



Nationwide Health Information Network (NHIN)

Query for Documents

Web Service Interface Specification

V 2.0

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1 Preface

1.1 Introduction

The Nationwide Health Information Network (NHIN) Web Service Interface specifications define the core set of standard services to be implemented by each node on the NHIN network in order exchange interoperable health information over the Internet. Health Information Organizations (HIOs) which act as nodes on the NHIN are termed NHIOs. These functional services provide discovery and information exchange capabilities and rest upon a foundational set of messaging, security, and privacy services.

This document presents the NHIN Query for Documents Web Service Interface specification. Together with the Retrieve Documents Service Interface specification, Query for Documents enables the NHIN's Query/Retrieve information exchange pattern.

1.2 Intended Audience

The primary audiences for NHIN Specifications are the individuals responsible for implementing software solutions that realize these interfaces at Health Information Organizations (HIOs) who are, or seek to be, nodes on the NHIN network. This specification document is intended to provide an understanding of the context in which the web service interface is meant to be used, the behavior of the interface, the Web Services Description Language (WSDLs) used to define the service, and any Extensible Markup Language (XML) schemas used to define the content.

1.3 Business Needs Supported by this Specification

Query for documents is the second in the three-step process which defines the Query/Retrieve information exchange pattern in the NHIN:

- 1) Arbitrate patient identity
- 2) Query for list of available documents
- 3) Retrieve documents

1.4 Referenced Documents and Standards

The following documents and standards were referenced during the development of this specification. Specific deviations from or constraints upon these standards are identified below.

- 1) **Org/SDO name:** HITSP

Reference # / Spec Name: TP13 / Manage Sharing of Documents Transaction Package

Version #: v2.6

Underlying Specs:

- IHE ITI TF Supplement XCA TI (2009-8-10)
- IHE ITI TF Vol. 1 & 2a, 2b, 2x, 3 Revision 6.0 (2009-8-10)

NHIN Deviations or Constraints: see entry for IHE ITI TF Supplement XCA TI (2009-8-10)

Link: http://www.hitsp.org/ConstructSet_Details.aspx?&PrefixAlpha=2&PrefixNumeric=13

- 2) **Org/SDO name:** HITSP

Reference # / Spec Name: C80/ Clinical Document and Message Terminology Component

Version #: v1.1.1



NHIN Deviations or Constraints:

Underlying Specs:

Link: http://www.hitsp.org/ConstructSet_Details.aspx?&PrefixAlpha=4&PrefixNumeric=80

3) **Org/SDO name:** IHE

Reference # / Spec Name: ITI TF Supplement XCA TI

Version #: 2009-8-10

NHIN Deviations or Constraints:

- IHE XCA 3.38 -. This specification allows return of -1 in hash and size to indicate "not available" to support dynamic documents. The use of availabilityStatus="urn:ihe:iti:2010:StatusCode:DeferredCreation" indicates that the document creation has been deferred until a retrieve is received. Further explanation is given in sections 2.3 "Transaction Standard" and 3.3 "Query Parameters".
- IHE XCA 3.38 - Document identifiers may be only valid for a limited time period – IHE makes no statement about this.
- IHE XCA 3.38 – XCA does not currently support the XDSUnknownPatientId to be used in a response to Cross Gateway Query. This specification allows this error to be used to indicate that a previously valid patient identifier is no longer valid. This deviation from XCA increases the risk of a spoofing attack as it is easier for an attacker to identify an invalid patient identifier. Rather than use this error, XCA requires that invalid identifiers result in the return of an empty list. **IHE Change Proposal 450** has been submitted to request a change of the IHE requirement and is expected to be approved by Spring 2010.

Underlying Specs:

Link:

http://www.ihe.net/Technical_Framework/upload/IHE_ITI_TF_Supplement_Cross_Community_Access_XCA_TI_2009-08-10.pdf

Change Proposals Adopted by NHIN:

- a. **Change Proposal Name:** IHE Change Proposal 420

Change Proposal Description: Updates XCA to use a single Action value for both synchronous and asynchronous interactions. This balloted and approved Change Proposal will integrate into the XCA Supplement in August 2010 and is adopted by the NHIN now because of its importance.

Change Proposal Link: ftp://ftp.ihe.net/IT_Infrastructure/TF_Maintenance-2009/CPs/FinalText/CP-ITI-420-FT.doc

- b. **Change Proposal Name:** IHE Change Proposal 403, 429

Change Proposal Description: Minor updates to audit requirements.

Change Proposal Links: ftp://ftp.ihe.net/IT_Infrastructure/TF_Maintenance-2009/CPs/FinalText/CP-ITI-403-FT.doc,

ftp://ftp.ihe.net/IT_Infrastructure/TF_Maintenance-2009/CPs/FinalText/CP-ITI-429-FT.doc

- c. **Change Proposal Name:** IHE Change Proposal 413

Change Proposal Description: Clarification of calculation of hash.

