO queries go through the HIP TN Network Trust Broker, which will broker both transport and message level security. Each QO will only need to know and trust the HIP TN Network's digital certificates for transport level security (two-way TLS), and message level security (encryption and digital signature).

Clinician Index

The initial security model of the HIP TN Network is that a valid SAML assertion from a trusted QO will be trusted if it conforms to the HIP TN Network standards. User authentication and policy decisions based on user attributes will be made at the QO

level. As a result, initial services (Patient Discovery and clinical Document Query and Retrieve services) will not require a Clinician Index. The Clinician Index will be required for clinical messaging and other potential Value Added Services that will be covered in a future phase of the HIP TN Network.

Facility Index

The Facility Index will be used for the Immunization Gateway services in order to validate that messages submitted to the Immunization Registry are from the right facility. Accessing the Immunization Registry for patient immunization records is integrated as part of the HIP TN Network Record Locator Service. The HIP TN Network will also provide a service to allow facilities in QOs to submit patient immunization record updates to the Immunization Registry. A Facility Index with relevant information is needed in order to do the following:

- Construct a VXQ message with the correct facility ID, which is the NPI identifier for the initiating organization, to query the Immunization Registry as part of Record Locator Service.
- Ensure that messages submitted to the Immunization Registry are from the correct facility (VXU message NPI number is checked against the NPI number in the HIP TN Facility Index).

The Facility Index will contain the following information about each facility:

- Affiliated QO (RHIO)
- Facility Name
- Facility Street Address, City, State, ZIP
- Contact First Name, Last Name, Phone
- Facility OID
- Facility NPI identifier

Note that in some cases, such as practices with a single clinician, the facility may choose to use the clinician's NPI identifier as the facility NPI identifier.

Query for patient immunization record to the Immunization Registry is integrated in the Record Locator Service. The HIP TN Network, upon receiving the XCPD query from a QO, will validate SAML assertion sent by the QO. Using the user organization sent in SAML, the HIP TN Network will look up the facility's NPI identifier in the Facility Index and use that to construct the VXQ query to the Immunization Registry. The Immunization Registry will check if the facility with the given NPI identifier has a valid trading partner relationship established and respond accordingly.

For immunization record updates from QOs, the HIP TN will follow this process before sending VXU to Immunization Registry:

- a. Look in SAML for the Facility's strong identifier which might be one of the

- following attributes: UserOrganization, UserOrganizationOID, or NPI.
- b. If none exists, drop the VXU message and send an error message back to QO.
 - c. Otherwise, use the first available SAML attribute found above, in the order listed, to locate the NPI associated with the facility.
 - d. If no entry was found in Facility index, then drop the VXU message and send an error message back to QO.
 - e. Otherwise, compare the NPI located in step d (above) with the one in MSH segment.
 - f. If NPI matches, then send the VXU to the Immunization Registry.
 - g. Otherwise, look into the ProvidersNPI list associated with this facility, and find out if the NPI found in MSH segment matches with one of the NPIs in the list.
 - h. If a match is found, then forward the VXU to the Immunization Registry.
 - i. Otherwise, drop the VXU message and send an error message back to the initiating QO.

Security: Trust Broker

Each of the initiating QOs must ensure proper user authentication and that the user is authorized to consume services provided by the HIP TN Network.

Initiating QOs must also support transport-layer and message-level security detailed in the following sections. All QO queries will go through the HIP TN Network Trust Broker, which will broker both **transport** and **message level security**.

Each QO will only need to know and trust the HIP TN Network's digital certificates for transport level security (two-way TLS), and message level security (encryption and digital signature).

The initial security model of the HIP TN Network is that a valid SAML assertion from a trusted QO will be trusted if it conforms to the HIP TN Network standards

QOs responding to queries from the HIP TN Network are responsible for ensuring that information on patients can be disclosed to the requesting user based on applicable policies and patient privacy directives (opt-in or opt-out), which is maintained within the QO. If a patient "opts-out", no record shall be returned to or through the HIP TN Network.

Specifications

Transport Layer Security

All HIP TN Network web services shall conform to web service security requirements as specified in IHE's ATNA profile. Two-Way TLS is required for all communications.

Message-level Security

The message-level security supported by in the HIP TN Network's Interoperability Services is based on the NwHIN standards. The following two elements should be signed:

1. `<wsu:Timestamp>` inside the `<wsse:Security>` element, with a detached signature
2. Message body with an enveloped signature

Auditing

All HIP TN Network web services shall conform to web service auditing requirements as specified in IHE's ATNA profile. QOs initiating and responding to transactions shall ensure auditable events are logged properly according to ATNA requirements.

The HIP TN Network will log all auditable events in its Audit Record Repository according to ATNA standards.

SAML

The HIP TN Network's Interoperability Services use SAML assertions for user authentication, user authorization, and auditing purposes. All web service requests shall have a `<wsse:Security>` element in the SOAP header, which contains the entire SAML token. A

`<wsse:SecurityTokenReference>` element shall be present, referencing the included SAML token using a key identifier reference.

The HIP TN Network standard on SAML assertion is mostly based on the **NwHIN Authorization Framework Service Interface Specification v1.9.1**. Note that the standard subject confirmation method, as specified in the `<saml2:SubjectConfirmation>` element, used by the HIP TN Network's Interoperability Services differs from the NwHIN. The NwHIN requires the subject confirmation method to be holder-of-key. This is only possible if all end users are assigned a certificate (key).

Since most systems do not provide end user certificates, the sender-vouches subject confirmation method is used by the HIP TN Network 's Interoperability Services instead.

A later version of the NwHIN Authorization Framework (v2.0), which has been provisionally approved by the NwHIN Technical Committee, contains changes to some of the SAML attributes described below. HIP TN is evaluating the changes and may revise this specification to be consistent with the NwHIN in a future revision.

SAML Attributes and Child Elements

The following lists of bullets describe the SAML assertion in more details:

<saml2:Assertion> attributes and child elements:

- **Version** [required]: The version of the assertion. The identifier for SAML 2.0 is "2.0".
- **ID** [required]: The identifier for this assertion. It is of type **xs:ID**, and MUST be unique (SAML specification requires the probability of identical identifiers to be 2^{128} or lower). This requirement may be met by encoding a random value of 128 bits or greater.
- **IssueInstant** [required]: The time instant of issue in UTC. The SAML specifications also specify that systems should not rely on time resolution finer than milliseconds.
- **<saml2:Issuer>** [required]: The SAML authority that is making the claim(s) about the assertion. The format of the content can be specified by a Format attribute. If unspecified, the format is of "urn:oasis:names:tc:SAML:2.0:nameid-format:entity", which is a URI of not more than 1024 characters.
- **<saml2:Subject>** [required]: The individual issuing the request -- the "end user". The subject can be a system user, such as in the case for automatic notification to a service subscription.
- **<saml2:AuthnStatement>** [required]: Describes the means by which the subject was authenticated at a particular time.
- **<saml2:AttributeStatement>** [required]: User credentials and purpose for use information shall be included in the SAML assertion element. The key required attributes include:
 - **UserName**: The name of user initiating the request.
 - **UserOrganization**: Practice/facility/company name. This is the organization the user is affiliated with and on whose behalf the service request is made of.
 - **UserRole**: As defined by NwHIN.

- **PurposeForUse:** As defined by NwHIN.¹
- **UserRHIO:** Name of the RHIO (in this case the name of the QO).

