

Integrating the Healthcare Enterprise



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IHE Radiology Technical Framework Supplement

10

Cross-Community Access for Imaging (XCA-I)

15

Trial Implementation

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Foreword

25 This is a supplement to the IHE Radiology Technical Framework, Rev. 10.0. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

This supplement is submitted for Trial Implementation as of May 17, 2011 and will be available for testing at subsequent IHE Connectathons. The supplement may be amended based on the results of testing. Following successful testing it will be incorporated into the Radiology Technical Framework. Comments are invited and may be submitted on the IHE forums at 30 <http://forums.rsna.org> or by email to radiology@ihe.net.

This supplement describes changes to the existing technical framework documents and where indicated amends text by addition (**bold underline**) or removal (~~**bold strikethrough**~~), as well as addition of large new sections introduced by editor’s instructions, such as “add new text,” which for readability are not bolded or underlined.

35 “Boxed” instructions like the sample below indicate to the Volume Editor how to integrate the relevant section(s) into the relevant Technical Framework volume:

<i>Replace Section X.X by the following:</i>
--

40 General information about IHE can be found at: www.ihe.net

Information about the IHE Radiology can be found at: <http://www.ihe.net/Domains/index.cfm>

Information about the structure of IHE Technical Frameworks and Supplements can be found at: <http://www.ihe.net/About/process.cfm> and <http://www.ihe.net/profiles/index.cfm>

45 The current version of the IHE Technical Framework can be found at: http://www.ihe.net/Technical_Framework/index.cfm

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Introduction

110 This supplement, developed by the IHE Radiology Technical Committee, describes the Cross-Community Access for Imaging (XCA-I) profile. The XCA-I profile is a specialization of the ITI XCA profiles adding the actors and transactions to retrieve the Reports and images manifest from a cross community.

Profile Abstract

115 The Cross-Community Access for Imaging (XCA-I) Integration Profile specifies actors and transactions to query and retrieve patient-relevant medical imaging data being held by other communities.

A community is defined as a coupling of facilities/enterprises that have agreed to work together using a common set of policies for the purpose of sharing clinical information via an established
120 mechanism. Facilities/enterprises may host any type of healthcare application such as PACS/RIS, EHR, PHR, etc. A community 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. Such communities may be XDS Affinity Domains which define document sharing using the XDS profile or any other communities, no matter what their internal sharing
125 structure. This profile addresses sharing between such communities.

The XCA-I Profile extends the IT Infrastructure XCA Profile. XCA provides the means to access Diagnostic reports and Imaging Manifests. XCA-I provides the means to access the imaging objects referenced in the Manifests. The reader of XCA-I, is expected to have read and understood the XCA profile, including the meaning of terms such as Community,
130 homeCommunityId, etc. The reader is also expected to have read and understood the XDS-I.b profile.

Open Issues and Questions

1. Can a non-DICOM-wrapped JPEG be transferred “WADO-like” through a proxy? (Cross-Gateway Imaging Document Set Retrieve)

135 The URL sent to the initiating gateway identifies the instance, but not the oid of the image source. The initiating gateway has no easy way to know where to get the instance.

Note: OID in the WADO request or initiating gateway could cache the instance.

Potential issue with proxy of WADO is the delay involved in the responding gateway getting the images in order to compose the WADO response will likely be longer than the
140 timeout for the WADO request.

An Imaging Document Consumer will have mapped the AE Titles from Manifest received from initiating gateway to the initiating gateway itself. When the image

145 consumer composes a WADO retrieve, it will go to initiating Gateway which has no information in the URL. One possible solution, WADO would need the HomeCommunityID with the RepositoryID and SOP Instance UID.

Closed Issues

2. Do we need to discuss pre-fetching by an initiating Gateway?

150 The turnaround at the Imaging Document Consumer to retrieve the image sets, as specified by the KOS, should be quick. No intermediate pre-fetching should be necessary. However, this will be left to the product designers.

3. How can the “Retrieve Latency” of large data sets through multiple intermediate nodes be managed?

155 XCA-I does include support of Asynchronous Mode Support for all Imaging Document Set Retrieval actors: Consumer, Initiating Gateway, Responding Gateway, Imaging Document Source.

(Currently asynchronous support for Retrieve is already mandatory for the Responding Gateway).

4. Should an Initiating Gateway proxy local Imaging Doc Set Retrievals?

160 Due to the size of Imaging Document sets, an Initiating Gateway Actor, acting as a proxy for Imaging Document Source Actors in the same community adds unnecessary latency in the Imaging Document set retrieval and is not specified to do proxy when the Imaging Document Source is in the same community as the Imaging Document Consumer.

5. Should ITI-39 include an asynchronous option?

165 No action taken on ITI-39

6. Is it important for partial success in RAD-75 to be accurately reported?

The Responding Gateway is permitted to suppress failures so the Init. Gateway may report success, when it is actually a partial success. Is this an issue we need to address? If so, this should be coordinated with the XCA profile to harmonize Gateway behavior.

170 Success does not mean you transferred all images requested. The manifest has the list of images. This list could be used to confirm successful transfer of images.

7. How will JPIP be managed? (scope of use, end-to-end vs. middle-to-end)

A couple possible scenarios:

- 175 • The Initiating Gateway can act as a JPIP proxy. This would happen if it receives a RAD-69 request for images using JPIP transfer syntax and it retrieves the images from a Responding Gateway that also supports JPIP.

- 180
- The consumer could direct the JPIP request to an adapter which retrieves the images without JPIP via the Initiating GW serving them to Imaging Document Consumers inside its own community. If the adapter is grouped with the initiating GW, then the Consumer does not have to differentiate it's JPIP request. If the adapter is grouped with the consumer, then the initiating GW does not need to process & transform DICOM images to JPIP.

185

8. How will security be handled? How can we ensure that the resulting JPIIP request is actually paired to the original RAD-69 request?

We are not requiring any of the actors to support JPIP. JPIP is an optional mode of operation.

190

9. How are "legal"/permission/access issues addressed between sites that do not share the common legal environment of an affinity domain?

Policy choices will not be addressed by this profile. Each community may have different policies. The profile has been designed with this fact in mind and an understanding of enough variety of policies so that any reasonable policy can be implemented without violating the profile.

195

10. Should there be an option for mapping metadata terminology between communities?

Mapping metadata is an issue. However, it is left to the implimenters to define.

200

11. Do we need to specify how to change the attributes within the images for importing? Does Import Reconciliation Workflow support these use cases or should the behavior be specified in this profile?

IRWF Importer needs to be optionally grouped with Image Document Consumer.

205

12. Do we need to describe Responding Gateways using non-XDS-I infrastructure in this profile?

The profile currently mandates support for XDS-I inside the responding community. Theoretically, a Responding Gateway, although mandated to support XDS-I transactions, could access local images using other means. IHE always allows systems to implement alternate methods.

Volume 1 – Integration Profiles

1.7 History of Annual Changes

- 210 *Add the following bullet to the end of the bullet list in section 1.7*
- Added the Cross-Community Access for Imaging (XCA-I) Profile which describes mechanisms for imaging information to be queried and retrieved from other communities.

1.n Copyright Permission

Add the following to sections 1.n:

2.1 Dependencies among Integration Profiles

Add the following to Table 2-1

Cross-Community Access for Imaging (XCA-I)	XDS.b	Required for access of documents	
	XCA	Required for cross community access of documents	
	Audit Trail and Node Authentication, incl. Radiology Audit Trail Option	Each XCA-I Actor shall be grouped with Secure Node Actor or Secure Application	Required to manage audit trail of exported PHI, node authentication and transport encryption.
	Consistent Time	Each XCA-I Actor shall be grouped with the Time Client Actor.	To ensure consistency among document and submission set dates.

Add the following section to section 2.1 towards the end of the Integration Profiles Overview

2.1.29 Cross-Community Access for Imaging (XCA-I) Integration Profile

The Cross-Community Access for Imaging (XCA-I) Integration Profile specifies actors and transactions to query and retrieve patient-relevant medical imaging data being held by other communities.

- 225 Within a community, a group of facilities/enterprises shares clinical information via an established mechanism such as XDS-I (in which case the community can be referred to as an XDS Affinity Domain). This profile addresses sharing between such communities.

The XCA-I Profile extends the IT Infrastructure XCA Profile. XCA provides access to Diagnostic reports and Imaging Manifests. XCA-I provides access to the imaging objects

230 referenced in the Manifests. The reader of XCA-I is expected to have read and understood the XCA Profile, including the meaning of terms such as Community, homeCommunityId, etc.

Add the following new actors to Section 2.3 Actor Descriptions in TF Vol 1, following the alphabetical order.

2.3 Actors Descriptions

235 **Initiating Imaging Gateway – The Initiating Imaging Gateway Actor proxies Imaging Document Set Retrieve requests from an Image Document Consumer to a Responding Imaging Gateway with a Cross Gateway Retrieve Imaging Document Set transaction.**

240 **Responding Imaging Gateway – The responding Imaging Gateway proxies Cross Gateway Retrieve Imaging Document Set requests from an Initiating Imaging Gateway to an Imaging Document Source with an Image Document Set Retrieve request.**

Add a new column in Table 2.3-1 with title XCA-I.

Add a new row in Table 2.3-1 with first column (Actor) as Initiating Imaging Gateway

Add a new row in Table 2.3-1 with first column (Actor) as Responding Imaging Gateway

245 *Mark an X in the cell for XCA-I: Initiating Imaging Gateway, XCA-I:Responding Imaging Gateway, XCA-I:Image Document Source, XCA-I:Image Document Consumer.*

Add the new transaction 75 Cross Gateway Retrieve Imaging Document Set to TF vol 1, section 2.4 Transaction Descriptions. Update the transaction number accordingly.

250 **75. Cross Gateway Retrieve Imaging Document Set** – An Initiating Imaging Gateway sends a request for an Imaging Document Set to a Responding Imaging Gateway.

Add a new column in Table 2.4-1 with title XCA-I

Add a new row in Table 2.4-1 with first column (Transaction) as Cross Gateway Retrieve Imaging Document Set [RAD-75].