Change Proposal Link: ftp://ftp.ihe.net/IT_Infrastructure/TF_Maintenance-2009/CPs/FinalText/CP-ITI-413-FT.doc



d. **Change Proposal Name:** IHE Change Proposal 415

Change Proposal Description: Defines an error in the case where a list of document unique ID's in a query without patient identifier reference different patients

Change Proposal Link: ftp://ftp.ihe.net/IT_Infrastructure/TF_Maintenance-2009/CPs/FinalText/CP-ITI-415-FT.doc

4) **Org/SDO name:** IHE

Reference # / Spec Name: ITI TF Vol. 1 & 2a, 2b, 2x, 3

Version #: Revision 6.0 (2009-8-10)

NHIN Deviations or Constraints:

Underlying Specs:

Links:

- http://www.ihe.net/Technical_Framework/upload/IHE_ITI_TF_6-0_Vol1_FT_2009-08-10-2.pdf
- http://www.ihe.net/Technical_Framework/upload/IHE_ITI_TF_6-0_Vol2a_FT_2009-08-10-2.pdf
- http://www.ihe.net/Technical_Framework/upload/IHE_ITI_TF_6-0_Vol2b_FT_2009-08-10.pdf
- http://www.ihe.net/Technical_Framework/upload/IHE_ITI_TF_6-0_Vol2x_FT_2009-08-10.pdf
- http://www.ihe.net/Technical_Framework/upload/IHE_ITI_TF_6-0_Vol3_FT_2009-08-10-2.pdf

5) **Org/SDO name:** OASIS

Reference # / Spec Name: ebRIM: OASIS/ebXML Registry Information Model

Version #: v 3.0

NHIN Deviations or Constraints:

Underlying Specs:

Link:

<http://docs.oasis-open.org/regrep/v3.0/specs/regrep-rim-3.0-os.pdf>

6) **Org/SDO name:** OASIS

Reference # / Spec Name: ebRS: OASIS/ebXML Registry Services Specifications

Version #: v 3.0

NHIN Deviations or Constraints:

Underlying Specs:

Link:

<http://docs.oasis-open.org/regrep/v3.0/specs/regrep-rs-3.0-os.pdf>

1.5 Relationship to Other NHIN Specifications

This specification is related to other NHIN specifications as described below:

- **Messaging Platform** – specifies a base set of messaging standards and web service protocols which must be implemented by each NHIN node and applies to all transactions. All NHIN inter-



nodal messages are SOAP messages over HTTP using web services, must be encrypted and digitally signed.

- **Authorization Framework** – defines the exchange of metadata used to characterize each NHIN request. The purpose of that exchange is to provide the responder with the information needed to make an authorization decision for the requested function. Each initiating message must convey information regarding end user attributes and authentication using SAML 2.0 assertions.

Together, the Messaging Platform and the Authorization Framework define the foundational messaging, security and privacy mechanisms for the NHIN.

- **Patient Discovery** – defines the mechanism by which one NHIN node can query another to reciprocally establish patient identity and to determine if a node may be a source of information for a specific patient. It represents the first of three steps in the typical NHIN Query/Retrieve information exchange pattern.
- **Retrieve Documents** – allows an initiating NHIN node to retrieve specific documents from a responding node using the Document Reference IDs obtained via a prior Query for Documents transaction. It represents the final of the three steps in the typical NHIN Query/Retrieve information exchange pattern.
- **Web Services Registry** – enables nodes to discover each other through interactions with the NHIN UDDI registry, which lists NHIN nodes, the NHIN web services supported by each node, and how to reach those service end points. In this context, it might be needed to identify target nodes.

2 Interface Description

2.1 Definition

A query initiated from one NHIO to another, requesting a list of available documents meeting the given query parameters for a particular patient for later retrieval.

In this Interface definition, a “document” refers to the form of clinical data as it is transferred between NHIOs, not as it is stored in an NHIO. Any HIO may store clinical data in whatever format or repository it chooses, so long as the NHIO can respond to queries as described in this interface, and respond to “retrieve document” requests as described in the “Retrieve Documents Service Interface specification”¹. Specifically, a “document” transferred between NHIOs need not meet the criteria for persistence, stewardship, etc. as identified by the HL7 Structured Documents committee.

The primary assumption in the context of the NHIN is that documents are formatted as XML data following the HL7 Clinical Document Architecture (CDA) standard, but nothing precludes this interface from being used to query for other kinds of documents, such as Adobe Portable Document Format files or images.

2.2 Triggers

After having obtained a Patient Identifier (PID), an NHIO edge system submits a query to its NHIO’s NHIN Gateway (the format of that query is outside the scope of this specification). In turn, the NHIN Gateway sends a query in the specified format to the NHIO Gateway correlated with the PID – specifically to the

¹ Note that to maintain compliance with HITSP constraints, the document hash value must be consistent between the document query transaction and the document retrieval transaction. See sections 3.3 “Query Parameters” and 2.6 “Technical Post-conditions” for more details.



service endpoint, as identified in the NHIN service registry. The query includes the target patient identifier and, optionally, other constraining metadata. For further details regarding query parameters and metadata, see section 3.3 “Query Parameters”.

2.3 Transaction Standard

NHIN Query for Documents utilizes the IHE Cross Community Access (XCA) ITI-38: Cross Gateway Query transaction, which is part of HITSP TP13. The XCA Profile is an addendum to the complete IHE IT Technical Infrastructure Technical Framework (ITI-TF). The location of these documents, as well as other foundational standards for this transaction, is listed in Section 1.4 “Referenced Documents and Standards”.