- **<saml2:AuthzDecisionStatement>** [optional]: This can be used to express decisions made by the initiating entity based on local policy or patient consent. The SAML sender can use XACML to express the decision.
- **<ds:Signature>** [required]: The **<saml:Assertion>** element shall be digitally signed by the SAML issuer, using the enveloped signature method. The key information should be included so that a receiving party can verify the signature. The attesting entity should have a trust relationship with the SAML issuer.

<saml2:Subject> child elements:

- **<saml2:NameID>** [optional]: Identifies the subject.
- **<saml2:SubjectConfirmation>** [required]: Provides the means for verifying the assertion.

<saml2:SubjectConfirmation> attributes and child elements:

- **Method** [required]: Use the “*urn:oasis:names:tc:SAML:2.0:cm:sender-vouches*” method.
- **<saml2:SubjectConfirmationData>** [optional]: Additional confirmation information.

<saml2:AuthnStatement> attributes and child elements:

- **AuthnInstant** [required]: Describes the time at which the authentication took place. It is encoded in UTC.
- **SessionIndex** [optional]: Specifies the index of a particular session between the principle identified by the subject and the authenticating authority.
- **<saml2:SubjectLocality>** [required]: The DNS domain name and IP address for the system from which the assertion subject was apparently authenticated.
- **<saml2:AuthnContext>** [required]: The context of an authenticated event.

<saml2:SubjectLocality> attributes:

- **Address** [required]: The network address of the system from which the principle identified by the subject was authenticated.
- **DNSName** [required]: The DNS name of the system from which the principle identified by the subject was authenticated.

<saml2:AuthnContext> child elements:

- **<saml2:AuthnContextClassRef>** [required]: A URI reference identifying the method by which the subject was authenticated. There are many methods of

¹ Newer NwHIN specifications have changed the name of this attribute.

authentication, see <http://docs.oasis-open.org/security/saml/v2.0/saml-authn-context-2.0-os.pdf> for more information.

<saml2:AttributeStatement> child elements:

- **<saml2:Attribute>** [required]: Identifies an attribute by name and includes its values.

<saml2:Attribute> attributes and child elements:

- **Name** [required]: The name of the attribute.
- **NameFormat** [required]: A URI reference representing the classification of the attribute name.
- **<saml2:AttributeValue>** [required]: The value of the attribute. This element is dependent on the attribute. It can contain a string, an xml element, etc.

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```

rCpXo1zNQqJ81hr6QXnPAjdd72k2MkfLm9qf9mtgGGWcMufQDtXw2rZF4MCVWLaWgPD7aj1SV+Qm
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  <ds:Exponent>AQAB</ds:Exponent>
</ds:RSAKeyValue>
</ds:KeyValue>
</ds:KeyInfo>
</ds:Signature>
<saml2:Subject>
  <saml2:NameID Format="urn:oasis:names:tc:SAML:1.1:nameid-format:X509SubjectName">
    CN=tuserone, O=Axolotl</saml2:NameID>
  <saml2:SubjectConfirmation Method="urn:oasis:names:tc:SAML:2.0:cm:sender-vouches" />
</saml2:Subject>
<saml2:Conditions NotBefore="2010-10-28T18:13:43.667Z"
NotOnOrAfter="2010-10-28T18:13:54.667Z" />
<saml2:AuthnStatement AuthnInstant="2010-10-28T18:13:44.667Z">
  <saml2:SubjectLocality Address="127.0.0.1"
    DNSName="localhost" />
  <saml2:AuthnContext>
    <saml2:AuthnContextClassRef>
      urn:oasis:names:tc:SAML:2.0:ac:classes:unspecified</saml2:AuthnContextClassRef>
    </saml2:AuthnContext>
</saml2:AuthnStatement>
<saml2:AttributeStatement>
  <saml2:Attribute Name="PurposeForUse"
    NameFormat="http://www.hhs.gov/healthit/nhin">
    <saml2:AttributeValue>
      <nhin:PurposeForUse xmlns:nhin="http://www.hhs.gov/healthit/nhin"
        code="TREATMENT" codeSystem="2.16.840.1.113883.18.7.1"
        codeSystemName="nhin-purpose" displayName="Treatment" />
    </saml2:AttributeValue>
  </saml2:Attribute>
  <saml2:Attribute Name="UserName"
    NameFormat="http://www.hhs.gov/healthit/nhin">
    <saml2:AttributeValue xmlns:xs="http://www.w3.org/2001/XMLSchema"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xsi:type="xs:string">tuserone</saml2:AttributeValue>
  </saml2:Attribute>
  <saml2:Attribute Name="UserOrganization"
    NameFormat="http://www.hhs.gov/healthit/nhin">
    <saml2:AttributeValue xmlns:xs="http://www.w3.org/2001/XMLSchema"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xsi:type="xs:string">Axolotl</saml2:AttributeValue>
  </saml2:Attribute>
  <saml2:Attribute Name="UserOrganizationOID"
    NameFormat="http://www.hhs.gov/healthit/nhin">
    <saml2:AttributeValue xmlns:xs="http://www.w3.org/2001/XMLSchema"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xsi:type="xs:string">1.2.3.4.5</saml2:AttributeValue>
  </saml2:Attribute>
  <saml2:Attribute Name="UserRHIO"
    NameFormat="http://www.hhs.gov/healthit/nhin">
    <saml2:AttributeValue xmlns:xs="http://www.w3.org/2001/XMLSchema"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xsi:type="xs:string">TestRHIO</saml2:AttributeValue>
  </saml2:Attribute>
  <saml2:Attribute Name="UserRole"
    NameFormat="http://www.hhs.gov/healthit/nhin">
    <saml2:AttributeValue>
      <nhin:Role xmlns:nhin="http://www.hhs.gov/healthit/nhin"
        code="112247003" codeSystem="2.16.840.1.113883.6.96"
        codeSystemName="SNOMED CT" displayName="Medical Doctor" />
    </saml2:AttributeValue>
  </saml2:Attribute>
  <saml2:Attribute Name="urn:oasis:names:tc:SAML:2.0:profiles:attribute:XPSA:US:npi"
    NameFormat="http://www.hhs.gov/healthit/nhin">

```