255 *Mark an X in the cell for XCA-I: Cross Gateway Retrieve Imaging Document Set [RAD-75] and XCA-I:Retrieve Imaging Document Set [RAD-69]*

Add Section 29

29 Cross-Community Access for Imaging (XCA-I) Integration Profile

260 The Cross-Community Access for Imaging (XCA-I) Integration Profile specifies actors and transactions to query and retrieve patient-relevant medical imaging data being held by other communities.

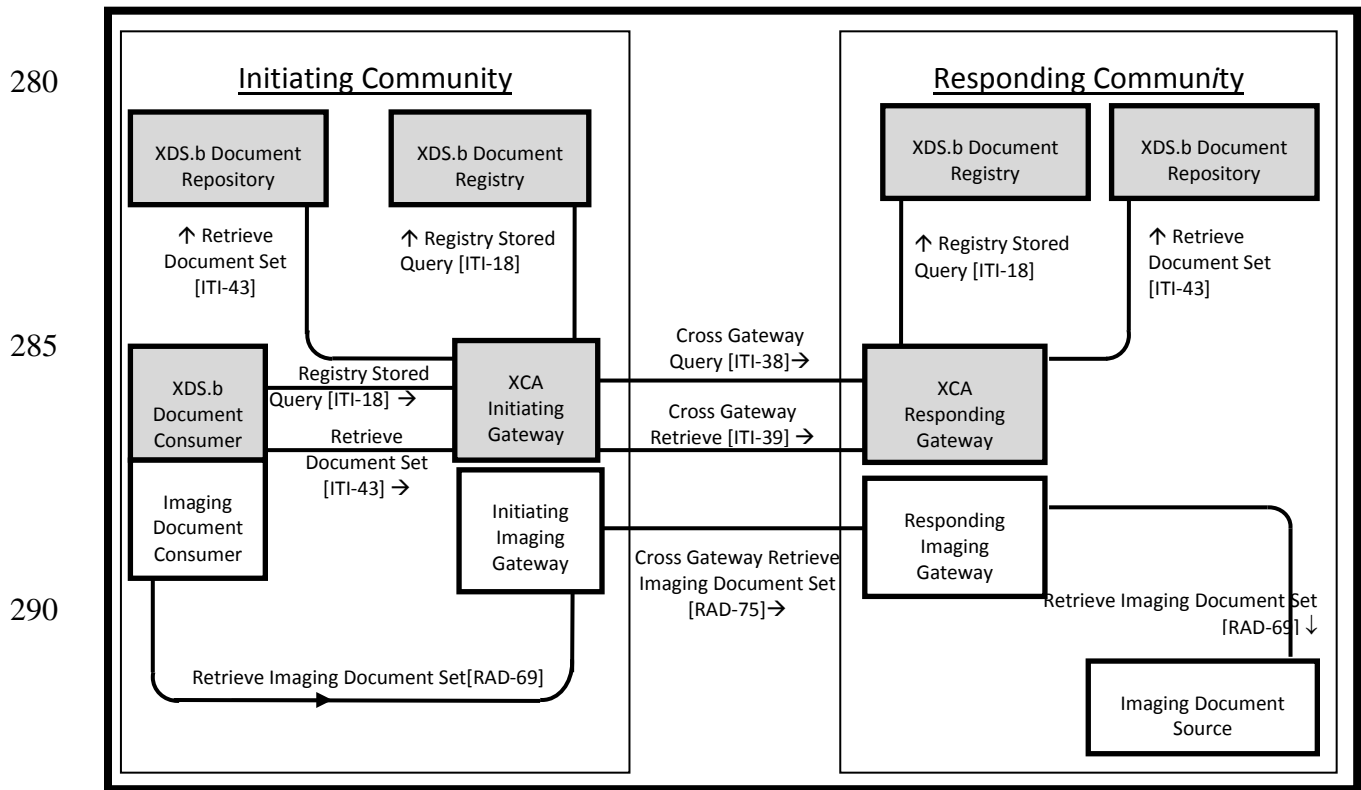
Within a community, a group of facilities/enterprises shares clinical information via an established mechanism such as XDS-I (in which case the community can be referred to as an XDS Affinity Domain). This profile addresses sharing between such communities.

The XCA-I Profile extends the IT Infrastructure XCA Profile. XCA provides access to Diagnostic reports and Imaging Manifests. XCA-I provides access to the imaging objects referenced in the Manifests. The reader of XCA-I is expected to have read and understood the XCA Profile, including the meaning of terms such as Community, homeCommunityId, etc.

270 29.1 Actors/ Transactions

Figure 29.1-1 shows the actors defined in the Cross-Community Access for Imaging (XCA-I) profile and the transactions between them.

The shaded actors are NOT included in this profile but are shown to illustrate the full set of actors that play a role other endpoint of transactions that ARE part of the profile (e.g., the Document Registry Actor is an endpoint for the Registry Stored Query Transaction). As a result, the shaded actors are not listed in Table 29.1-1.



295 **Figure 29.1-1 Cross-Community Access for Imaging Actor Diagram**

Table 29.1-1 lists the transactions for each actor directly involved in the XCA-I Profile. To claim support of this Profile, an implementation must perform the required transactions (labeled “R”). Transactions labeled “O” are optional. A complete list of options defined by this Integration Profile and that implementations may choose to support is listed in Volume 1, Section 29.2.

300

Table 29.1-1 Cross-Community Access for Imaging Integration Profile - Actors and Transactions

Actors	Transactions	Optionality	TF Reference
Imaging Document Consumer	Retrieve Imaging Document Set [RAD-69]	R	RAD TF-3: 4.69
Imaging Document Source	Retrieve Imaging Document Set [RAD-69]	R	RAD TF-3: 4.69
Initiating Imaging Gateway	Retrieve Imaging Document Set [RAD-69]	R	RAD TF-3: 4.69

Actors	Transactions	Optionality	TF Reference
	Cross Gateway Retrieve Imaging Document Set [RAD-75]	R	RAD TF-3: 4.75
Responding Imaging Gateway	Cross Gateway Retrieve Imaging Document Set [RAD-75]	R	RAD TF-3: 4.75
	Retrieve Imaging Document Set [RAD-69]	R	RAD TF-3: 4.69

29.1.1 Actor Requirements

305 The Responding Imaging Gateway shall support the use of Asynchronous Web Services Methods (see ITI TF-2: Appendix V) for the RAD-75 transaction.

The Initiating Imaging Gateway is required to support Asynchronous Web Services Exchange for the RAD-69 Transaction.

310 29.2 XCA-I Profile Options

Options that may be selected for this Integration Profile are listed in the table 29.2-1 along with the Actors to which they apply. Dependencies between options when applicable are specified in notes.

Table 29.2-1 Cross-Community Access for Imaging - Actors and Options

Actor	Options	Vol & Section
Imaging Document Consumer	Asynchronous Web Services	Vol 3, sec. 4.69.4.3
Initiating Imaging Gateway	Asynchronous Web Services	Vol 3, Sec. 4.75.4.2 Vol 3, sec. 4.69.4.3
Responding Imaging Gateway	<i>No options defined</i>	-
Imaging Document Source	Asynchronous Web Services	Vol 3, sec. 4.69.4.3

315 29.3 XCA-I Process Flow

The XCA-I Profile addresses sharing image data sets between communities.

29.3.1 Use Case – Image set sharing between communities

320 Assume a geographically dispersed region, such as Southeast Wisconsin, with several healthcare communities (or XDS Affinity Domains). One community provides image sharing services for Greater Milwaukee region and one for Kenosha region.

- In each community, a Health Information Exchange Service Provider (HIE-SP) provides:
 - an XDS Infrastructure (an XDS Registry and an XDS Repository) for sharing reports and image manifests.
 - an Affinity Domain with a common patient identifier and common coded terminology for managing the sharing of images.
- In each community, Diagnostic Imaging Service Providers provide access to locally stored images through transactions defined by the XDS-I.b Integration Profile.
- Two communities agree to share patient records for urgent care using transactions defined in XCA-I.

325
330 A patient X, who receives her primary care in Kenosha, frequently travels to the Greater Milwaukee region for business. While visiting Milwaukee, patient X is admitted to the Milwaukee University Hospital (MUH) for urgent care. The attending physician places an imaging procedure order.

335 The local PACS, acting as an XDS-I.b Imaging Document Consumer, performs an automated query for relevant priors within the Greater Milwaukee region and to the Kenosha region through an XDS.b Stored Query transaction to the local HIE-SP's Initiating Gateway.