The XCA ITI-38 specification has been relaxed within this NHIN specification as needed to support the query for, and retrieval of, dynamically generated document content. As described further in sections 2.6 “Technical Post-conditions” and 3.3 “Query Parameters”, for documents whose creation has been deferred until retrieve time, the metadata values for document hash and document size are not required to be the actual hash and size of the later retrieved document, as mandated by XCA. In addition `availabilityStatus="urn:ihe:iti:2010:StatusCode:DeferredCreation"` is used to identify this special status. This modification to XCA is expected to be adopted by IHE at some future time.

A WSDL for the Responding Gateway actor and a full XML Schema can be accessed via a URL provided in Appendix B of this document.

2.4 Design Principles and Assumptions

The following assumptions or design principles underlie this specification:

- How an NHIO determines which other NHIOs to direct queries is not specified. This is a local NHIO decision.
- An NHIN Gateway directs a query to other individual NHIOs. This specification does not define a central or federated service that performs transactions across multiple NHIOs.
- An authorization decision evaluates each request against local consumer preferences and local policies and permissions to determine which document(s) can be made available for retrieval.
- Patient Identifiers (PIDs), once shared with another NHIO will NEVER be reassigned to another person.

2.5 Technical Pre-conditions

The following technical pre-conditions exist for this interface specification:

- The NHIO(s) to which the query will be directed have been selected and applicable service endpoints have been identified.
- The identifier for the patient as assigned by the each respondent NHIO’s assigning authority has been acquired through some verifiable means, primarily through use of the Patient Discovery. It is recommended that a patient identifier be re-discovered through the Patient Discovery Specification at least as often as every encounter prior to use in a document query.
- The patient has provided their consent to share their information.

2.6 Technical Post-conditions

The following technical post-conditions will result after the execution of this interface specification:

- Errors encountered will be handled, as specified in Section 4 “Error Handling”.
- Audit records are created and stored by both the requesting and responding NHIO, as described in section 5 “Auditing”.



- Consumer preferences and local policies and permissions were enforced by the responding NHIO.
 - Only those documents available to the requestor are included in the list
 - If the requester was not authorized to view a list of documents, appropriate errors were returned.
- The response to this query is a collection of Document IDs referring to available documents, and some metadata describing each.
 - These references may be used in the Retrieve Document transaction, as described in the NHIN Retrieve Documents specification.
 - These document references are valid for a limited duration (the timeframe of which is determined by the implementation of a particular HIO), and, if the document reference is ever the subject of a successful Retrieve Document transaction, it will persist forever. The intention here is to persist documents that have been actually retrieved across the NHIN, but not persist documents that have never been retrieved (this is important to those HIOs that may dynamically generate documents).
- Part of the document metadata that is returned in the response to this message includes a hash value of the actual document. It is required that the hash value of the document be computed either before or during this query transaction so that it may be returned as part of the query. Document Consumers may use this hash value to assess the validity of retrieved documents.
 - In the event that the document hash and/or size are not known at the time of query because the creation of the document is being delayed until a retrieve is received, availabilityStatus="urn:ihe:iti:2010:StatusCode:DeferredCreation" and -1 for hash and size may be used to indicate this state; further explanation is provided in sections 2.3 "Transaction Standard" and 3.3 "Query Parameters".

3 Interface Definition

3.1 ITI-38 – Cross Gateway Query

This transaction is described in IHE ITI XCA Supplement Section 3.38. The figure below illustrates the actors and transactions involved in the ITI-38 Cross Gateway Query transaction. Note that the diagram represents the Initiating Community (NHIO in this context) as an IHE XDS-based community. The NHIN Query for Documents transaction does not require the XDS architecture; it is merely presented in the diagram for illustrative purposes. A sample query and response is provided in Appendix A "Sample Messages".