```
<saml2:AttributeValue xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
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</saml2:Attribute>
<saml2:Attribute Name="ProviderETIN"
NameFormat="http://www.hhs.gov/healthit/nhin">
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</saml2:Attribute>
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xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
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</saml2:Attribute>
<saml2:Attribute Name="SPI"
NameFormat="http://www.hhs.gov/healthit/nhin">
<saml2:AttributeValue xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:type="xs:string">spi</saml2:AttributeValue>
</saml2:Attribute>
</saml2:AttributeStatement>
</saml2:Assertion>
```

Certificate Management

Features such as two way TSL and digital signature require communicating systems to verify trusted certificates.

The HIP TN Network will issue and manage **digital certificates** for trusted QOs, which will be used to establish trust among the HIP TN Network participants.

A system that uses the Interoperability Services conforming to HIP TN Network security requirements should obtain its certificate used by Interoperability Services from the HIP TN Network and install it in the system's certificate key store. The QO will also obtain The HIP TN Network's certificate and install it in the QO system's trust store.

Roles & Responsibilities

Organization	Role	Responsibility
HIP TN	Certificate Authority	Verify/review applicant's (QO) credentials.
	Facility Index Administration	<ul style="list-style-type: none"> Verify/review facility data from QOs and maintain (update) the Facility Index based on QO data. Acquire OID for HIP TN from OID assigning authority (HL7 or Axolotl or ??). Assign sub OIDs for QOs that don't have their own OID (preference is for the QO to have its

		own OID)
Axolotl	Certificate Authority	Issue and manage digital certificates for HIP TN Network participants after credential verification by HIP TN.
	Facility Index vendor	Provide Facility Index application to HIP TN.
	Trust Broker Service vendor	Maintain and administer Trust Broker services used by transactions through the HIP TN Network.
QO	Local Trust Broker	Verify QO user identify, and ensure local authentication.
	Facility Index Data Source	QO should acquire their unique OID from OID assigning body. Gather/manage facility data, ensure accuracy and send to HIP TN and Department of Health (when a new facility signs the BAA/TPA).
QO Vendors	Local Trust Broker services provider	Generate/manage private key used for the HIP TN Network transactions and trust HIP TN certificate.
		Authenticate QO users.
		Ensure transactions to the HIP TN Network conform to security specifications.
		Modify transactions to generate negative test results and provide documentation of negative results (proving Trust Broker responds correctly)
		<u>What SAML attributes are the QOs responsible for inserting into the SAML?</u>
	Local Facility Index data management	Provide application to manage local facility data to QOs.
Dept of Health		Verify that records sent to the Immunization Registry include an NPI identifier that has already been established with the DoH.

Test Results (Expected and Actual)

Expected

Axolotl will provide a QO testing environment (QO Test) for QOs to begin testing XCPD, Cross Community Patient Discovery. The QO Test environment will consist of Interoperability Services to return a patient list and a CCD for document retrieval.

The test for Trust Broker will repeat the ones for RLS Phase 1 (Figure 2: Patient Discovery Test Case 1: Patient Discovery ~~Test Case 1: Patient Discovery~~, Test Case 2:

Document Query, ~~Test Case 3: Document Retrieval~~ (~~Test Case 3: Document Retrieve~~) but with the following security checks turned on:

- Transport security with two way TLS
- Message level security with encryption and digital signature
- Application level security with SAML verification

Prior to testing, QOs shall obtain digital certificates from HIP TN and install on their systems and create the appropriate SAML attributes.

The HIP TN Network's Test QO System provided by Axolotl will be configured to require transport and message level security as listed above.

QOs shall configure their systems to conform to the HIP TN Network security standard for each of the HIP TN Network RLS Phase 1 transactions – Patient Discovery, Document Query, and Document Retrieve.

Test Case: SAML Assertion

Test Case 4: SAML Assertion

1. The QO will invoke HIP TN Network services with the correct HIP TN Network issued client certificate at the transport layer.
 - Negative Action: If a proper QO certificate trusted by the HIP TN Network is not presented, the connection will be rejected by the HIP TN Network.
 - Positive Action: If a proper QO certificate trusted by the HIP TN Network is presented for two-way TLS, the HIP TN Network will accept the service connection.
2. All messages (i.e., Patient Discovery, Document Query and Document Retrieve queries) from the QO to the HIP TN Network shall contain the following parts digitally signed with the appropriate key for the QO:
 - Time stamp
 - Message body

The HIP TN Network will check that the signatures are presented and can be verified with the trusted QO's public key.

- Negative Action: If the signatures are missing, or cannot be verified with a HIP TN Network trusted QO's public key, the message will be rejected.
 - Positive Action: If signatures are verified with a HIP TN Network trusted QO's public key, the message will be processed.
3. The request message from the QO to the HIP TN Network shall contain the required SAML assertion for the user making the service request. The SAML

assertion shall be digitally signed with the appropriate key for the QO. The HIP TN Network will check that the SAML assertion is present and valid, contains the required user attributes, and the signature is presented and can be verified with the trusted QO's public key.

- Negative Action: If the SAML assertion is not present, does not meet all HIP TN Network requirements, or the signature cannot be verified with the trusted QO's public key, the service request message will be rejected.
- Positive Action: If the SAML assertion is present and meets all HIP TN Network requirements, and the signature can be verified with the trusted QO's public key, the service request message will be processed from the QO.

Note: HIP TN will prepare a test harness to send negative action test cases, to verify that validation according to the standards is in place.

Test Case: Ability to populate Facility Index

Test Case 5: Facility Index

1. For the Facility Index, a QO shall submit facility information as listed in the Facility Index section of this document, including the facility's NPI identifier.
2. The HIP TN Network will show that the entry can be added to the Facility Index with the submitted information.

Note: The facility's NPI identifier will later be used to query the Immunization Registry when the interface becomes available.

Test Case: Ability to populate Clinician Index

Test Case 6: Clinician Index

This test intentionally left blank.

Actual

(Actual test results will be documented via screen prints and logs after tests described above, ["Expected Results"], are performed).

Milestone: Inter-HIE Query between Axolotl and two Qualified Organizations (QOs)

Definition

This milestone establishes that QOs can “connect” to the HIP TN Platform. This connection will be demonstrated by establishing a connection between each QO and HIP TN (a “ping”). It involves a test query and retrieval between each QO and HIP TN (using a CCD test file).

The steps involved for each QO include:

- A. Query (QO to HIP TN) and (HIP TN to QO)