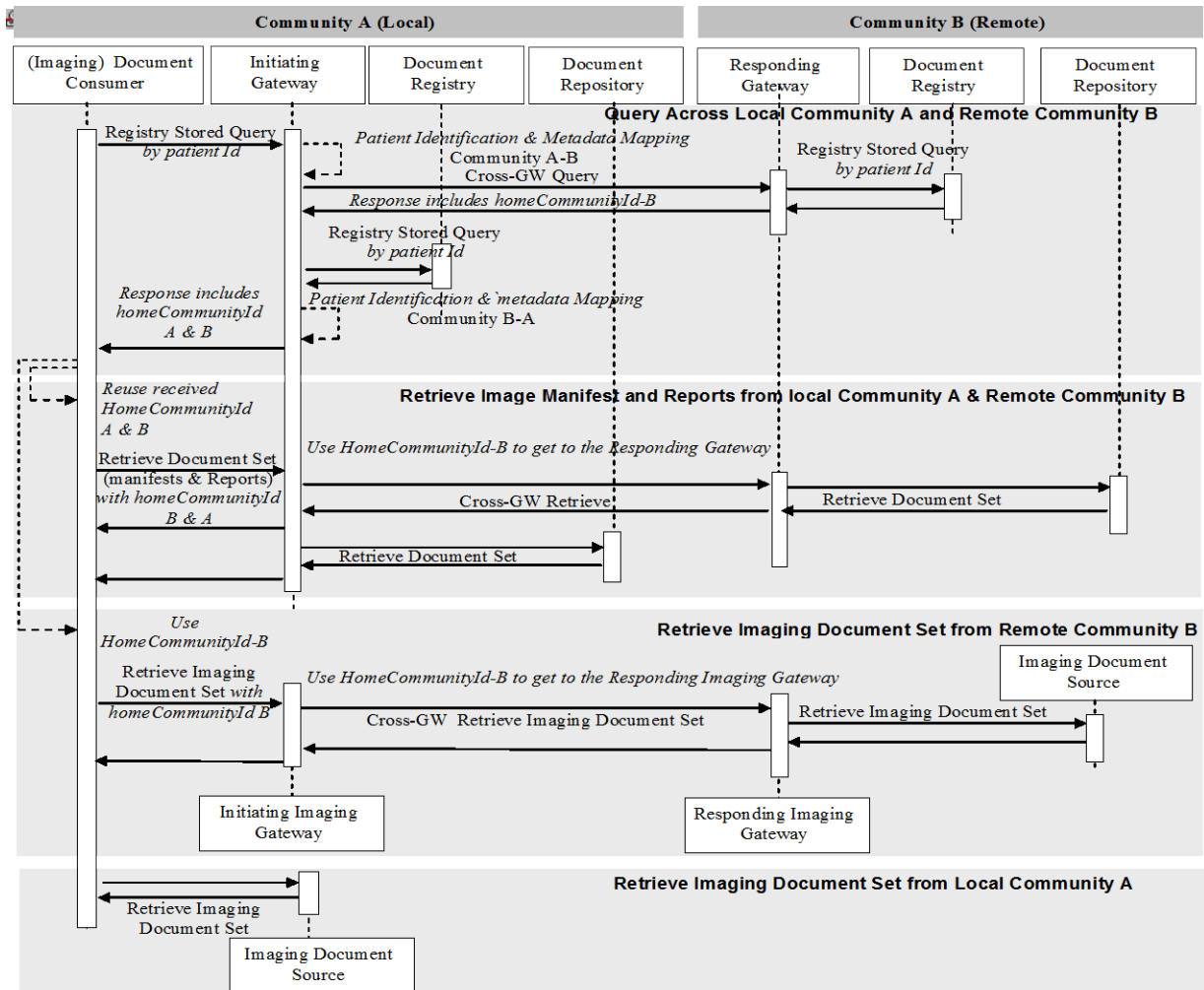
340 The Initiating Gateway in Greater Milwaukee queries both the local Document Registry and the Responding Gateway for Kenosha. Relevant priors are located in Kenosha and in the South Milwaukee Diagnostic Imaging Center. The South Milwaukee Diagnostic Imaging Center shares images using XDS-I.b as part of the Greater Milwaukee region.

The MUH PACS, acting as an XDS-I.b Imaging Document Consumer, directly accesses images from the South Milwaukee Diagnostic Imaging Center via their XDS I.b Imaging Document Source.

345 Images from the Kenosha region are retrieved through the Greater Milwaukee HIE-SP's XCA-I Initiating Imaging Gateway, retrieving the images from the Kenosha HIE-SP's XCA-I Responding Imaging Gateway. The Kenosha HIE-SP XCA-I Responding Imaging Gateway, in turn, retrieves the images from Imaging Document Source imaging repositories in the Kenosha region.

350 **29.3.2 Detailed Interactions**

The following diagram presents a high level view of the interactions between actors when both initiating and responding communities are XDS-I.b Affinity Domains. Details on each interaction follow the diagram.



355

Figure 29.3.2-1 XCA-I Detailed Interactions

Query across Local Community A and Remote Community: Document Consumer *initiates a Registry Stored Query request by patient id* – the Document Consumer initiates the initial transaction by formatting a Registry Stored Query request by patient identifier. The consumer uses PDQ, PIX or some other means to identify the Local Affinity Domain patient id, formats that information plus any other query parameters into a Registry Stored Query request and sends this request to an Initiating Gateway.

360

Initiating Gateway processes Registry Stored Query by patient id request – The Initiating Gateway receives a Registry Stored Query by patient id and must determine

365

- a) Which Responding Gateways this request should be sent to
- b) What patient id to use in the Cross Gateway Queries. Detailed specification of these steps is not in the intended scope of this profile. Combination of this profile with other existing

profiles (e.g., XCPD, PIX/PDQ), future profiles or configuration mechanisms is possible. Please refer to ITI TF-2x: E.7 *XCA and Patient Identification Management* for possible use of existing profiles PIX and PDQ.

370

For each Responding Gateway identified, the Initiating Gateway initiates a Cross Gateway Query transaction. The Initiating Gateway also initiates a Registry Stored Query to the local Document Registry.

375

Responding Gateway processes Cross Gateway Query by patient id – The Responding Gateway processes the Cross Gateway Query by initiating a Registry Stored Query to the local Document Registry. The Responding Gateway updates the response from the Document Registry to ensure that the homeCommunityId is specified on every applicable element. This updated response is sent as the response to the Cross Gateway Query.

380

Initiating Gateway processes Cross Gateway Query by patient id responses – The Initiating Gateway collects the responses from all Responding Gateways it contacted. For each response it verifies that the homeCommunityId is present in each appropriate element. Once all responses are received the Initiating Gateway consolidates all updated response data into one response to the Document Consumer. The Initiating Gateway returns to the Document Consumer the same homeCommunityId attribute values that it received from Responding Gateway(s).

385

Document Consumer receives Registry Stored Query by patient id response – The Document Consumer receives the results of the query from the Initiating Gateway and must account for two unique aspects of the response; namely that a) the homeCommunityId attribute will be specified and b) the Document Consumer may not be able to map the Retrieve Location UID value directly to a Document Repository located in a remote community. . For example, the initiating and responding community will have common Requested Procedure vocabularies. The Initiating Gateway will respond to the Document Consumer’s request using the common coding/vocabulary scheme designated for the initiating community. The Document Consumer retains the values of the homeCommunityId attribute for future interaction with the Initiating Gateway.

390

395

Retrieve Image Manifest and Reports from local Community A & Remote Community B:

Document Consumer initiates a Retrieve Document Set – If the Document Consumer issued a Registry Stored Query, the response to the Registry Stored Query by patient id includes a) the document unique ID b) the Retrieve Location unique ID c) the homeCommunityId attribute. The Document Consumer shall specify these three parameters in its Retrieve Document Set transaction to the Initiating Gateway.

400

405

Initiating Gateway processes Retrieve Document Set – The Initiating Gateway determines which Responding Gateway(s) to contact by using the homeCommunityId to obtain the Web Services endpoint of the Responding Gateway(s). If the homeCommunityId represents the local community the Initiating Gateway will initiate a Retrieve Document Set to a local Document Repository. The Retrieve Document Set may contain more than one unique homeCommunityId so the Initiating Gateway may have to initiate requests to more than one Responding Gateway,

and consolidate the results. The Initiating Gateway specifies the homeCommunityId in the Cross Gateway Retrieve Imaging Document Set transaction. The homeCommunityId identifies the community associated with the Responding Gateway.

410 **Responding Gateway processes Cross Gateway Retrieve**– The Responding Gateway within an XDS Affinity Domain processes the Cross Gateway Retrieve initiating a Retrieve Document Set transaction to 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 will contact multiple Document Repositories and consolidate the
415 responses.

Retrieve Image Set from Remote Community B

Imaging Document Consumer initiates a Retrieve Imaging Document Set . The response to the Retrieve Document Set provides the image manifest and includes a) the Retrieve Location UID identifying the Imaging Document Source, b) the document unique Ids identifying the imaging
420 documents within the Imaging Document Source c) list of one or more DICOM transfer syntax UIDs, d) Study Instance UID, e) Series Instance UID f) the homeCommunityId attribute. The Imaging Document Consumer specifies these parameters in its Retrieve Imaging Document Set transaction to the Initiating Imaging Gateway.

Initiating Imaging Gateway processes Retrieve Imaging Document Set – The Initiating
425 Imaging Gateway determines which Responding Imaging Gateways to contact by using the homeCommunityId to obtain the Web Services endpoint of the Responding Imaging Gateway. The Retrieve Imaging Document Set may contain more than one unique homeCommunityId so the Initiating Imaging Gateway may have to initiate requests to more than one Responding Imaging Gateway, and consolidate the results. The Initiating Imaging Gateway specifies the
430 homeCommunityId in the Cross Gateway Retrieve Imaging Document Set transaction. The homeCommunityId identifies the community associated with the Responding Imaging Gateway.

Responding Imaging Gateway processes Cross Gateway Retrieve Imaging Document Set – The Responding Imaging Gateway within an XDS Affinity Domain processes the Cross Gateway Retrieve Imaging Document Set initiating a Retrieve Imaging Document Set transaction to the
435 Imaging Document Source identified by the Retrieve Location UID within the request. If the Cross Gateway Retrieve Imaging Document Set requests multiple documents with different Retrieve Location UIDs, the Responding Imaging Gateway will contact multiple Imaging Document Sources and consolidate the responses.

Retrieve Image Set from Local Community A

440 **Imaging Document Consumer initiates a Retrieve Imaging Document Set** – The response to the Retrieve Document Set provides the image manifest and includes a) the repository unique ID identifying the Imaging Document Source, b) the document unique Ids identifying the documents within the Imaging document source c) list of one or more DICOM transfer syntax UIDs, d) Study Instance UID, e) Series Instance UID f) the homeCommunityId attribute.

445 Because the homeCommunityId represents the local community, the Imaging Document Consumer will initiate a Retrieve Imaging Document Set to the local Imaging Document Source.

29.3.3 Actor Grouping Considerations

450 XCA-I presumes the community uses the XDS-I.b and XDS.b integration profiles for enabling Imaging Document Set behaviour. XCA-I defines no required grouping with any actor. The implementor may consider grouping actors as needed. For example, an Image Document Source may choose to group with an IRWF Importer for importing images. The XCA-I profile does not explicitly group the XCA-I Initiating Imaging Gateway and XCA Initiating Gateway pair and the XCA-I Responding Imaging Gateway and XCA Responding Gateway pair.

455 The XCA-I profile requires that the Initiating and Responding Imaging Gateways that are used in conjunction with the XCA Initiating and Responding Gateways and will be part of XDS communities that support XDS.b.

29.4 XCA-I Security Considerations

29.4.1 XCA Risk Assessment

460 The risk analysis for XCA enumerates assets, threats, and mitigations. The complete risk data is stored and maintained in a central location. The complete risk data is stored and available from IHE¹.