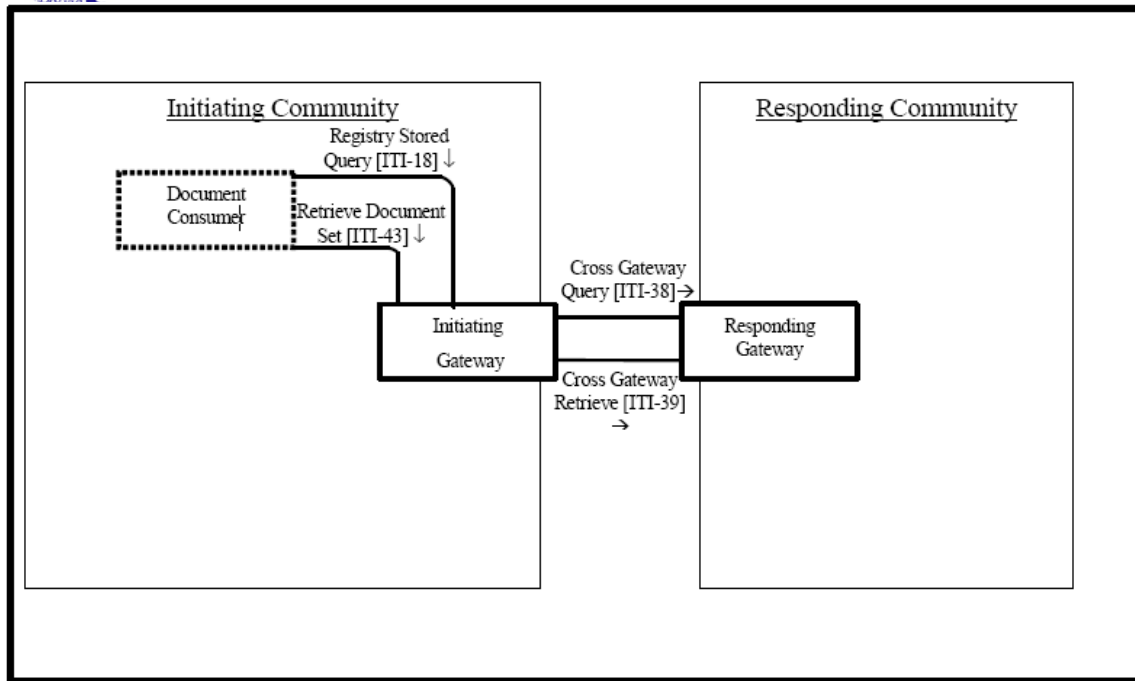


Figure 18.1-1. XCA Actor Diagram

The scope of the Cross Gateway Query transaction is based on the Registry Stored Query transaction [ITI-18]. Much of the Registry Stored Query transaction [ITI-18] is inherited by the Cross Gateway Query transaction. All stored queries listed in ITI-18 shall be supported by any responding NHIN Gateway. The XCA specification identifies special handling of some types of stored queries when a community does not support a related concept. Refer to Section 3.38.4.1.2.3 of the XCA Supplement for a description of special handling (return no elements) when a community does not support a related concept.

The Cross Gateway Query occurs between an Initiating NHIN Gateway and a Responding NHIN Gateway. The responding gateway's `homeCommunityId` attribute shall be returned within all appropriate elements. Responding NHIN Gateways shall support asynchronous query requests as described in the XCA Supplement section 3.38.1 and 3.38.5 (Note Section 3.38.5 is significantly updated by approved IHE Change Proposal 420 and is adopted for use by NHIN, see Section 1.4 "Referenced Documents and Standards" for a description and link to this change proposal). Initiating NHIN Gateways may choose whether to use synchronous or asynchronous interactions.

The common coding/vocabulary scheme used for the meta-data and query parameters of the Cross Gateway Query is defined in section 3.3 "Query Parameters".

3.1.1 homeCommunityId

A community (NHIO) is identifiable by a globally unique id called the `homeCommunityId`. Membership of a facility/enterprise in one community does not preclude it from being a member in another community. The following information is included in the IHE XCA profile to define the use of the `homeCommunityId`. NHIN specific annotations are included in square brackets:

- The `homeCommunityId` is a globally unique identifier for a community used to assist in subsequent requests for locating the data held by that community. `homeCommunityId` is structured as an OID limited to 64 characters and specified in URI syntax, for example the `homeCommunityId` of 2.16.840.1.113883.3.166 would be formatted as `urn:oid:2.16.840.1.113883.3.166`.



- [Each NHIO shall use the homeCommunityId of the form “urn:oid:n.n.n.n” using a globally unique OID assigned to the NHIO when responding to a Cross Gateway Query. The Initiating Gateway is expected to use this homeCommunityId to correlate a subsequent Retrieve Document request with the HIO that holds the requested data.]
- It is returned within the response to Cross Gateway Query to indicate the association of a response element with a community. It is specified as the ebRIM home attribute within the relevant response elements. Document Consumers process the value in the response as an opaque unique identifier.
- It is used by Initiating Gateways [when retrieving documents] to direct requests to the community where the data originated.

3.2 Query Parameters

The query parameters for the Cross-Gateway query are defined by the IHE. See Volume 2a of IHE ITI Technical Framework, Section 3.18.4.1.2.3.7 “Parameters for Required Queries”. For more detailed descriptions of the parameters see Volume 3 of the IHE IT Technical Framework, Section 4.1.7 “Document Definition Metadata” Table 4.1-5. Links to these references are provided in Section 1.4 “Referenced Documents and Standards” in this document.

Document metadata elements, including coded and non-coded elements, are used in several ways in a document sharing environment such as has been adopted for the NHIN. The primary uses of the metadata are:

1. To facilitate efficient searches for documents
2. To provide detailed information that NHIO users can review to determine which documents they wish to retrieve
3. To provide information that computer systems can use to verify that the data is about the correct patient (subset of demographics), determine if they are capable of displaying and/or parsing the document, and to determine if the requesting user has permission to access the document

Each of the metadata elements may contribute to some or all of these uses.

In order to allow receiver of the query response to validate patient demographics, the sourcePatientInfo metadata element, although technically optional, should contain a minimum of demographics for the patient, including first name, last name, date of birth, and gender. This is the same requirement as specified by IHE, in the ITI Technical Framework Volume 3 Table 4.1-5 sourcePatientInfo Attribute.

HITSP C80 defines value sets for document metadata elements requiring a coded vocabulary term for its value. This specification adopts the vocabulary for document metadata elements defined in HITSP C80².

Efficient document searches can best be facilitated by limiting search parameters to a few elements, each with a coarse granularity. For document searches on the NHIN, it is recommended to use the following elements as the primary search parameters:

- Patient ID
- Class code
- Practice Setting Code
- Healthcare Facility Type
- Document Creation Time (not a coded element and thus not further described in this document. As referenced above, IHE Technical Framework Volumes 2a and 3 provide more detail for this and other query parameters.)