- B. Query Response (QO to HIP TN) and (HIP TN to QO)
- C. Document Query (HIP TN to QO) and (QO to HIP TN)
- D. Document Retrieval/Return (HIP TN to QO) and (QO to HIP TN)

This milestone includes the testing of the Patient Discovery, Document Query and Document Retrieve queries (per the technical specifications indicated in this document). In this milestone, the QOs demonstrate the services in Record Locator Services Phase 1 and Trust Broker, to the HIP TN Network (QO Test). All Trust Broker services will be turned on for this milestone. This does not include queries from one QO to another or queries to the Immunization Registry. Those are covered in subsequent milestones.

Function

This purpose of this milestone is to test the readiness of the QOs for sending and receiving test data to the HIP TN Network (acting as a test QO). The HIP TN Network (QO Test) will respond to the originating QO query, essentially acting as a test QO. No data will pass from one QO to another QO.

It includes the handling of:

1. Setting Axolotl as the responding QO
2. Query for Patient Discovery (QOs and Enterprise Services) from originating QO
3. Document Query (for selected patient) from originating QO
4. Query for Document Retrieve from originating QO

Specifications

Need detail from Axolotl – same specs repeated for next milestone: QO to QO?

Roles & Responsibilities

Organization	Role	Responsibility
HIP TN	Test Planning	Ensure all parties involved in the test of this milestone are in a readiness state to perform the required test(s).
		Ensure test plan is finalized and sent to all participants of the test.
		Conduct a conference call to discuss the test, logistics, etc.
		Set up a conference call and webinar for the actual test to monitor and to resolve any issues that may arise real time.
		Ensure that the test is performed on the agreed-upon date.
	Test Executing	Participate in the testing by reviewing the plan and monitoring the test.
	Test Validation	Ensure that the test performed meets the stated Expected Results.
		Capture and document the Actual Results in the Interoperability Services document.
Axolotl	Test Planning	Set up test patients and communicate those to the QOs for use in the actual test.
		Participate in the conference call to discuss the test, logistics, etc.
	Test Execution	Conduct test with the QO(s) and HIP TN.
	Test Validation	Provide test results documentation (screen prints, etc.) to HIP TN.
QO	Test Planning	Provide a test system for testing of this milestone.
		Participate in the test planning for scheduling of test and logistics (what and how to test; read and understand the test plan).
		Work with respective vendors to ensure queries and responses are ready for test.
	Test Execution	Participate in the test, capture all screen prints, and provide feedback (via conference call

		facilitated by HIP TN).
QO Vendors	Test Planning	Participate in meetings, as appropriate, to ensure QO readiness for test.
		Make changes, if necessary, to be able to execute complete test.

Test Results (Expected and Actual)

Expected

Axolotl will provide a QO testing environment (QO Test) for QO(s) to begin testing XCPD, Cross Community Patient Discovery. The QO Test environment will consist of Interoperability Services to return a patient list and a test CCD for document retrieval. For this milestone, the QOs will only be connected to the HIP TN Network and queries will not flow from one QO to another. The following tests will be conducted in the test environments of the HIP TN Network (QO Test) and each QO.

Test Case 7: Patient Discovery, QO to HIP TN

1. Axolotl will provide test patient demographic data to the QOs to create and send an XCPD query to the (Axolotl) QO Test.
2. Each QO will send an XCPD query for a patient to the (Axolotl) QO Test.
 - Transport security with two way TLS certificate exchange, message level security with encryption and digital signature, or application level security with SAML verification will also be tested in this milestone.
3. QO Test will return two patients for each QO to select from.
Note: The aggregation of a patient candidate list from different QOs will not be tested in this milestone. Record aggregation across QOs will be tested in the QO to QO milestone and the QO to Immunization Registry milestone.
4. Each QO selects a patient, which effectively selects the patient ID that will be used for query for records in the Document Query.
5. Each QO will be able to validate the XCPD query process, and store the patient ID for the XCA record query in the Document Query.

Test Case 8: Document Query, QO to HIP TN

1. Each QO sends an XCA query to QO Test using the patient ID returned in the XCPD query, to query for records.

2. QO Test will return an XCA query response listing one CCD for the patient with appropriate metadata.
3. Each QO will be able to validate that the XCA query response from QO Test conforms to IHE standards.

Test Case 9: Document Retrieve, QO to HIP TN

1. Using the document unique ID and repository ID return in the XCA response in the Document Query, each QO will send an XCA retrieve request to retrieve the CCD from QO Test.
2. Each QO will be able to validate that the XCA retrieve from QO Test conforms to IHE standards, and display or consume the returned CCD as needed.

Actual

(Actual test results will be documented via screen prints and logs after tests described above, ["Expected Results"], are performed).

Milestone: Inter-HIE Query between two Qualified Organizations (QOs)

Definition

In this milestone, HIP TN and the QOs demonstrate the services in Record Locator Services Phase 1 and Trust Broker, from one QO, through the HIP TN Network, to another QO. It involves a test query and retrieval from a provider in QO1 to a provider in QO2 over the HIP TN Network using a test CCD file.

The steps involved include:

- A. Query (User in QO1 to HIP TN to QO2)
 - B. Response (from QO2 to HIP TN to QO1)
 - C. Document Query (User in QO1 to HIP TN to QO2)
 - D. Document Retrieval/Return (from certified EHR to QO2 to HIP TN to QO1 to certified EHR)*
- *for this milestone, the certified EHR can be a “**test EHR**”. All data will be test data.

Specifically, the ability to query for Patient Discovery, Document Query and Document Retrieve from one QO to another is included. Message and transport level security will be turned on for this milestone. Accessing Immunization Registry data will not be included as it will be covered in the Immunization Registry. Demonstration of this milestone is completed with test data.

Function

The Milestone was identified to be able to test the query capability of a QO to another QO to determine if a patient exists in the MPI of the receiving QO and if clinical information exists for the patient, to return the requested document(s) to the initiating QO.

It includes the (secure) testing and handling of:

1. Query for Patient Discovery (QOs and Enterprise Services)
2. Document Query (of selected patient)
3. Query for Document Retrieve (return of CCD per QO)

Specifications

Same specs as QO to Axolotl milestone?

Roles & Responsibilities

Organization	Role	Responsibility
HIP TN	Test Coordination	Ensure all parties involved in the test of this milestone are in a readiness state to perform the required test(s).
		Set up a conference call and webinar for the test for communication and to resolve any issues that may arise real time.
	Test Execution	Ensure that the test is performed on the agreed-upon date.
	Testing	Participate in the testing by reviewing the plan and monitoring the test.
	Test Validation	Ensure that the test performed meets the stated Expected Results.
		Capture and document the Actual Results in the Interoperability Services document.