The risks associated with the data content and protocols of RAD-69 and RAD-75 are a subset of those identified for the transactions in XCA.

465 29.4.2 Requirements/Recommendations

The following mitigations shall be implemented by all XCA-I actors. These mitigations moderate all high impact risks.

M1: All actors in XCA-I shall be grouped with an ATNA Secure Node or Secure Application actor and a CT Time Client actor.

470 **M2:** An Imaging Document Source shall include a SHA1 hash of the image document content in the Document metadata of the “RAD-1x” response. The Imaging Document Consumer shall have the ability to verify the SHA1 hash of the image document with the SHA1 hash in the metadata.

¹ The risk analysis data may be found at: ftp://ftp.ihe.net/IT_Infrastructure/iheitiyr5-2007-2008/Technical_Cmte/Profile_Work/XC/XCARiskAnalysis.xls

475 **M3:** Imaging Document Consumer implementations shall handle overloading through excessive volume of response data by discontinuing the read on the socket and closing it. The Initiating and Responding Imaging Gateways shall respond to disconnection by discontinuing processing of responses.

480 **M6:** The Responding Imaging Gateway shall return either zero documents with no further information or XDSUnknownPatientId in response to queries of unknown patient identifiers, depending on local policy. This applies to patient identifiers that are properly formatted or improperly formatted. By not using an error code indicating that the identifier is ill formatted, you are able to reduce the ability of applications to fish for data.

485 *The following mitigations address the risk of a document being maliciously changed. This mitigation is optional.*

M5: Documents may be digitally signed using the DSG profile

The following mitigations are transferred to the vendors, XDS Affinity Domains, and enterprises.

490 **T1:** Backup systems for registry metadata, repository documents, and gateway configuration are recommended.

T2: All implementations are recommended to ensure that all received data is propagated appropriately (i.e., without corruption and complete results) or an error is presented.

495 **T3:** Network protection services are recommended to be sufficient to guard against denial of service attacks on all service interfaces.

T4: A process that reviews audit records and acts on inappropriate actions is recommended.

T5: It is recommended that service interfaces be implemented with a good design to guard against corruption and denial of service attacks

29.4.3 Policy Choices

500 Security and privacy policy choices will not be addressed by this profile. Each community may have different security and privacy policies. The profile has been designed with this fact in mind and an understanding of enough variety of policies so that any reasonable policy can be implemented without violating the profile.

505

Volume 3 - Transactions

Modify section 4.69 in the XDS-I.b Trial Implementation Supplement

4.69 Retrieve Imaging Document Set

This section corresponds to Transaction RAD-69 of the IHE Technical Framework. “Retrieve Imaging Document Set” is used by: ~~the Imaging Document Consumer to retrieve DICOM objects from an Imaging Document Source.~~

510

- an XDS-I.b Imaging Document Consumer to retrieve from an Imaging Document Source
- an XCA-I Imaging Document Consumer to retrieve from an Initiating Imaging Gateway
- 515 • an XCA-I Responding Imaging Gateway to retrieve from an Imaging Document Source

515

The objects retrieved are those that are referenced within an XDS-I.b manifest document as described in RAD XDS-I.b Supplement: 4.68. This transaction is derived from, and is nearly identical to, the “Retrieve Document Set” Transaction (ITI-43) of the IHE IT Infrastructure Technical Framework. It adds minor additional semantics and constraints on the requirements defined in Transaction ITI-43.

520

4.69.1 Scope

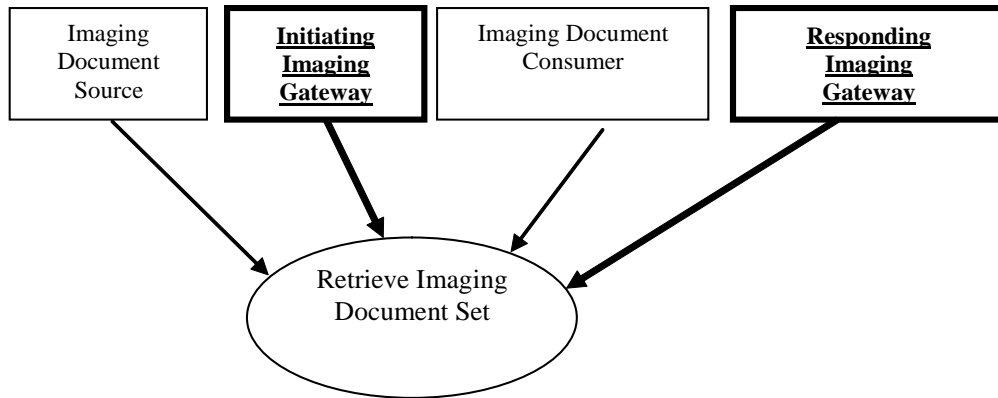
This transaction is used by the Imaging Document Consumer to retrieve a set of DICOM objects from the Imaging Document Source or an Initiating Imaging Gateway. This transaction is also used by a Responding Imaging Gateway to retrieve a set of DICOM objects from an Imaging Document Source in its own community.

525

The Imaging Document Consumer gains access to the manifest object (KOS) previously retrieved from the Document Repository by the grouped Document Consumer Actor via the Retrieve Document Set transaction. The Imaging Document Consumer extracts the XDSDocumentEntry.uniqueId and a repositoryUniqueId associated with the Imaging Document Source from the manifest (KOS) object for use in creating the retrieval request.

530

4.69.2 Use Case Roles



Actor: Imaging Document Consumer

535 **Role:** Issues a web service request to retrieve a set of DICOM instances **from an Imaging Document Source or from remote communities through an Initiating Imaging Gateway.**

Actor: Responding Imaging Gateway

Role: Issues a web service request to retrieve a set of DICOM instances from an Imaging Document Source.

540 **Actor:** Imaging Document Source

Role: Receives a web service request **from an Imaging Document Consumer or Responding Imaging Gateway** for retrieval of a set of DICOM instances and generates the web service response with the appropriate content.

Actor: Initiating Imaging Gateway

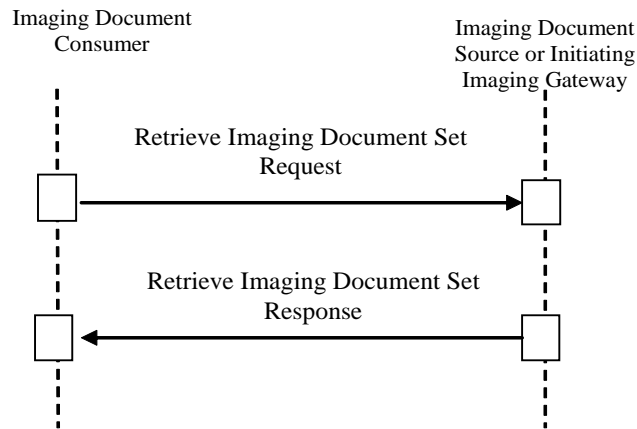
545 **Role:** Receives a web service request from an Imaging Document Consumer for retrieval of a set of DICOM instances and generates the web service response with the appropriate content.

4.69.3 Referenced Standards

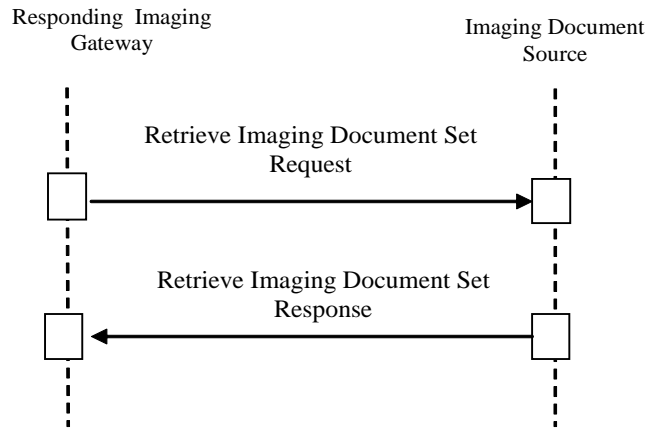
550 For a list of the standards inherited from the underlying ITI-43 Retrieve Document Set, see ITI TF-2**b**: 3.43.3.

4.69.4 Interaction Diagrams

Replace existing Diagram with this set of 2 Diagrams:



555



4.69.4.1 Retrieve Imaging Document Set Request message

~~An Imaging Document Consumer sends a request to an Imaging Document Source to retrieve the set of images referenced within a manifest object.~~ This message is an extension of the Retrieve Document Set transaction as defined in ITI TF-2**h**: 3.43.

560

- In XDS-I.b, an Imaging Document Consumer sends a request to an Imaging Document Source to retrieve the set of images referenced within a manifest object.
- In XCA-I, an Imaging Document Consumer sends a request to an Initiating Imaging Gateway to retrieve the set of images referenced within a manifest object.
- In XCA-I, a Responding Imaging Gateway sends a request to an Imaging Document Source in the responding community to retrieve the set of images referenced within a manifest object.

565

4.69.4.1.1 Trigger Events

570 The Imaging Document Consumer wishes to retrieve a set of DICOM instances that are referenced within a DICOM Manifest ~~that was previously retrieved by the grouped Document Consumer Actor.~~ The Imaging Document Consumer obtains the documents' unique Ids (i.e., the SOP Instance UIDs referenced within the DICOM manifest) along with the associated study and series instance UIDs. The Imaging Document Consumer will either compute the repositoryUniqueId(s) from the Retrieve AE Title attribute(s) within the DICOM
575 manifest or populate the repositoryUniqueId(s) using the Retrieve Location UID attribute(s) within the DICOM manifest. The Imaging Document Consumer also maps the repositoryUniqueId(s) to web services endpoint(s) which are the targets of the message.

The Imaging Document Consumer obtains the homeCommunityID for the Imaging Document Source from the Registry Stored Query response.

580 Once the documents' **homeCommunityIDs**, uniqueIds and repositoryUniqueId(s) have been obtained, the Imaging Document Consumer will send the Retrieve Imaging Document Set Request to the Imaging Document Source or Initiating Imaging Gateway.