² As of October, 2009, a draft of HITSP C80 (v1.1.1) has been produced with significant changes to the section on document metadata, and it is this draft that is being adopted by this specification. It is expected that HITSP will formally adopt and publish these changes sometime in early 2010.



3.2.1 Patient ID

The Patient ID (PID) is the technical identifier used to represent the subject (patient) for whom documents are sought. This identifier shall originate from an Assigning Authority Domain supporting the NHIO. This specification **does not** constrain who the Assigning Authority is, whether it is the same as the Home Community ID, whether more than one might be utilized within an HIO, or whether a given Assigning Authority may be referenced by more than one HIO.

The Patient ID shall contain two parts:

- Patient Identity Assigning Authority in the form of an OID
- An identifier in the above Assigning Authority domain

Within the query request and response, these components of the patient ID are to be specified in the HL7 CX format. In the context of an NHIO, these values are exchanged during patient discovery; the Assigning Authority is the *root* of the patient identifier and the Patient ID is the *extension*.

The HL7 identifier type CX consists of several components, but this specification restricts them to the use of two components, the ID Number, and the Assigning Authority (AA). The Assigning Authority identifies the "domain" over which the ID Number represents a unique entity. Furthermore, the AA is represented using a Universal ID and Universal ID Type. In the XDS specification, ISO Object Identifiers must be used as Universal ID. Therefore, Universal ID Type is always ISO. The required format is: IDNumber^^^&OIDofAA&ISO. No other values/modifications in other components or subcomponents are allowed.

An explicit example is: 543797436^^^&1.2.840.113619.6.197&ISO

Note that the '&' character must be properly encoded in the XML content. Within the AdhocQueryRequest, the patient identifier shall be surrounded by single quotes as in the following example:

```
<rim:Slot name="$XDSDocumentEntryPatientId">
  <rim:ValueList>
    <Value>'d8420442513945d^^^&1.3.6.1.4.1.21367.2005.1.1&ISO'</Value>
  </rim:ValueList>
</rim:Slot>
```

These requirements stem from the IHE specification for the XCA Cross Gateway Query (ITI-38), which bases query parameters on the IHE Registry Stored Query (ITI-18). The Registry Stored Query itself references the XDS document metadata definition and CX data type. These constraints and references are parts of the IHE ITI XCA Supplement Section 3.38.4.1.2.2 and the XDS CX Data Type is described in Volume 3 of the IHE ITI Technical Framework Section 4.1.7 Table 4.1-3.

3.2.2 Hash

The hash contains the hash of the target document, computed following the SHA-1 algorithm. If the hash value is not known at the time of the query, -1 may be returned for the hash value and 'urn:ihe:iti:2010:StatusType:DeferredCreation' shall be returned as the DocumentStatus.

3.2.3 Size

The actual size (in bytes) of the document, or -1 if the size of the document is not known at query time. If -1 is specified, 'urn:ihe:iti:2010:StatusType:DeferredCreation' shall be returned as the DocumentStatus.

4 Error Handling

Error codes used in the Query for Documents interface will conform to the error codes listed in IHE TF Volume 3 Section 4.1.13. The error codes relevant to the Stored Query are listed in the following table:



Error Code	Description
XDSRegistryError	Error from the registry in processing the query (eg. invalid query criteria)
XDSRegistryBusy	Too much activity
XDSRegistryOutOfResources	Resources are low.
XDSTooManyResults	
XDSUnknownStoredQuery	The Query ID provided in the request is not recognized.
XDSStoredQueryMissingParam	A required parameter to a stored query is missing.
XDSStoredQueryParamNumber	A parameter which only accepts a single value is coded with multiple values
XDSUnknownPatientId	The Patient ID specified is no longer valid. If the Patient ID is not known, has never been valid, and the HIE is not able to distinguish this from previously valid Patient ID's then this error should also be returned. Otherwise a Patient ID that has never been valid should result in an empty list.
XDSUnknownCommunity	A value for the homeCommunityId is not recognized
XDSMissingHomeCommunityId	A value for the homeCommunityId is required and has not been specified

5 Auditing

Both the Initiating Gateway and Responding Gateway shall audit the Cross Gateway Query as described in Section 3.38.4.1.4 in the XCA Supplement.

This section of the supplement is copied below for reference only. Please consult the current XCA supplement to ensure the latest version is being used.

3.38.4.1.4 Security Considerations

Both the Initiating Gateway and Responding Gateway shall audit the Cross Gateway Query. The audit entries shall be equivalent to the entries required for the Registry Stored Query.

The Initiating Gateway:

- If receiving a Registry Stored Query transaction from a Document Consumer, shall audit as if 1130 it were a Document Registry. See ITI TF-2a: 3.18.4.2.5.
- In addition, shall audit the Cross Gateway Query as if it were a Document Consumer except that for EventTypeCode the Initiating Gateway shall specify EV("ITI-38", "IHE Transactions", and "Cross Gateway Query"). See ITI TF-2a: 3.18.4.2.4.
- In addition, if interacting with a local Document Registry, shall audit as if it were a 1135 Document Consumer. See ITI TF-2a: 3.18.4.2.5.