Axolotl	Test Planning	
	Testing	Conduct test with the QO(s) and HIP TN.
	Test Validation	Provide test results documentation (screen prints, etc.) to HIP TN.
QO	Test Planning	Participate in the test planning for scheduling of test and logistics (what and how to test; read and understand the test plan).
		Work with respective vendors to ensure queries

		and responses are ready for test.
	Test Execution	Participate in the Test, capture all screen prints, and provide feedback (via conference call facilitated by HIP TN).
QO Vendors	Test Planning	Participate in meetings, as appropriate, to ensure QO readiness for test.
		Make changes, if necessary, to be able to execute complete test.

Test Results (Expected and Actual)

Expected

All parties will agree on patient demographic data (common to both QOs) used for the XCPD query.

Test Case 10: Patient Discovery, QO to QO

1. The initiating QO will send an XCPD query for a patient, through the HIP TN Network, to the responding QO.
2. The responding QO will return more than one patient for the initiating QO to select from.
3. The initiating QO will select a patient, which effectively selects the patient ID that will be used for query for records.

Notes:

- The aggregation of a patient candidate list from the two QOs will be tested in this milestone. Record aggregation will be done at the initiating QO level.
- The initiating QO will validate the XCPD query process, and store the patient ID for the XCA record query.

Test Case 11: Document Query, QO to QO

1. The initiating QO will send an XCA query through the HIP TN Network using the patient ID returned in the XCPD query, to query the responding QO for records.
2. The responding QO will return an XCA query response listing one CCD for the patient with appropriate metadata.
3. The initiating QO will be able to validate that the XCA query response from the responding QO conforms to standard.

Test Case 12: Document Retrieve

1. Using the document unique ID and repository ID return in the XCA response, the initiating QO will send an XCA retrieve request (through HIP TN to the responding QO) to retrieve the CCD from the responding QO.
2. The initiating QO will be able to validate that the XCA retrieve from the responding QO conforms to standards, and display or consume the returned CCD as needed.

Actual

(Actual test results will be documented via screen prints and logs after tests described above, ["Expected Results"], are performed).

DRAFT

Milestone: Inter-HIE Production Pilot between two Qualified Organizations (QOs)

Definition

In this milestone, HIP TN and the QOs demonstrate the services in Record Locator Services Phase 1 and Trust Broker, from one QO, through the HIP TN Network, to another QO. It involves a pilot query and retrieval from a provider in QO1 to a provider in QO2 over the HIP TN Network. The milestone assumes that a provider EHR is in production. Pilot data used is real patient data.

The steps involved include:

- A. Query (EP/EH in QO1 to HIP TN to QO2)
- B. Response (from QO2 to HIP TN to QO1)
- C. Document Query (EP/EH in QO1 to HIP TN to QO2)
- D. Document Retrieval/Return (from certified EHR to QO2 to HIP TN to QO1 to certified EHR).*

***this step should be validated with all parties, including QO's EP/EH's to determine feasibility/appropriateness, and if this can be achieved.**

Specifically, the ability to query for Patient Discovery, Document Query, and Document Retrieve from one QO to another is included. Message and transport level security will be turned on for this milestone. Accessing Immunization Registry data will not be included as it will be covered in the Immunization Registry milestone.

Function

This milestone was identified to be able to test the query capability of one QO, through the HIP TN Network, to another QO to determine if a patient exists in the MPI of the responding QO and if clinical information exists for the patient, to return the requested document(s) to the initiating QO.

It includes the (secure) testing and handling of:

1. Query for Patient Discovery (QOs and Enterprise Services)
2. Document Query (of selected patient)
3. Query for Document Retrieve (Return of CCD per QO)

Specifications

Roles & Responsibilities

Organization	Role	Responsibility
HIP TN		
Axolotl		
QO		
QO Vendors		

Test Results (Expected and Actual)

Expected

- Test Case: SAML Assertion
- Test Case: Patient Discovery
- Test Case: Document Query
- Test Case: Document Retrieve
- Test Case: Infrastructure Operational Readiness
- Test Case: HIP TN Audit Log

Actual

(Actual test results will be documented via screen prints and logs after tests described above, ["Expected Results"], are performed).

DRAFT

Milestone: Full Production Inter-HIE Go-Live

Definition

In this milestone, HIP TN and the QOs demonstrate the services in Record Locator Services Phase 1 and Trust Broker, from one QO, through the HIP TN Network, to another QO. Specifically, the ability to query for Patient Discovery, Document Query and Document Retrieve from one QO to another is included. Message and transport level security will be turned on for this milestone.

Details on Immunization Registry data will not be addressed here as it is covered in the Immunization Registry milestone. However, per the Immunization Registry and NwHIN project plans, the functionality for both of these entities will be part of Full Production.

Function

This milestone was identified to validate the query capability of one QO, through the HIP TN Network, to another QO to determine if a patient exists in the MPI of the responding QO and if clinical information exists for the patient, to return the requested document(s) to the initiating QO.

It includes the (secure) testing and handling of:

1. Query for Patient Discovery (QOs and Enterprise Services)
2. Document Query (of selected patient)
3. Query for Document Retrieve (return of CCD, if available, per QO)

Demonstration of this milestone is completed with all available providers (hospitals, physician practices, etc.) in the QOs, and with the production data available for exchange.

This milestone will begin xx number of days after pilot production sign-off. Timeframes and details regarding cut-over to Full Production will be further defined through discussions with the QOs on User Acceptance Testing (what is an acceptable test to demonstrate this milestone – time frame, number of transactions, types of transactions, etc.). All agreed-to major defects are closed prior to Full Production.

Specifications

Roles & Responsibilities

Organization	Role	Responsibility
HIP TN		
Axolotl		
QO		
QO Vendors		

Results (Expected and Actual)

System Checks:

- review of Audit Log and Web Traffic Log – need samples
- user verification of queries for Patient Discovery, Document Query, Document Retrieve
- Load Test, system performance/response time analysis
- Other?

Milestone: Access to State Immunization Registry

Definition

This milestone includes testing the connectivity between the Immunization Registry and the HIP TN Network (i.e., a “ping”). The test message is **either** an HL7 2.3.1 VXU message.

The next step is to send an HL7 message from an EP/EH’s certified EHR to the QO to HIP TN to the Department of Health’s Immunization Registry. The iterations of this will occur in this order:

- Test
- UAT
- Performance Test
- Pilot (live data)
- Production (with one EP/EH at two different QOs)

The ability for facilities, through their respective QO’s, to query and retrieve immunization records from the State’s Immunization Registry is part of the service provided through the HIP TN Network. Additionally, facilities with certified EHRs may update records in the Immunization Registry via their respective QOs and through the HIP TN Network.