585 **In response to the Cross Gateway Retrieve Imaging Document Set [RAD-75], the Responding Imaging Gateway initiates a Retrieve Imaging Document Set request to the Imaging Document Source in the responding community.**

4.69.4.1.2 Message Semantics

The Retrieve Imaging Document Set Request shall carry the following information:

- 590 • A required repositoryUniqueId that identifies the Imaging Document Source from which the DICOM instance is to be retrieved. This value shall either be “computed” based on the Retrieve AE Title (0008, 0054) attribute(s) present in the DICOM manifest or be populated from the Retrieve Location UID (0040,E011) attribute(s) that is present in the DICOM manifest. For a description of how this “computation” can be achieved, see IHE RAD TF-3: Appendix G.3.
- 595 • A required list of one or more documentUniqueIds that identify the documents within the Imaging Document Source. These values correspond to the SOP Instance UIDs referenced within the DICOM manifest.
- A required list of one or more DICOM transfer syntax UIDs that the Imaging Document Consumer is capable of processing.
- 600 • A required Study Instance UID value that identifies the study containing the DICOM images/ objects to be retrieved. The Study Instance UID is extracted from the KOS manifest.
- A required Series Instance UID value that identifies the series containing the DICOM images/ objects to be retrieved. The Series Instance UID is extracted from the KOS manifest.
- **A homeCommunityID, required if:**
 - **the Retrieve Imaging Document Set request is to an Initiating Imaging Gateway.**

- 605 • **the Retrieve Imaging Document Set request is from a Responding Imaging Gateway to a Imaging Document Source.**

The message shall be structured as described in section 4.69.5 Protocol Requirements.

4.69.4.1.3 Expected Actions

610 When receiving a Retrieve Imaging Document Set Request, an Imaging Document Source **or Initiating Imaging Gateway** shall generate a Retrieve **Imaging** Document Set Response.

615 **In XCA-I, an Initiating Imaging Gateway initiates a Cross Gateway Retrieve Imaging Document request to all Responding Imaging Gateways that can satisfy the request, to obtain the information from responding communities in order to construct the Retrieve Imaging Document Set Response.**

4.69.4.2 Retrieve Imaging Document Set Response message

4.69.4.2.1 Trigger Events

This message will be triggered by receipt of a Retrieve Imaging Document Set Request Message.

4.69.4.2.2 Message Semantics

620 The semantics of the Retrieve Imaging Document Set Response Message are identical to those inherited from the ITI-43 transaction and are specified in ITI TF-2**b**: 3.43.4.2.2.

4.69.4.2.3 Expected Actions

*Note: The items in this section highlighted in **Green** are the changes that are included in CP187*

625 An Imaging Document Source **or Initiating Imaging Gateway** shall provide the **Imaging** document(s) Set(s) indicated in the request. The Imaging Document Source **or Initiating Imaging Gateway** shall return the **imaging** document(s) or an error code in case the imaging document could not be returned. The pixel data shall be encoded using one of the DICOM transfer syntaxes included in the Retrieve Imaging Document Set Request Message. If the
630 Imaging Document Source cannot encode the pixel data using any of the **provided requested** transfer syntaxes then an error status shall be returned.

If the Imaging Document Consumer or **Responding Imaging Gateway** specifies a transfer syntax field of 1.2.840.10008.1.2.4.94 (DICOM JPIP Referenced Transfer Syntax) or 1.2.840.10008.1.2.4.95 (DICOM JPIP Referenced Deflate Transfer Syntax), **and the Imaging**
635 **Document Source supports the requested transfer syntax,** the following behavior is expected:

- 640 • If the DICOM Image Object(s) **have a transfer syntax(es) that match the requested transfer syntax– already have the same JPIP transfer syntax as the one indicated in the request,** the Retrieve Imaging Document Set Response shall include the DICOM Image Objects unchanged.
- 645 • If the DICOM Image Object(s) have a transfer syntax that differs from that of the request, the Retrieve Imaging Document Set Response shall include the DICOM image with the transfer syntax changed to the requested transfer syntax. In addition, the pixel data Attribute (7Fe0,0010 tag) will have been removed and replaced with a Pixel Data Provider URL (0028,7FE0 tag). The URL represents the JPIP request and will include the specific target information.
- 650 • Upon receipt of this Retrieve Imaging Document Set Response, the Imaging Document Consumer may request the pixel data from the pixel data provider using the supplied URL. Additional parameters required by the application may be appended to the URL when accessing the pixel data provider.
- For example, a JPIP request for a 200 by 200 pixel rendition of the entire image can be constructed from the Pixel Data Provider URL as follows:
 - Pixel Data Provider URL (0028,7FE0) =
https://server.xxx/jpipservice.cgi?target=imgxyz.jp2,
 - 655 • URL Generated by the application =
https://server.xxx/jpipservice.cgi?target=imgxyz.jp2&fsiz=200,200

The conditions of failure and possible error messages are given in the ebRS standard and detailed in ITI TF-3: 4.1.13 “Error Reporting”.

660 **In XCA-I, the Initiating Imaging Gateway can act as a JPIP proxy and accept the JPIP request from the Imaging Document Consumer and make the corresponding request to the Imaging Document Source. If a direct route is available from the Imaging Document Consumer to the Imaging Document Source, the Imaging Document Consumer is allowed to make a direct JPIP request to the Imaging Document Source, assuming security considerations are observed.**

665

4.69.4.3 Asynchronous Web Services Exchange Method

An Image Document Consumer that supports the asynchronous option shall use the Asynchronous Web Services Exchange method if the Initiating Imaging Gateway also supports the asynchronous option.

670 **The Initiating Imaging Gateway that supports the asynchronous option, shall respond to an Image Document Consumer using the use the Asynchronous Web Services Exchange method.**

A Responding Imaging Gateway shall use the Asynchronous Web Services Exchange method if the Image Document Source supports the asynchronous option.

675 **The Image Document Source that supports the asynchronous option, shall respond to an Image Document Consumer using the Asynchronous Web Services Exchange method.**

The Image Document Consumer or the Responding Imaging Gateway supporting this method shall use the non-anonymous response EPR in the WS-Addressing replyTo header.

680 **The Initiating Imaging Gateway, Responding Imaging Gateway, the Image Document Source and the Image Document Consumer shall support the Asynchronous Web Services Methods in the ITI Asynchronous Web Services Trial Implementation Supplement 2x: Appendix V.5: Web Services for IHE Transactions, which also includes additional considerations for implementers.**

4.69.5 Protocol Requirements

685 *Note: The items in this section highlighted in **Turquoise** are the changes that are included in CP190*

Implementers of this transaction shall comply with all requirements described in ITI TF-2x: Appendix V: Web Services for IHE Transactions.

690 The Retrieve Imaging Document Set transaction shall use SOAP12 and MTOM with XOP encoding (labeled MTOM/XOP in this specification). See ITI TF-2x: Appendix V for details. The Imaging Document Source **or Initiating Imaging Gateway** shall:

- Accept the Retrieve **Imaging** Document Set Request message in MTOM/XOP format.
- Generate the Retrieve **Imaging** Document Set Response message in MTOM/XOP format

695 The Imaging Document Consumer **or Responding Imaging Gateway** shall:

- Generate the Retrieve **Imaging** Document Set Request message in MTOM/XOP format.
- Accept the Retrieve **Imaging** Document Set Response message in MTOM/XOP format.

WSDL Namespace Definitions

Iherad	urn:ihe:rad:xdsi-b:2009
Ihe	urn:ihe:iti:xds-b:2007
Rs	urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0
Lcm	urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0
Query	urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0

700 These are the requirements for the Retrieve Imaging Document Set transaction presented in the order in which they would appear in the WSDL definition:

- The following types shall be imported (xsd:import) in the /definitions/types section:
 - namespace="urn:ihe:rad:xdsi-b:2009", schema=" XDSI.b_ImagingDocumentSource.xsd"
 - The baseline XDS.b schema (namespace="urn:ihe:iti:xds-b:2007", schema=" XDS.b_DocumentRepository.xsd")
- The /definitions/message/part/@element attribute of the Retrieve Imaging Document Set Request message shall be defined as “iherad:RetrieveImagingDocumentSetRequest”
- The /definitions/message/part/@element attribute of the Retrieve Imaging Document Set Response message shall be defined as “ihe:RetrieveDocumentSetResponse”
- The /definitions/portType/operation/input/@wsaw:Action attribute for the Retrieve Imaging Document Set Request message shall be defined as “urn:ihe:rad:2009:RetrieveImagingDocumentSet”
- The /definitions/portType/operation/output/@wsaw:Action attribute for the Retrieve Imaging Document Set Response message shall be defined as “urn:ihe:iti:2007:RetrieveDocumentSetResponse”
- The /definitions/binding/operation/soap12:operation/@soapAction attribute shall be defined as “urn:ihe:rad:2009:RetrieveImagingDocumentSet”

720 These are the requirements that affect the wire format of the SOAP message. The other WSDL properties are only used within the WSDL definition and do not affect interoperability. Full sample request and response messages are in section 4.69.5.1 Sample SOAP Messages.

For informative WSDL for the Imaging Document Source **and Responding Imaging Gateway** actors see example on the IHE FTP server at:
ftp://ftp.ihe.net/TF_Implementation_Material/RAD.