The Responding Gateway:

- Shall audit the Cross Gateway Query as if it were a Document Registry except that for EventTypeCode the Responding Gateway shall specify EV("ITI-38", "IHE Transactions", "Cross Gateway Query"). See ITI TF-2a: 3.18.4.2.4.
- In addition, if interacting with a local Document Registry, shall audit as if it were a Document Consumer. See ITI TF-2a: 3.18.4.2.5.



Appendix A: Sample Messages

The samples in the following two sections show a typical SOAP request and its relative SOAP response. The sample messages also show the WS-Addressing headers <Action/>, <MessageID/>, <ReplyTo/>...; these WS-Addressing headers are populated according to the W3C WS-Addressing standard.

All of the samples presented in this section are also available online on the IHE FTP site at ftp://ftp.ihe.net/TF_Implementation_Material/ITI/packages/.

Sample Cross Gateway Query SOAP 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 returnComposedObjects="true" returnType="LeafClass" />
      <rim:AdhocQuery id="urn:uuid:14d4debf-8f97-4251-9a74-a90016b0af0d">
        <rim:Slot name="$XDSDocumentEntryPatientId">
          <rim:ValueList>
            <Value>'d8420442513945d^^^&amp;1.3.6.1.4.1.21367.2005.1.1&amp;ISO'</Value>
          </rim:ValueList>
        </rim:Slot>
        <rim:Slot name="$XDSDocumentEntryStatus">
          <rim:ValueList>
            <rim:Value>('urn:oasis:names:tc:ebxml-regrep:StatusType:Approved',
'urn:ihe:iti:2010:StatusType:DeferredCreation')</Value>
          </rim:ValueList>
        </rim:Slot>
      </query:AdhocQuery>
    </query:AdhocQueryRequest>
  </s:Body>
</s:Envelope>
```

Sample Response

```
<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:CrossGatewayQueryResponse</a:Action>
    <a:RelatesTo>urn:uuid:def119ad-dc13-49c1-a3c7-e3742531f9b3</a:RelatesTo>
  </s:Header>
  <s:Body>
    <AdhocQueryResponse xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0" status="Success">
      <rim:RegistryObjectList>
        <rim:ExtrinsicObject id="urn:uuid:08a15a6f-5b4a-42de-8f95-89474f83abdf" isOpaque="false"
mimeType="text/xml" objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1"
status="urn:oasis:names:tc:ebxml-regrep:StatusType:Approved" home="urn:oid:
2.16.840.1.113883.3.166">
          <rim:ExtrinsicObject home="urn:oid: 2.16.840.1.113883.3.166" id="urn:uuid:7b3f363f-0465-
4bc0-bdb3-bb72657284ca" isOpaque="false" lid="urn:uuid:7b3f363f-0465-4bc0-bdb3-bb72657284ca"
mimeType="text/xml" objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1"
status="urn:oasis:names:tc:ebxml-regrep:StatusType:Approved">
            <rim:Slot name="URI">
              <rim:ValueList>
                <rim:Value>http://111.111.11.11:2011/IB/servlet/runHXML?IBSite=ihetest&
            </rim:Slot>
          </rim:ExtrinsicObject>
        </rim:RegistryObjectList>
      </AdhocQueryResponse>
    </s:Body>
  </s:Envelope>
```




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```
IBThread=repo_query&doc_id=df7e998e-fc53-4a51-61a0-b31293b046c7</rim:Value>
</rim:ValueList>
</rim:Slot>
<rim:Slot name="creationTime">
  <rim:ValueList>
    <rim:Value>20080516</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Slot name="hash">
  <ValueList>
    <Value>fcd7410538d3ae5a69b5d6d6b7e97b2252191328</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Slot name="languageCode">
  <rim:ValueList>
    <rim:Value>en-us</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Slot name="repositoryUniqueId">
  <rim:ValueList>
    <rim:Value>2.16.840.1.113883.3.166.3.1</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Slot name="serviceStartTime">
  <rim:ValueList>
    <rim:Value>200805150800</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Slot name="serviceStopTime">
  <rim:ValueList>
    <rim:Value>200805151001</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Slot name="size">
  <rim:ValueList>
    <rim:Value>35452</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Slot name="sourcePatientId">
  <rim:ValueList>
    <rim:Value>NISTTEST12^^^&2.16.840.1.113883.1.166.1.2&ISO</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Slot name="sourcePatientInfo">
  <rim:ValueList>
    <rim:Value>PID-3|pid1^^^domain</rim:Value>
    <rim:Value>PID-5|Schnur^Anna^^^</rim:Value>
    <rim:Value>PID-7|19560813</rim:Value>
    <rim:Value>PID-8|F</rim:Value>
    <rim:Value>PID-11|1 King Street NW^^Abingdon^VA^24210^USA</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Name>
  <rim:LocalizedString charset="UTF-8" value="Physical Test" xml:lang="en-us" />
</rim:Name>
<rim:Description />
<rim:VersionInfo versionName="1.1" />
<rim:Classification classificationScheme="urn:uuid:93606bcf-9494-43ec-9b4e-
a7748d1a838d" classifiedObject="urn:uuid:7b3f363f-0465-4bc0-bdb3-bb72657284ca" home="urn:oid:
2.16.840.1.113883.3.166" id="urn:uuid:541d7892-0391-4af0-abf0-cf4c30628f37"
lid="urn:uuid:541d7892-0391-4af0-abf0-cf4c30628f37" nodeRepresentation=""
objectType="urn:oasis:names:tc:ebxml-regrep:Object:RegistryObject:Classification">
  <rim:Slot name="authorInstitution">
    <rim:ValueList>
      <rim:Value>Adult Clinic</rim:Value>
      <rim:Value>Beach Community Medical</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Slot name="authorPerson">
    <rim:ValueList>
```