Function

The “query for patient immunization record” feature is integrated in the RLS’s Patient Discovery and Clinical Document Query and Retrieve services. Refer to the process diagrams in the End to End Process section of this document (Figure 2: Patient Discovery, Figure 3: Document Query Query, Figure 4: Document Retrieve). The “update records in the Immunization Registry” feature is included in this section of the Network Interoperability Services document (Access to State Immunization Registry section). This service allows **facilities individuals and organizations** to submit patient immunization record updates to the Immunization Registry via the QOs and the HIP TN Network. Refer to the process diagrams in the End to End Process section of this document (**Error! Reference source not found.**).

A **Facility Index** with relevant information is needed in order to do the following:

- Construct a VXQ message with the **facility individual or organization** NPI identifier to query the Immunization Registry as part of Record Locator Service;

- Ensure that VXU messages submitted to update the Immunization Registry are from the correct facility (VXU message NPI number is validated against the HIP TN Facility Index).

Details on how the Facility Index is used for these purposes are described in the Facility Index section of this document.

This milestone includes the following scenario: two scenarios, that will be executed in different time frames and environments:

Scenarios to be performed in Test Environments:

- Queries for Patient Discovery, Document Query, and Document Retrieve from the initiating QO, through the HIP TN Network, to the Immunization Registry, and back to the initiating QO. The environments used are the “current QO-designated Test system”, the HIP TN Network Test system and the Immunization Registry Test system;
- Immunization record updates from a provider’s EHR system, via the QO, through the HIP TN Network, to the Immunization Registry, returning the updated record back through the HIP TN Network to the QO.
 - If the EHR system is capable of consuming the updated record, this will be included in the test.
 - If not, the QO will display the updated record to the provider in the QO system.

The environments used are the “current EHR-designated Test system,” the QO system,” the HIP TN Network, and the Immunization Registry Test system.

The scenario to be performed in Production Environments:

- Queries for Patient Discovery, Document Query, and Document Retrieve from the initiating QO, through the HIP TN Network, to the Immunization Registry, and back to the initiating QO.
- Immunization record updates from a provider’s EHR system, via the QO, through the HIP TN Network, to the Immunization Registry and back through the HIP TN Network to the QO.
 - If the EHR system is capable of consuming the updated record, this will be included in the test.
 - If not, the QO will display the updated record to the provider in the QO system.

The environments used are the EHR Production system, the QO Production system, the HIP TN Network Production system, and the Immunization Registry Production system.

Specifications

Transactions between the HIP TN Network and DOH will be real time for queries and Immunization Registry updates.

1. Query for Patient Immunization Record

The QOs will utilize the RLS function (XCPD/XCA) to query the Immunization Registry and other QOs.

The provider (requestor) initiates a patient search via the QO system which sends the XCPD query to the HIP TN Network. The HIP TN Network will “translate” the XCPD query into an HL7 v2.3.1 VXQ query message before sending it to the Department of Health (DoH) interface. The DoH interface leverages the DoH MPI as well as the Immunization Registry and returns all demographic and immunization record information to the HIP TN Network. The HIP TN Network first sends the demographic record information to the QO system in response to the Patient Discovery Query message.

Note: If a patient has “opted out” of the Immunization Registry, the Department of Health will return a demographic record with an indication that the patient has opted out. The HIP TN Network will not return to the initiating QO any response from the DoH response to the Patient Discovery query.

After the desired patient is selected by the provider, which initiates the Document Query message to the HIP TN Network, the HIP TN Network returns the metadata that contains information related to a CCD that contains the immunization record (if the immunization record is resident in the HIP TN Network cache memory) to the QO system along with metadata for other documents returned by QOs. The provider then selects the immunization record desired, which initiates the Document Retrieve query message to the HIP TN Network. The HIP TN Network returns the immunization record (if the record is resident in the HIP TN Network cache memory) to the QO in response to the Document Retrieve query message.

If the information required to respond to a Document Query message is not resident in the HIP TN Network cache memory, then the HIP TN Network will translate the query into a VXQ message and send it to the Immunization Registry. Likewise, if the information required to respond to a Document Retrieve message is not resident in the HIP TN Network cache memory, then the HIP TN Network will translate the query into a VXQ message and send it to the Immunization Registry. In either case, the Immunization Registry will respond to the VXQ message by sending the immunization record to the HIP TN Network. The HIP TN Network will return the appropriate information to the QO system in response to the Document Query and Retrieve messages.

Axolotl will build query capabilities to the Immunization Registry to retrieve demographic and immunization records based on the CDC Implementation Guide, which is based on HL7 v2.3.1.

The HIP TN Network will check the facility individuals or organization sent in the XCPD query with SAML assertion and utilize the Facility Index to construct a VXQ message with the appropriate NPI identifier for the initiating facility individual or organization to query the Immunization Registry. The initiating facility individual or organization will appear in the sending facility field in the VXQ message, with its NPI identifier in the ID component.??

For the organization Address Book . . ? The HIP TN Network Facility Index will initially contain the following information about each facility:

- Affiliated QO (RHIO)
- Facility Name
- Facility Street Address, City, State, ZIP
- Contact First Name, Last Name, Phone
- Facility OID
- Facility NPI identifier

Note that in some cases, such as practices with a single clinician, the facility may choose to use the clinician's NPI identifier as the facility NPI identifier.

2. Update Records in the Immunization Registry

The QOs will build capability to pass an HL7 update message (VXU) from an individual or organization provider to the Immunization Registry for the immunization record based on CDC standards, HL7 v2.3.1. The preferred transport is a simple web service with the HL7 message as the payload, or an HTTPs POST with the HL7 message and the SAML assertion as the parameter.?

Axolotl will build capabilities to receive Immunization Registry updates from QOs based on CDC standards, HL7 v2.3.1, and forward them to the Department of Health's Immunization Registry. Response from the Immunization Registry will be relayed to the initiating QO.

The VXU message (originated by the provider) must include the CVX Code associated with the immunization.

If CVX code is not available in the provider's EHR system, the CPT code would not suffice because there is not a 1-1 relationship of CVX codes to CPT codes (see below) as demonstrated in the following example:

CVX code 128 will be used for all formulations of Influenza, H1N1-09 vaccine. There are 3 other CVX codes for this vaccine (125-live nasal, 126-injectable-preservative free and 127-injectable). These also map to this CPT code. In practice, CPT 90663 shall be mapped to CVX 128. If the vaccine is

stored in the registry as one of the other vaccines (CVX 125, 126 or 127) and the registry must send a CPT code to another system, then use CPT code 90663.

The HIP TN Network Facility Index (with relevant information) will be used by the HIP TN Network immunization update service to ensure that messages submitted to the Immunization Registry are from the correct facility. The HIP TN Network's immunization service will verify that the sending facility NPI identifier in the VXU message matches the NPI identifier in the Facility Index for the facility sent in the SAML assertion (If no match, HIP TN will reject the message).

The Department of Health will define a process for matching VXU messages to the correct patient to avoid the creation of duplicate patient records.

It is desirable for the response to the VXU message to be the updated immunization record from the Immunization Registry, instead of a simple acknowledgement of the VXU message. To achieve this, the following workflow will be used:

1. Upon receiving a VXU message from a QO, the HIP TN Network immunization update service will submit the message to the Immunization Registry after validation.
2. If the Immunization Registry returns an ACK to the VXU submission, the HIP TN Network immunization update service will construct a VXQ query using patient demographic information, which includes the patient ID submitted in the VXU message, to query the Immunization Registry.
3. Upon receiving the VXR response from the Immunization Registry to the VXQ query, the HIP TN Network immunization update service will relay the response back to the initiating QO.

In order for the above workflow to succeed, the following conditions need to be satisfied: (are the following correct?)

1. The data submission to the HIP TN Network needs to be a single VXU message for a patient instead of a batch, so that a VXQ query can be made for the patient.
2. The VXU messages need to contain good demographic information, ideally with the EHR's medical record number as the patient identifier, so that a VXQ query using demographic information in the VXU message will result in a unique match in the DoH's MPI and a VXR response from the Immunization Registry.

If the VXU message cannot be processed by the Department of Health (due to insufficient or invalid data, etc.), then a negative ACK will be sent to the HIP TN Network by the Immunization Registry. The HIP TN Network will format an error message and send it to the requestor (QO system).

Since the HIP TN Network and the QOs utilize web services, Axolotl will turn the negative message back from the DOH Immunization Registry indicating that either no patient exists or there isn't data for the patient. This message will be represented as a web service error(s) and returned, or simply passed along (the NACK) as it is.

Note: It is expected that Stage 2 Meaningful Use will include sending a VXQ Immunization Registry Query message prior to sending the VXU message. It is also expected that Stage 2 Meaningful Use will include absorbing the HL7 return messages from the Department of Health (VXR, VXX, and ACK messages) into the EHR. At that point in the future, the HIP TN Network will need to modify its response to Vxx messages and the QOs may need to build capacity to pass VXQ, VXU, VXR, VXX, and ACK messages.

Roles & Responsibilities

Organization	Role	Responsibility
HIP TN	Test Planning	Create test plan(s) for all tests to be conducted for this milestone.
	Test Coordination	Ensure all parties involved in the test of this milestone are in a readiness state to perform the required test(s). This includes the set-up of all test data in the test environments.
		Set up a conference call and webinar for the test for communication and to resolve any issues that may arise real-time.
	Test Execution	Ensure that the test is performed on the agreed-upon date.
		Participate in the testing by reviewing the plan and monitoring the test.
Axolotl	Development	Design the HIP Translation service to the DoH that translates a query message into an HL7 VXQ message.
		The negative ACK message will be returned from the Immunization Registry to the QO.
		Ensure that the Patient Discovery Query message

		returned to the requestor by HIP TN (coming from the Immunization Registry) for an “opt-out” patient mirrors what is returned when the Immunization Registry does not find a patient (“patient not found”).
	Defect Tracking	Manage defects unresolved (real time) via Axolotl Salesforce application.
	Test Validation	Ensure that the tests performed meet the stated Expected Test Results.
		Capture and document the Actual Test Results for inclusion in the Interoperability Services document.
QO	Facility Index Data Source	Gather/manage facility data (see Facility Index data fields), ensure accuracy and send to HIP TN and Department of Health (for all existing facilities in the QO, and when a new facility signs the BAA/TPA).
	Development	Work with respective vendor(s) to ensure queries and responses are ready for test.
	Test Planning	Participate in the test planning for scheduling of tests and logistics (what and how to test; read and understand the test plan).
		Identify a provider who is capable of testing the immunization update transaction.
		Coordinate the test system testing by ensuring provider has a test system available.
	Test Execution	Participate, along with the provider, in the testing, capture all screen prints and logs, and provide feedback (via conference call facilitated by HIP TN).
		Capture all screen prints and logs associated with the tests.
QO Vendors	Local Facility Index data management	Provide capability to manage local facility data to QOs.
	Test Planning	Participate in meetings, as appropriate, to ensure QO readiness for test.
		Make changes, if necessary, to be able to execute successful test.
Dept of Health	System Set-up	Procure and implement new hardware and software for real time query and update of the Department of Health Immunization Registry by the QOs / provider systems via the HIP TN Network.
	Development	Incorporate NPI identifier in the SIIS (State Immunization Information System) database.
		Incorporate NPI identifier in the “friendly record”.
		Update the list of ACK reject messages.

		Create an opt-out flag.
	Test Planning	Provide test system.
	Test Execution	Verify that records sent to the Immunization Registry via the HIP TN Network include an NPI identifier that has previously been established with the DoH.
		Verify the queries initiated by the QO system through the HIP TN Network process and send the response data (or no data) successfully.
		Verify that the Immunization Registry sends a message with an "opt-out" flag to HIP TN for "opt-out" patients (details to be defined).
		Verify that the update record initiated by the provider via the QO system and through the HIP TN Network processes and appropriately updates the Immunization Registry.
		Capture and document test results to verify successful VXQ and VXU message processing.
	Operations	<ul style="list-style-type: none"> • When a new provider has signed on with the QO, that provider's NPI number (and other info?) • Affiliated QO (RHIO) • Facility Name • Facility Street Address, City, State, ZIP • Contact First Name, Last Name, Phone • Facility OID • Facility NPI identifier <p>needs to be added to the SIIS system.</p>

Test Results (Expected and Actual)