- 725 The <iherad:RetrieveImagingDocumentSetRequest/> element for use with the Retrieve Imaging Document Set Request Message is defined as:
- One or more <iherad:StudyRequest/> elements each of which includes a “studyInstanceUID” attribute identifying the study associated with the DICOM images/ objects being retrieved. Each <iherad:StudyRequest/> element shall contain:
 - One or more <iherad:SeriesRequest/> elements each of which includes a “seriesInstanceUID” attribute identifying the series associated with the DICOM images/ objects being retrieved. Each <iherad:SeriesRequest/> element shall contain:
 - One or more <ihe:DocumentRequest/> elements, each one representing an individual document that the Imaging Document Consumer **or Responding Imaging Gateway** wants to retrieve from the Imaging Document Source. Each <ihe:DocumentRequest/> element contains:
 - A required <ihe:RepositoryUniqueId/> element that identifies the Imaging Document Source from which the document is to be retrieved. The

- 740 RepositoryUniqueId corresponds to the Retrieve Location UID in the manifest.
- A required <ihe:DocumentUniqueId/> element that identifies the document within the Imaging Document Source. This value corresponds to the SOP Instance UID referenced within the DICOM manifest.
 - ~~An **optionally required**~~ **optionally required** <ihe:HomeCommunityId/> element that corresponds to the home attribute of the Identifiable class in ebRIM. **The element shall be populated if the request is to an Initiating Imaging Gateway. Otherwise, it may be absent.**
- 745
- A required <iherad:TransferSyntaxUIDList/> element which contains a list of one or more <ihe:TransferSyntaxUID> elements. Each of the <iherad:TransferSyntaxUID> elements represent one of the transfer syntax encodings that the Imaging Document Consumer is capable of processing.
- 750

This allows the Imaging Document Consumer to specify one or more documents to retrieve from the **Document Repository Imaging Document Source or Initiating Imaging Gateway.**

755 The <ihe:RetrieveDocumentResponse/> element for use with the Retrieve Imaging Document Set Response Message is defined as:

- A required /ihe:RetrieveDocumentSetResponse/rs:RegistryResponse element
 - ~~An **optionally required**~~ **optionally required** sequence **if a matching document exists, with** <ihe:DocumentResponse/> elements containing
 - A conditionally **required**, <ihe:HomeCommunityId/> element. The value of this element shall be the same as the value of the /RetrieveImagingDocumentSetRequest/StudyRequest/SeriesRequest/DocumentRequest/HomeCommunityId element in the Retrieve Document Set Request Message. If the <ihe:HomeCommunityId/> element is not present in the Retrieve Document Set Request Message, this value shall not be present.
 - A required <ihe:RepositoryUniqueId/> that identifies the Imaging Document Source from which the document is to be retrieved. The value of this element shall be the same as the value of the /RetrieveImagingDocumentSetRequest/StudyRequest/SeriesRequest/DocumentRequest/RepositoryUniqueId element in the original Retrieve Imaging Document Set Request Message. This value corresponds to XDSDocumentEntry.repositoryUniqueId.
 - A required <ihe:DocumentUniqueId/> that identifies the document within the Imaging Document Source. The value of this element shall be the same as the value of the /RetrieveImagingDocumentSetRequest/StudyRequest/SeriesRequest/DocumentRequest/DocumentUniqueId element in the original Retrieve Imaging Document Set Request Message. This value corresponds to the SOP Instance UID referenced within the DICOM manifest.
- 760
- 765
- 770
- 775

- A required <ihe:Document/> element that contains the retrieved document **in base64binary encoded format as a XOP Infoset**
- A required <ihe:mimeType/> element that indicates the MIME type of the retrieved document

780

The /RetrieveDocumentSetResponse/rs:RegistryResponse/@status attributes provides the overall status of the request: It shall contain one of the following values:

urn:oasis:names:tc:ebxml-regrep:ResponseStatusType:Success

urn:ihe:iti:2007:ResponseStatusType:PartialSuccess

785

urn:oasis:names:tc:ebxml-regrep:ResponseStatusType:Failure

See ITI TF-3: 4.1.13 Error Reporting for the interpretation of these values.

For each document requested in an

/RetrieveImagingDocumentSetRequest/StudyRequest/SeriesRequest/DocumentRequest element:

- If a warning is reported when retrieving the document, then a /RetrieveDocumentSetResponse/rs:RegistryResponse/rs:RegistryErrorList/ rs:RegistryError element shall be returned with:
 - @severity is urn:oasis:names:tc:ebxml-regrep:ErrorSeverityType:Warning
 - @errorCode is specified
 - @codeContext contains the warning message
 - @location contains the DocumentUniqueId of the document requested
- The document shall be returned in an instance of /RetrieveDocumentSetResponse/DocumentResponse/Document as **base64binary encoded data a XOP Infoset**. The returned document and warning are correlated via the DocumentUniqueId.
- If an error is reported when retrieving a document, then a /RetrieveDocumentSetResponse/rs:RegistryResponse/rs:RegistryErrorList/ rs:RegistryError element shall be returned with:
 - @severity is urn:oasis:names:tc:ebxml-regrep:ErrorSeverityType:Error
 - @errorCode is specified
 - @codeContext contains the error message
 - @location contains the DocumentUniqueId of the document requested
- No corresponding RetrieveDocumentSetResponse/DocumentResponse element shall be returned
- If the document is successfully retrieved (without warning) then no /RetrieveDocumentSetResponse/rs:RegistryResponse/rs:RegistryErrorList/ rs:RegistryError element shall be present and a

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/RetrieveDocumentSetResponse/DocumentResponse/Document element shall be returned containing the document as **base64binary encoded data a XOP Infoset.**

815 The /RetrieveDocumentSetResponse/rs:RegistryResponse/rs:ResponseSlotList element is not used in this transaction.

The /RetrieveDocumentSetResponse/rs:RegistryResponse/@requestId attribute is not used in this transaction.

820 A full XML Schema Document for the XDS.b and XDS-I.b types is available online on the IHE FTP site at: ftp://ftp.ihe.net/TF_Implementation_Material/RAD (for XDS-I.b and XCA-I) and ftp://ftp.ihe.net/TF_Implementation_Material/ITI (for XDS.b).

4.69.5.1 Sample SOAP Messages

825 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 IHE ITI TF-2x: Appendix V: Web Services for IHE Transactions. The body of the SOAP message is omitted for brevity; in a real scenario the empty element will be populated with the appropriate metadata.

830 Samples presented in this section are also available online on the IHE FTP site, see ftp://ftp.ihe.net/TF_Implementation_Material/RAD.

4.69.5.1.1 Sample Retrieve Imaging Document Set SOAP Request

Note to the editor: please keep the following format for the sample text — courier new, 8pt, no spacing before and after the paragraph, tab stops every 1/8 of an inch for the first inch.

835 *Note to the editor: please keep the following format for the sample text – courier new, 8pt, no spacing before and after the paragraph, tab stops every 1/8 of an inch for the first inch.*

4.69.5.1.1.1 Synchronous Web Services Exchange

```
840 <s:Envelope
      xmlns:s="http://www.w3.org/2003/05/soap-envelope"
      xmlns:a="http://www.w3.org/2005/08/addressing">
      <s:Header>
845   <a:Action s:mustUnderstand="1">urn:ihe:rad:2009:RetrieveImagingDocumentSet</a:Action>
      <a:MessageID>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:MessageID>
      <a:ReplyTo s:mustUnderstand="1">
        <a:Address>http://www.w3.org/2005/08/addressing/anonymous</a:Address>
      </a:ReplyTo>
850   <a:To >http://localhost:2647/XdsService/IHEXDSIDocSource.svc</a:To>
      </s:Header>
      <s:Body>
```

```
855     <RetrieveImagingDocumentSetRequest xmlns:iherad="urn:ihe:rad:xdsi-b:2009"
xmlns:ihe="urn:ihe:iti:xds-b:2007">
      <StudyRequest studyInstanceUID="1.3.6.1.4...101">
        <SeriesRequest seriesInstanceUID="1.3.6.1.4...201">
          <ihe:DocumentRequest>
            <ihe:RepositoryUniqueId>1.3.6.1.4...1000</ihe:RepositoryUniqueId>
            <ihe:DocumentUniqueId>1.3.6.1.4...2300</ihe:DocumentUniqueId>
860          </ihe:DocumentRequest>
          <ihe:DocumentRequest>
            <ihe:RepositoryUniqueId>1.3.6.1.4...1000</ihe:RepositoryUniqueId>
            <ihe:DocumentUniqueId>1.3.6.1.4...2301</ihe:DocumentUniqueId>
865          </ihe:DocumentRequest>
        </SeriesRequest>
      </StudyRequest>
      <TransferSyntaxUIDList>
        <TransferSyntaxUID> 1.2.840.10008.1.2.1</TransferSyntaxUID>
        <TransferSyntaxUID> 1.2.840.10008.1.2.4.57</TransferSyntaxUID>
870        <TransferSyntaxUID> 1.2.840.10008.1.2.4.70</TransferSyntaxUID>
      </TransferSyntaxUIDList>
    </RetrieveImagingDocumentSetRequest>
  </s:Body>
</s:Envelope>
```

875 **4.69.5.1.1.2 Asynchronous Web Services Exchange**

```
880 <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:rad:2009:RetrieveImagingDocumentSet</a:Action>
    <a:MessageID>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:MessageID>
    <a:ReplyTo s:mustUnderstand="1">
885      <a:Address>http://192.168.2.4:9080/XcaService/ImagingDocumentConsumer.svc
    </a:ReplyTo>
    <a:To >http://localhost:2647/XdsService/IHEXDSIDocSource.svc</a:To>
  </s:Header>
  <s:Body>
890    <RetrieveImagingDocumentSetRequest xmlns:iherad="urn:ihe:rad:xdsi-b:2009"
xmlns:ihe="urn:ihe:iti:xds-b:2007">
      <StudyRequest studyInstanceUID="1.3.6.1.4...101">
        <SeriesRequest seriesInstanceUID="1.3.6.1.4...201">
          <ihe:DocumentRequest>
            <ihe:RepositoryUniqueId>1.3.6.1.4...1000</ihe:RepositoryUniqueId>
895          <ihe:DocumentUniqueId>1.3.6.1.4...2300</ihe:DocumentUniqueId>
          </ihe:DocumentRequest>
          <ihe:DocumentRequest>
            <ihe:RepositoryUniqueId>1.3.6.1.4...1000</ihe:RepositoryUniqueId>
            <ihe:DocumentUniqueId>1.3.6.1.4...2301</ihe:DocumentUniqueId>
900          </ihe:DocumentRequest>
        </SeriesRequest>
      </StudyRequest>
      <TransferSyntaxUIDList>
        <TransferSyntaxUID> 1.2.840.10008.1.2.1</TransferSyntaxUID>
905        <TransferSyntaxUID> 1.2.840.10008.1.2.4.57</TransferSyntaxUID>
        <TransferSyntaxUID> 1.2.840.10008.1.2.4.70</TransferSyntaxUID>
      </TransferSyntaxUIDList>
    </RetrieveImagingDocumentSetRequest>
  </s:Body>
910 </s:Envelope>
```

4.69.5.1.2 Sample Retrieve Document Set SOAP Response

Note to the editor: please keep the following format for the sample text – courier new, 8pt, no spacing before and after the paragraph, tab stops every 1/8 of an inch for the first inch.