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```
<rim:Value>^Hamilton^Greg^^</rim:Value>
</rim:ValueList>
</rim:Slot>
<rim:Slot name="authorRole">
  <rim:ValueList>
    <rim:Value>Chief Internist</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Slot name="authorSpecialty">
  <rim:ValueList>
    <rim:Value>Pulmonary Specialist</rim:Value>
  </rim:ValueList>
</rim:Slot>
<rim:Name />
<rim:Description />
<rim:VersionInfo versionName="1.1" />
</rim:Classification>
<rim:Classification classificationScheme="urn:uuid:93606bcf-9494-43ec-9b4e-
a7748d1a838d" classifiedObject="urn:uuid:7b3f363f-0465-4bc0-bdb3-bb72657284ca" home="urn:oid:
2.16.840.1.113883.3.166" id="urn:uuid:9f602797-f9d0-4ce9-a02c-a45770aeb5"
lid="urn:uuid:9f602797-f9d0-4ce9-a02c-a45770aeb5" nodeRepresentation=""
objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:Classification">
  <rim:Slot name="authorInstitution">
    <rim:ValueList>
      <rim:Value>Caring For Adults Clinic</rim:Value>
      <rim:Value>Raceway Medical Community</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Slot name="authorPerson">
    <rim:ValueList>
      <rim:Value>^Stewart^Chris^^</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Slot name="authorRole">
    <rim:ValueList>
      <rim:Value>Department Head</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Slot name="authorSpecialty">
    <rim:ValueList>
      <rim:Value>Teaching Professor</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Name />
  <rim:Description />
  <rim:VersionInfo versionName="1.1" />
</rim:Classification>
<rim:Classification classificationScheme="urn:uuid:41a5887f-8865-4c09-adf7-
e362475b143a" classifiedObject="urn:uuid:7b3f363f-0465-4bc0-bdb3-bb72657284ca" home="urn:oid:
2.16.840.1.113883.3.166" id="urn:uuid:22dbab5f-f2ef-471c-8a71-920c5e2bbc6a"
lid="urn:uuid:22dbab5f-f2ef-471c-8a71-920c5e2bbc6a" nodeRepresentation="34133-9"
objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:Classification">
  <rim:Slot name="codingScheme">
    <rim:ValueList>
      <rim:Value>2.16.840.1.113883.6.1</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Name>
    <rim:LocalizedString charset="UTF-8" value="SUMMARIZATION OF EPISODE NOTE"
xml:lang="en-us" />
  </rim:Name>
  <rim:Description />
  <rim:VersionInfo versionName="1.1" />
</rim:Classification>
<rim:Classification classificationScheme="urn:uuid:f4f85eac-e6cb-4883-b524-f2705394840f"
classifiedObject="urn:uuid:7b3f363f-0465-4bc0-bdb3-bb72657284ca" home="urn:oid:
2.16.840.1.113883.3.166" id="urn:uuid:c016bcbf-2a8b-4140-8dfc-e8ca1215a960"
lid="urn:uuid:c016bcbf-2a8b-4140-8dfc-e8ca1215a960" nodeRepresentation="N"
objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:Classification">
  <rim:Slot name="codingScheme">
```



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```
<rim:ValueList>
  <rim:Value>2.16.840.1.113883.5.25</rim:Value>
</rim:ValueList>
</rim:Slot>
<rim:Name>
  <rim:LocalizedString charset="UTF-8" value="Normal" xml:lang="en-us" />
</rim:Name>
<rim:Description />
<rim:VersionInfo versionName="1.1" />
</rim:Classification>
<rim:Classification classificationScheme="urn:uuid:a09d5840-386c-46f2-b5ad-9c3699a4309d"
classifiedObject="urn:uuid:7b3f363f-0465-4bc0-bdb3-bb72657284ca" home="urn:oid:
2.16.840.1.113883.3.166" id="urn:uuid:220e5350-de61-4955-b253-cb7d5a71f846"
lid="urn:uuid:220e5350-de61-4955-b253-cb7d5a71f846"
nodeRepresentation="2.16.840.1.113883.10.20.1" objectType="urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:Classification">
  <rim:Slot name="codingScheme">
    <rim:ValueList>
      <rim:Value>Connect-a-thon formatCodes</rim:Value>
    </rim:ValueList>
  </rim:Slot>
<rim:Name>
  <rim:LocalizedString charset="UTF-8" value="HL7 CCD Document" xml:lang="en-us" />
</rim:Name>
<rim:Description />
<rim:VersionInfo versionName="1.1" />
</rim:Classification>
<rim:Classification classificationScheme="urn:uuid:f33fb8ac-18af-42cc-ae0e-ed0b0bdb91e1"
classifiedObject="urn:uuid:7b3f363f-0465-4bc0-bdb3-bb72657284ca" home="urn:oid:
2.16.840.1.113883.3.166" id="urn:uuid:b2b47841-a48a-4a6c-8713-ff1b3ce202ed"
lid="urn:uuid:b2b47841-a48a-4a6c-8713-ff1b3ce202ed" nodeRepresentation="HOSP"
objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:Classification">
  <rim:Slot name="codingScheme">
    <rim:ValueList>
      <rim:Value>2.16.840.1.113883.5.111</rim:Value>
    </rim:ValueList>
  </rim:Slot>
<rim:Name>
  <rim:LocalizedString charset="UTF-8" value="Hospital" xml:lang="en-us" />
</rim:Name>
<rim:Description />
<rim:VersionInfo versionName="1.1" />
</rim:Classification>
<rim:Classification classificationScheme="urn:uuid:ccccf5598-8b07-4b77-a05e-ae952c785ead"
classifiedObject="urn:uuid:7b3f363f-0465-4bc0-bdb3-bb72657284ca" home="urn:oid:
2.16.840.1.113883.3.166" id="urn:uuid:3ba60301-14e1-45f7-b1cb-9cda2ee96032"
lid="urn:uuid:3ba60301-14e1-45f7-b1cb-9cda2ee96032" nodeRepresentation="394802001"
objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:Classification">
  <rim:Slot name="codingScheme">
    <rim:ValueList>
      <rim:Value>2.16.840.1.113883.6.96</rim:Value>
    </rim:ValueList>
  </rim:Slot>
<rim:Name>
  <rim:LocalizedString charset="UTF-8" value="General Medicine" xml:lang="en-us" />
</rim:Name>
<rim:Description />
<rim:VersionInfo versionName="1.1" />
</rim:Classification>
<rim:Classification classificationScheme="urn:uuid:f0306f51-975f-434e-a61c-c59651d33983"
classifiedObject="urn:uuid:7b3f363f-0465-4bc0-bdb3-bb72657284ca" home="urn:oid:
2.16.840.1.113883.3.166" id="urn:uuid:92989021-5243-40de-9100-c0f509241839"
lid="urn:uuid:92989021-5243-40de-9100-c0f509241839" nodeRepresentation="34133-9"
objectType="urn:oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:Classification">
  <rim:Slot name="codingScheme">
    <rim:ValueList>
      <rim:Value>2.16.840.1.113883.6.1</rim:Value>
    </rim:ValueList>
  </rim:Slot>
<rim:Name>
```