Expected **- Nathalie will update**

Test Case: SAML Assertion

Test Case: Ability to reference and validate Facility Index

Test Case: Patient Discovery

Test Case: Document Query

Test Case: Document Retrieve

Test Case: Immunization Registry Record Update

- The HIP TN Network, upon receiving an XCPD query from a QO, will validate the SAML assertion sent by the QO. Using the user organization sent in the SAML, the HIP TN Network will look up the facility's NPI identifier in the Facility Index and use that to construct the VXQ query to the Immunization Registry. The process is as follows: The Trust Broker will use the following process to validate the Facility:

- a. Look in SAML for the Facility's strong identifier which might be one of the following attributes: UserOrganization, UserOrganizationOID, or NPI.
- b. If none existed, reject the XCPD query.
- c. Otherwise, use the first available SAML attribute found above to locate the Home Community ID associated with the QO.
- d. If no entry was found in the Facility index then reject the XCPD query.
- e. Otherwise, use the Home Community ID found above to construct the VXQ message.

The Immunization Registry will check if the facility with the given NPI identifier has a valid trading partner relationship established, and respond accordingly.

- For immunization record updates from QOs, the HIP TN Network will check the sender's user organization, look up the facility's NPI identifier in the Facility Index, and validate that it matches the facility NPI identifier sent in the VXU message.

Actual

(Actual test results will be documented via screen prints and logs after tests described above, ["Expected Results"], are performed).

Milestone: Patient Matching Engine / Record Locator Services (RLS) - Phase 2

(future phase)

Definition

The Patient Matching Engine / Record Locator Services Phase 2 is a service that matches patients from across the HIP TN network by providing a Patient Demographic Registry of demographic information on all patients known to the entities exchanging data through the HIP TN Network.

Function

While the Phase 1 HIP TN Network RLS provides the ability for authorized users in QOs to query all participants in the HIP TN Network for patient clinical information, it requires a separate step for patient discovery. The patient discovery step most likely will require user intervention in order to select the right patient candidates returned from other QOs and the Immunization Registry.

In Phase 2 of the RLS, when QOs may send patient identity feeds to the HIP TN Network, the workflow can be improved with a matching engine and patient demographic registry at the HIP TN Network level.

With HIP TN Network RLS Phase 2, a provider in a QO can select a patient from the QO's patient registry and go directly to query the HIP TN Network for patient clinical information without having to go through a patient discovery step.

Specifications

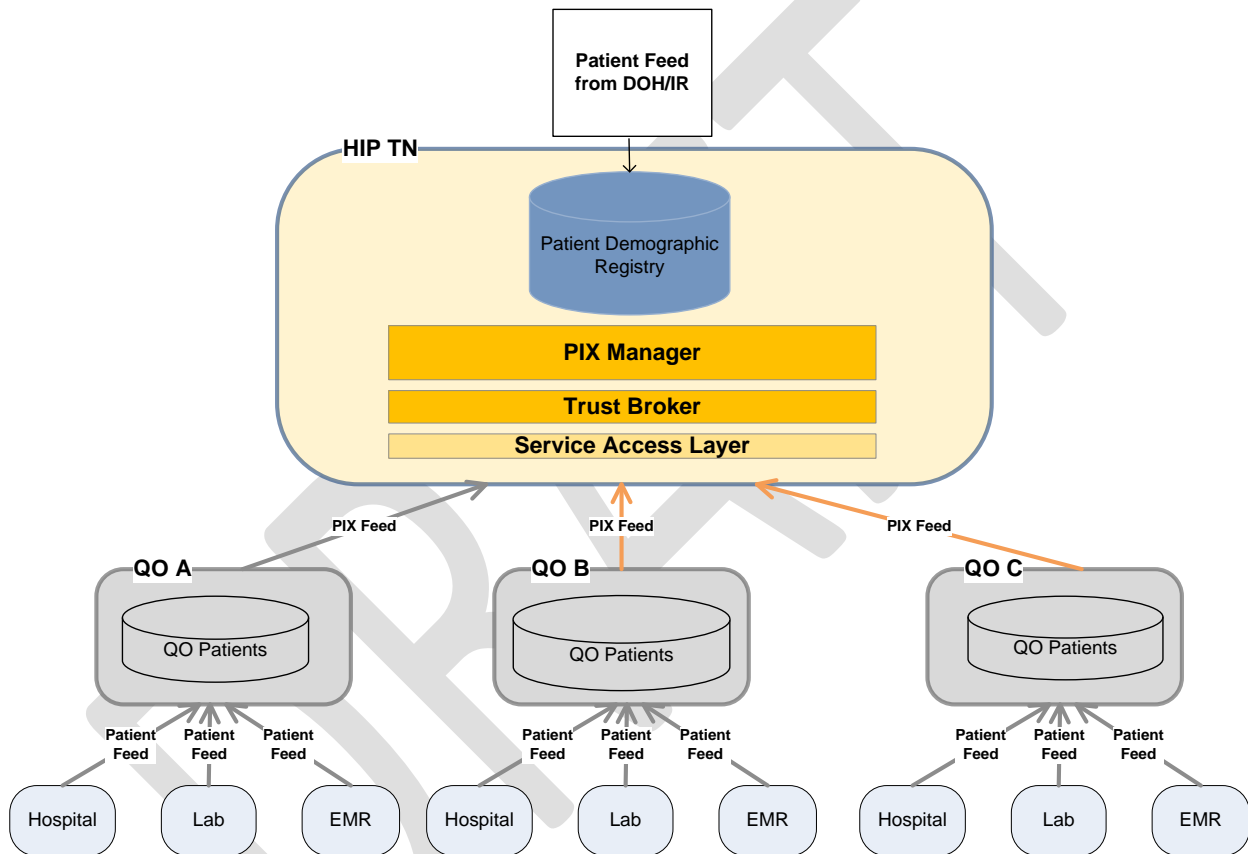
HIP TN Network Patient Matching Service

Each QO takes patient data feeds from participating data sources (providers) and maintains a patient demographic registry. Patient identity cross referencing among different data sources in a QO is maintained by the QO's matching engine.

Each QO will send patient identity data to the HIP TN Network to populate the HIP TN Network patient demographic registry using PIX V3 Patient Identity Feed transactions (ITI-44). Patient identity data from a QO or the Immunization Registry to the HIP TN Network should be the best known information on a patient from the QO or

Immunization Registry and include the QO's or Immunization Registry's identifier for the patient. Not all patient demographic changes within a QO's or Immunization Registry's patient data feeds will result in PIX feed transactions to the HIP TN Network. No transaction to the HIP TN Network is needed as long as the QO or Immunization Registry level patient data does not change.

The HIP TN Network's patient matching engine will match patients across QOs and the Immunization Registry and manages the cross-referencing of QO patient IDs.



Streamlined RLS Workflow

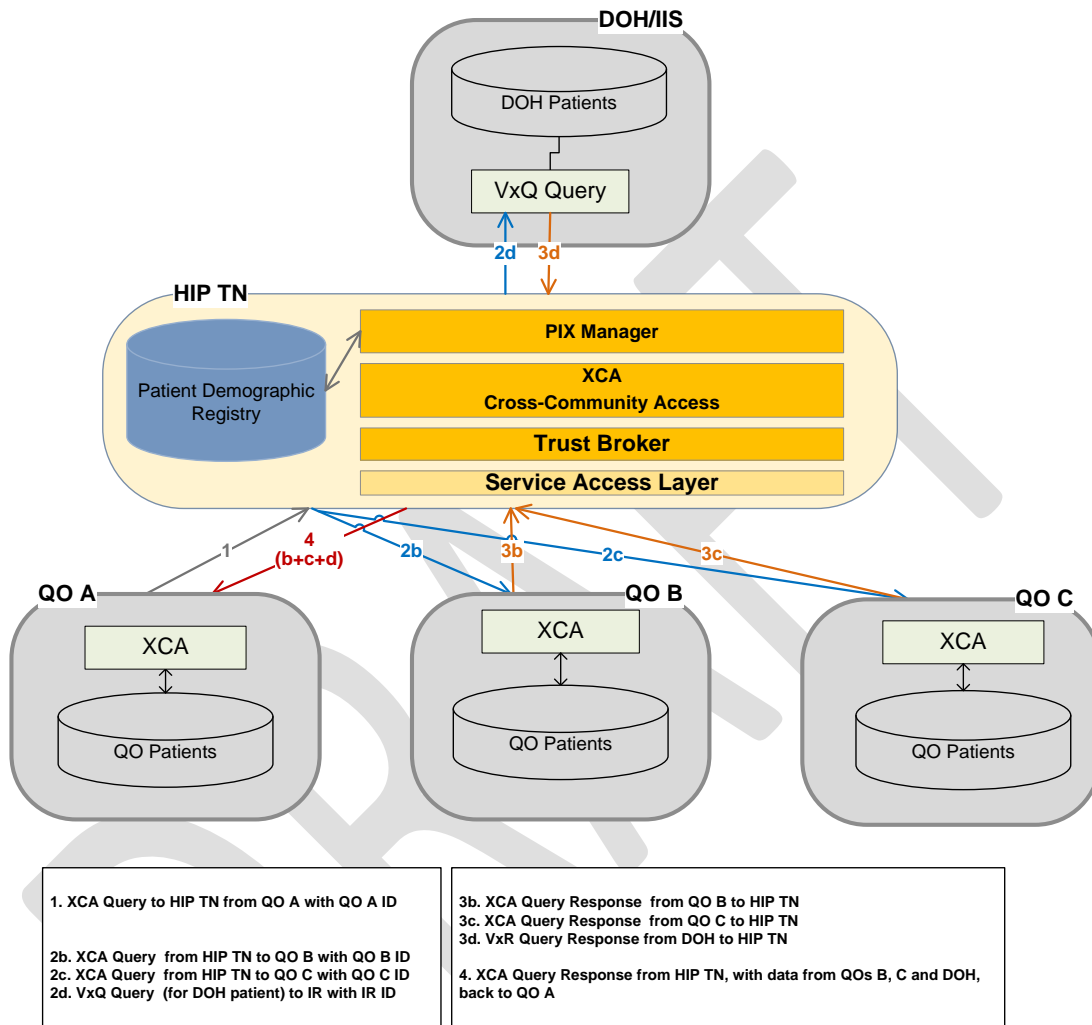
With RLS Phase 2, the workflow for a provider in a QO can be streamlined to skip the patient discovery step in Phase 1.

1. When a provider in a QO wants to query a patient's clinical information across HIP TN Network participants, the QO will initiate an XCA query to the HIP TN Network using the patient's ID from the QO.

2. The HIP TN Network's XCA service will use the HIP TN Network PIX manager to determine which QOs or Immunization Registry have the patient of interest, and find the appropriate patient ID to use for each of them.
3. For each QO that has records for the patient of interest, the HIP TN Network will initiate an XCA query with the patient's ID from that QO. For the Immunization Registry, the HIP TN Network will construct an HL7 V2 VXQ query with the patient's Immunization Registry ID.
4. Each responding QO returns lists of clinical documents of interest to the HIP TN Network. For a VXR response from the Immunization Registry, the HIP TN Network will transform the VXR response to an appropriate XCA response.
5. The HIP TN Network aggregates all XCA query responses from QOs and returns an aggregated XCA response to the initiating QO.

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The diagram below illustrates the workflow described above.



Retrieval of documents listed in the XCA response remains the same as in Phase 1.

Roles & Responsibilities

Organization	Role	Responsibility
HIP TN		
Department of Health		
Axolotl		
QO		
QO Vendors		

Test Results (Expected & Actual)

Milestone: Electronic Laboratory Reporting (2)

(future phase)

DRAFT

Milestone: Access to State Services (3)

(future phase)

DRAFT

Milestone: Test NwHIN Gateway Connectivity

DRAFT

Production and Post Go-Live Operations

Definition

To be defined

Product Owners

To be defined

Support Structure

To be defined

Service Level Agreements

To be defined

Reports

HIP TN Audit Log

HIP TN Web Traffic Log

Reference Material / Locations

Readers of this document will find it extremely helpful to download the IHE technical framework documentation available online at

http://www.ihe.net/Technical_Framework/index.cfm#IT.

Document	Ver.	Date	Description
IHE ITI Technical Framework Volume 1 (ITI TF-1) Integration Profiles	6.0	August 10, 2009	Provides a high-level view of IHE functionality showing the transactions organized into functional units called integration profiles.
IHE ITI Technical Framework Volume 2a (ITI TF-2a) Transactions Part A	6.0	August 10, 2009	Detailed technical descriptions of each IHE transaction 2a covers ITI-1 through ITI-28
IHE ITI Technical Framework Volume 2b (ITI TF-2b) Transactions Part B	6.0	August 10, 2009	Detailed technical descriptions of each IHE transaction 2b covers ITI-29 through ITI-57
IHE ITI Technical Framework Volume 2x (ITI TF-2x) Volume 2 Appendices	6.0	August 10, 2009	Contains all appendices providing technical details associated with the transactions.
IHE ITI Technical Framework Volume 3 (ITI TF-3) Cross-Transaction Specifications and Content Specifications	6.0	August 10, 2009	Contains specifications that are used by multiple transactions along with Content Specifications.
IHE ITI Technical Framework Supplement 2009-2010 Cross-Community Patient Discovery (XCPD)	2009-2010	August 10, 2009	Detailed technical descriptions of IHE transactions ITI-55 and ITI-56
IHE ITI Technical Framework Supplement 2009-2010 Cross-Community Access (XCA)	2009-2010	August 10, 2009	Detailed description of the means to query and retrieve patient relevant medical data held by other communities.