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4.69.5.1.2.1 Synchronous Web Services Exchange

```
<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:RetrieveDocumentSetResponse</a:Action>
    <a:RelatesTo>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:RelatesTo>
  </s:Header>
  <s:Body>
    <RetrieveDocumentSetResponse
      xmlns="urn:ihe:iti:xds-b:2007"
      xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
      xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
      xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
      xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0">
      <rs:RegistryResponse status="urn:oasis:names:tc:ebxml-regrep:ResponseStatusType:Success"/>
      <DocumentResponse>
        <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
        <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
        <mimeType>application/dicom</mimeType>
        <Document>UjBsR09EbGhjZ0dTQUxNQVFBUUNBRU1tQ1p0dGUXhEUzhi</Document>
      </DocumentResponse>
      <DocumentResponse>
        <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
        <DocumentUniqueId>1.3.6.1.4...2301</DocumentUniqueId>
        <mimeType>application/dicom</mimeType>
        <Document>UjBsR09EbGhjZ0dTQUxNQVFBUUNBRU1tQ1p0dU1GUCx4hu</Document>
      </DocumentResponse>
    </RetrieveDocumentSetResponse>
  </s:Body>
</s:Envelope>
```

945

4.69.5.1.2.2 Asynchronous Web Services Exchange

```
<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:RetrieveDocumentSetResponse</a:Action>
    <a:RelatesTo>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:RelatesTo>
  </s:Header>
  <s:Body>
    <RetrieveDocumentSetResponse
      xmlns="urn:ihe:iti:xds-b:2007"
      xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
      xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
      xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
      xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0">
      <rs:RegistryResponse status="urn:oasis:names:tc:ebxml-regrep:ResponseStatusType:Success"/>
      <DocumentResponse>
        <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
        <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
        <mimeType>application/dicom</mimeType>
        <Document>UjBsR09EbGhjZ0dTQUxNQVFBUUNBRU1tQ1p0dGUXhEUzhi</Document>
      </DocumentResponse>
      <DocumentResponse>
        <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
        <DocumentUniqueId>1.3.6.1.4...2301</DocumentUniqueId>
        <mimeType>application/dicom</mimeType>
        <Document>UjBsR09EbGhjZ0dTQUxNQVFBUUNBRU1tQ1p0dU1GUCx4hu</Document>
      </DocumentResponse>
    </RetrieveDocumentSetResponse>
  </s:Body>
</s:Envelope>
```

965

970 <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
 <DocumentUniqueId>1.3.6.1.4...2301</DocumentUniqueId>
 <mimeType>application/dicom</mimeType>
 <Document>UjBsR09EbGhjZ0dTQUxNQUFBUUNBRU1tQ1p0dU1GUCx4hu</Document>
975 </DocumentResponse>
 </RetrieveDocumentSetResponse>
 </s:Body>
 </s:Envelope>

980

End of added transaction 4.69

Add the following new subsection

4.75 Cross Gateway Retrieve Imaging Document Set

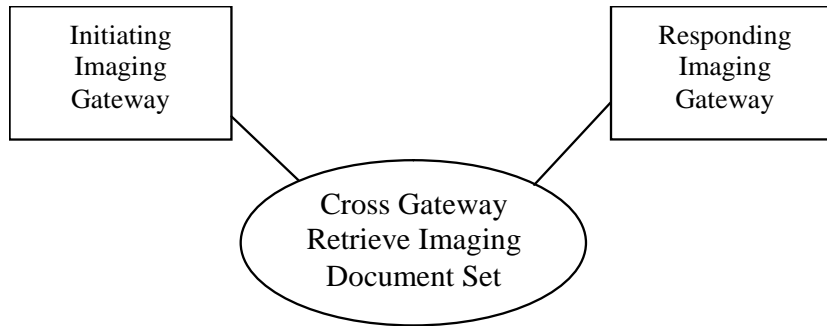
985 This section corresponds to Transaction 75 of the IHE Radiology Technical Framework. Transaction 75 is used by the Initiating Imaging Gateway and Responding Imaging Gateway actors.

4.75.1 Scope

990 The scope of the Cross Gateway Retrieve Imaging Document Set transaction is semantically the same as the Retrieve Imaging Document Set transaction [RAD-69]. Differences from the Retrieve Imaging Document Set transactions are:

- The Cross Gateway Retrieve Imaging Document Set is between an Initiating Imaging Gateway and a Responding Imaging Gateway.
- The 'homeCommunityId' parameter is required. This means that the homeCommunityId parameter which is conditionally required on the Retrieve Imaging Document Set transaction is required by this transaction.
- The Responding Imaging Gateway is required to support Asynchronous Web Services Exchange on the Cross Gateway Retrieve Imaging Document Set.

4.75.2 Use Case Roles



1000

Figure 4.75.2 Use Case Roles

Actor: Initiating Imaging Gateway

Role: To formulate a Cross Gateway Retrieve Imaging Document Set request

1005

Actor: Responding Imaging Gateway

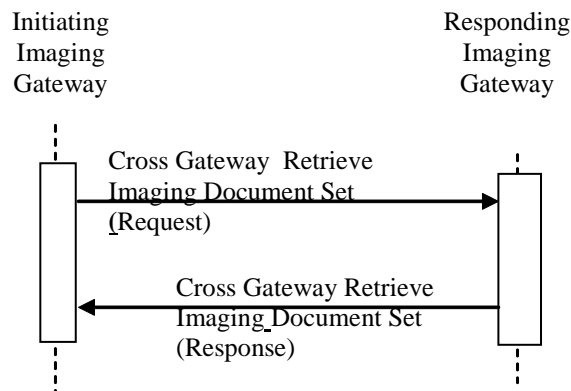
Role: To return the Imaging Document Set(s) requested.

4.75.3 Referenced Standard

For a list of the standards inherited from the underlying ITI-43 Retrieve Document Set, see ITI TF-2b: 3.43.3.

1010

4.75.4 Interaction Diagram



4.75.4.1 Cross Gateway Retrieve Imaging Document Set

1015 The Cross Gateway Retrieve Imaging Document Set uses the same syntax and standards as the Retrieve Imaging Document Set transaction specified in RAD-69. See Section 4.69.

4.75.4.1.1 Trigger Events

This message is initiated by the Initiating Imaging Gateway to retrieve Imaging Document Set(s) from another community represented by a Responding Imaging Gateway. The triggers for the Initiating Imaging Gateway include:

- 1020
- a Retrieve Imaging Document Set (RAD-69) request initiated by an Imaging Document Consumer within the Initiating Imaging Gateway's community.
 - Prefetch logic as a result of a retrieval of a KOS manifest

4.75.4.1.2 Message Semantics

1025 The message semantics for Cross Gateway Retrieve Imaging Document Set are the same as Retrieve Imaging Document Set (RAD-69).

The Initiating Imaging Gateway shall specify the homeCommunityId parameter within the Cross Gateway Retrieve Imaging Document Set. The homeCommunityId shall contain the value that identifies the community associated with the Responding Imaging Gateway(s).

1030 4.75.4.1.3 Expected Actions

Actors supporting this transaction shall support the Expected Actions described in RAD-69. See XCA-I Supplement:4.69.

1035 The Responding Imaging Gateway shall determine the Imaging Document Source(s) which hold the imaging documents requested and initiate a RAD-69 transaction to those Imaging Document Sources.

If more than one Imaging Document Source is contacted, the Responding Imaging Gateway shall consolidate the results from the multiple sources into one response to the Initiating Imaging Gateway. If both successes and failures are received, the Responding Imaging Gateway may choose to use PartialSuccess status to reflect both failure and success. The Responding Imaging Gateway may alternatively choose to suppress the failures and report only successes.

1040

Every RegistryError element returned in the response shall have the location attribute set to the homeCommunityId of the Responding Imaging Gateway.

1045 The Initiating Imaging Gateway actor shall consolidate results from all Responding Imaging Gateways. This includes reflecting in the consolidated results returned to the originating Retrieve Imaging Document Set [RAD-69] all successes and failures received from Responding Imaging Gateways. If one of more responses with a status of failure or partial successes are

1050 received from Responding Imaging Gateways, the Initiating Imaging Gateway shall respond to the original RAD-69 request from the Imaging Document Consumer with both DocumentResponse and RegistryErrorList elements in one response and specify PartialSuccess status.

Note: the Responding Imaging Gateway may have suppressed failures resulting in the Initiating Imaging Gateway reporting a success.

4.75.4.2 Asynchronous Web Service Method

1055 An Initiating Imaging Gateway that supports the asynchronous option shall use the Asynchronous Web Services Exchange method.

The Responding Imaging Gateway shall respond to an Initiating Imaging Gateway using the Asynchronous Web Service Method.

The Initiating Imaging Gateway supporting this method shall use the non-anonymous response EPR in the WS-Addressing replyTo header.

1060 The Initiating and Responding Imaging Gateways shall support the Asynchronous Web Services Methods in the ITI Asynchronous Web Services Trial Implementation Supplement 2x: Appendix V.5: Web Services for IHE Transactions, which also includes additional considerations for implementers.

1065 4.75.5 Protocol Requirements

The Cross Gateway Retrieve Imaging Document Set request and response protocol requirements are identical to the Retrieve Imaging Document Set Transaction except as noted below.