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```
<rim:LocalizedString charset="UTF-8" value="SUMMARIZATION OF EPISODE NOTE"
xml:lang="en-us" />
</rim:Name>
<rim:Description />
<rim:VersionInfo versionName="1.1" />
</rim:Classification>
<rim:ExternalIdentifier home="urn:oid: 2.16.840.1.113883.3.166" id="urn:uuid:1a27b62c-
c508-4713-ble5-aec138b93af2" identificationScheme="urn:uuid:58a6f841-87b3-4a3e-92fd-a8ffeff98427"
lid="urn:uuid:1a27b62c-c508-4713-ble5-aec138b93af2" objectType="urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:ExternalIdentifier" registryObject="urn:uuid:7b3f363f-0465-4bc0-
bdb3-bb72657284ca" value="338275^^^&2.16.840.1.113883.3.166.1.1&ISO">
  <rim:Name>
    <rim:LocalizedString charset="UTF-8" value="XSDDocumentEntry.patientId"
xml:lang="en-us" />
    </rim:Name>
    <rim:Description />
    <rim:VersionInfo versionName="1.1" />
  </rim:ExternalIdentifier>
  <rim:ExternalIdentifier home="urn:oid: 2.16.840.1.113883.3.166" id="urn:uuid:b1f8a6fc-
7537-464d-bd09-dfab13853293" identificationScheme="urn:uuid:2e82c1f6-a085-4c72-9da3-8640a32e42ab"
lid="urn:uuid:b1f8a6fc-7537-464d-bd09-dfab13853293" objectType="urn:oasis:names:tc:ebxml-
regrep:ObjectType:RegistryObject:ExternalIdentifier" registryObject="urn:uuid:7b3f363f-0465-4bc0-
bdb3-bb72657284ca" value="129.6.58.92.147">
    <rim:Name>
      <rim:LocalizedString charset="UTF-8" value="XSDDocumentEntry.uniqueId" xml:lang="en-
us" />
    </rim:Name>
    <rim:Description />
    <rim:VersionInfo versionName="1.1" />
  </rim:ExternalIdentifier>
</rim:ExtrinsicObject>
</rim:RegistryObjectList>
</AdhocQueryResponse>
</s:Body>
</s:Envelope>
```

Note: The AdhocQuery/@id 14d4debf-8f97-4251-9a74-a90016b0af0d is a well known constant which stands for the FindDocuments query. The ITI-18 specification lists about a dozen different such ad hoc query types that shall be used here.

The FindDocuments query finds documents (XSDDocumentEntry objects) for a given patientID with a matching 'status' attribute. The other parameters can be used to restrict the set of XSDDocumentEntry objects returned.



Appendix B: WSDL

IHE provides example WSDL definitions for the Responding Gateway actor supporting the Cross Gateway Query Transaction. The WSDL, as well as schema and examples, can be accessed at ftp://ftp.ihe.net/TF_Implementation_Material/ITI/packages/XCA.Support.Materials.v5.zip

Note: this version of the materials includes changes resulting from IHE Change Proposal 420 which is adopted by this specification.