Table 4.75.5-1 WSDL Namespace Definitions

Soap	http://schemas.xmlsoap.org/wsdl/soap/
soap12	http://schemas.xmlsoap.org/wsdl/soap12/
Wsaw	http://www.w3.org/2006/05/addressing/wsdl/
Xsd	http://www.w3.org/2001/XMLSchema
Iherad	urn:ihe:rad:xdsi-b:2011
Ihe	urn:ihe:iti:xds-b:2007
Rs	urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0
Lcm	urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0
Query	urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0

1070 **Responding Imaging Gateway:** These are the requirements for the Cross Gateway Retrieve Imaging Document Set transaction presented in the order in which they would appear in the Responding Imaging Gateway WSDL definition:

- 1075 • The following types shall be imported (xsd:import) in the /definitions/types section:
 - namespace="urn:ihe:rad:xdsi-b:2009", schema="XDSI.b_ImagingDocumentSource.xsd"
 - The baseline XDS.b schema (namespace="urn:ihe:iti:xds-b:2007", schema="XDS.b_DocumentRepository.xsd")

- 1080 • The /definitions/message/part/@element attribute of the Cross Gateway Retrieve Imaging Document Set Request message shall be defined as “iherad:CrossGatewayRetrieveImagingDocumentSetRequest”
- The /definitions/message/part/@element attribute of the Cross Gateway Retrieve Imaging Document Set Response message shall be defined as “iherad:CrossGatewayRetrieveImagingDocumentSetResponse”
- 1085 • attributes shall be set as described below Table 4.75.5-2
- To support Asynchronous Web Services Exchange on the Imaging Document Consumer or the Responding Imaging Gateway, the Imaging Document Source or the Initiating Imaging Gateway shall support the use of a non-anonymous response EPR in the WS-Addressing replyTo header.

1090

Table 4.75.5-2 Requirements for portType and Binding attributes

Attribute	Web Service Exchange
/definitions/portType/operation@name	RespondingGateway_CrossGatewayRetrieveImagingDocumentSet
/definitions/portType/operation/input/@wsaw:Action	urn:ihe:rad: :2011:CrossGatewayRetrieveImagingDocumentSet
/definitions/portType/operation/output/@wsaw:Action	urn:ihe:rad: 2011:CrossGatewayRetrieveImagingDocumentSetResponse
/definitions/binding/operation/soap12:operation/@soapAction	urn:ihe:rad: 2011:CrossGatewayRetrieveImagingDocumentSet

These are the requirements that affect the wire format of the SOAP message. The other WSDL properties are only used within the WSDL definition and do not affect interoperability. Full sample request and response messages are in Sec 4.75.5.1 Sample SOAP Messages.

1095 For informative WSDL for the Responding Gateway actor see ITI TF-2x: Appendix W.

The <ihe:RetrieveImagingDocumentSetRequest/> element is defined in RAD-69, Section 4.69.5. When used within the Cross Gateway Retrieve Imaging Document Set the <ihe:HomeCommunityId/> element is required.

1100 A full XML Schema Document, the WSDL and sample messages for the XCA-I types, are available online on the IHE FTP site at: ftp://ftp.ihe.net/TF_Implementation_Material/RAD (for XCA-I).

4.75.5.1 Sample SOAP Messages

1105 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. The body of the SOAP message is omitted for brevity; in a real scenario the empty element will be populated with the appropriate metadata.

1110 Samples presented in this section are also available online on the IHE FTP site, see ftp://ftp.ihe.net/TF_Implementation_Material/RAD.

4.75.5.1.1 Sample Cross Gateway Retrieve Imaging Document Set SOAP Request

4.75.5.1.1.1 Synchronous Web Services Exchange

```
1115 <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:rad:2011
1120 CrossGatewayRetrieveImagingDocumentSet</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"
1125 >http://localhost:2647/XcaService/IHEXCAIGateway.svc</a:To>
    </s:Header>

    <s:Body>
1130 <RetrieveImagingDocumentSetRequest xmlns:iherad="urn:ihe:rad:xdsi-b:2011"
      xmlns:ihe="urn:ihe:iti:xds-b:2007">
      <StudyRequest studyInstanceUID="1.3.6.1.4...101">
        <SeriesRequest seriesInstanceUID="1.3.6.1.4...201">
1135 <ihe:DocumentRequest>
          <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
          <ihe:RepositoryUniqueId>1.3.6.1.4...1000</ihe:RepositoryUniqueId>
          <ihe:DocumentUniqueId>1.3.6.1.4...2300</ihe:DocumentUniqueId>
        </ihe:DocumentRequest>
1140 <ihe:DocumentRequest>
          <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
          <ihe:RepositoryUniqueId>1.3.6.1.4...1000</ihe:RepositoryUniqueId>
          <ihe:DocumentUniqueId>1.3.6.1.4...2301</ihe:DocumentUniqueId>
        </ihe:DocumentRequest>
      </SeriesRequest>
1145 </StudyRequest>
      <TransferSyntaxUIDList>
        <TransferSyntaxUID> 1.2.840.10008.1.2.1</TransferSyntaxUID>
        <TransferSyntaxUID> 1.2.840.10008.1.2.4.57</TransferSyntaxUID>
1150 <TransferSyntaxUID> 1.2.840.10008.1.2.4.70</TransferSyntaxUID>
      </TransferSyntaxUIDList>
    </RetrieveImagingDocumentSetRequest>
  </s:Body>
</s:Envelope>
```

4.75.5.1.1.2 Asynchronous Web Services Exchange

1155

```
<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:rad:xdsi-b:2011
CrossGatewayRetrieveImagingDocumentSet</a:Action>
    <a:MessageID>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:MessageID>
    <a:ReplyTo>
      http://192.168.2.4:9080/XcaiService/InitiatingImagingGatewayReceiver.svc
    </a:ReplyTo>
    <a:To
s:mustUnderstand="1">http://localhost:2647/XcaiService/IHEXCAIGateway.svc</a:To>
  </s:Header>
```

1170

```
<s:Body>
  <RetrieveImagingDocumentSetRequest xmlns:iherad="urn:ihe:rad:xdsi-b:2009"
xmlns:ihe="urn:ihe:iti:xds-b:2007">
    <StudyRequest studyInstanceUID="1.3.6.1.4...101">
      <SeriesRequest seriesInstanceUID="1.3.6.1.4...201">
        <ihe:DocumentRequest>
          <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
          <ihe:RepositoryUniqueId>1.3.6.1.4...1000</ihe:RepositoryUniqueId>
          <ihe:DocumentUniqueId>1.3.6.1.4...2300</ihe:DocumentUniqueId>
        </ihe:DocumentRequest>
        <ihe:DocumentRequest>
          <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
          <ihe:RepositoryUniqueId>1.3.6.1.4...1000</ihe:RepositoryUniqueId>
          <ihe:DocumentUniqueId>1.3.6.1.4...2301</ihe:DocumentUniqueId>
        </ihe:DocumentRequest>
      </SeriesRequest>
    </StudyRequest>
    <TransferSyntaxUIDList>
      <TransferSyntaxUID> 1.2.840.10008.1.2.1</TransferSyntaxUID>
      <TransferSyntaxUID> 1.2.840.10008.1.2.4.57</TransferSyntaxUID>
      <TransferSyntaxUID> 1.2.840.10008.1.2.4.70</TransferSyntaxUID>
    </TransferSyntaxUIDList>
  </RetrieveImagingDocumentSetRequest>
</s:Body>
</s:Envelope>
```

1195

4.75.5.1.2 Sample Cross Gateway Retrieve Imaging Document Set SOAP Response

1200

4.75.5.1.2.1 Synchronous Web Services Exchange

1205

```
<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:rad:2011:CrossGatewayRetrieveImagingDocumentSetResponse</a:Action>
    <a:RelatesTo>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:RelatesTo>
  </s:Header>
  <s:Body>
    <RetrieveDocumentSetResponse
      xmlns="urn:ihe:iti:xds-b:2007">
```

1210

```
1215     xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
        xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
        xmlns:rims="urn:oasis:names:tc:ebxml-regrep:xsd:rims:3.0"
        xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0">
1220 <rs:RegistryResponse status="urn:oasis:names:tc:ebxml-regrep:ResponseStatusType:Success"/>
        <DocumentResponse>
            <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
            <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
            <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
            <mimeType>application/dicom</mimeType>
            <Document>UjBsR09EbGhjZ0dTQUxNQUFBUUNBRU1tQ1p0dGUXhEUzhi</Document>
1225 </DocumentResponse>
        <DocumentResponse>
            <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
            <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
            <DocumentUniqueId>1.3.6.1.4...2301</DocumentUniqueId>
            <mimeType>application/dicom</mimeType>
1230 <Document>UjBsR09EbGhjZ0dTQUxNQUFBUUNBRU1tQ1p0dU1GUCx4hu</Document>
        </DocumentResponse>
    </RetrieveDocumentSetResponse>
</s:Body>
```

1235 4.75.5.1.2.2 Asynchronous Web Services Exchange

```
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
1240 xmlns:a="http://www.w3.org/2005/08/addressing">
    <s:Header>
        <a:Action
            s:mustUnderstand="1">urn:ihe:rad:2011:CrossGatewayRetrieveImagingDocumentSetResponse</a:Action>
            <a:RelatesTo>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:RelatesTo>
        </s:Header>
1245 <s:Body>
        <RetrieveDocumentSetResponse
            xmlns="urn:ihe:iti:xds-b:2007"
            xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
            xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
            xmlns:rims="urn:oasis:names:tc:ebxml-regrep:xsd:rims:3.0"
            xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0">
1250 <rs:RegistryResponse status="urn:oasis:names:tc:ebxml-regrep:ResponseStatusType:Success"/>
        <DocumentResponse>
            <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
            <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
            <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
            <mimeType>application/dicom</mimeType>
            <Document>UjBsR09EbGhjZ0dTQUxNQUFBUUNBRU1tQ1p0dGUXhEUzhi</Document>
1255 </DocumentResponse>
        <DocumentResponse>
            <homeCommunityId>urn:oid:1.2.3.4</homeCommunityId>
            <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
            <DocumentUniqueId>1.3.6.1.4...2301</DocumentUniqueId>
            <mimeType>application/dicom</mimeType>
            <Document>UjBsR09EbGhjZ0dTQUxNQUFBUUNBRU1tQ1p0dU1GUCx4hu</Document>
1260 </DocumentResponse>
        </RetrieveDocumentSetResponse>
1265 </s:Body>
```

1270 Modify Table 5.1-2 in RAD TF-3: 5.1.1 as follows:

IHE Radiology Transaction	ATNA Trigger Event(s)	Actor(s) that shall be able to record audit event
...
Provide and Register Imaging Document Set [RAD-54]	PHI-export	Imaging Document Source
WADO Retrieve [RAD-55]	Instances-Stored	Imaging Document Source
	Study-used	Imaging Document Consumer
...
Patient Demographics Query [ITI-21]	Query Information	Patient Demographics Supplier shall audit
Provide and Register Imaging Document Set – MTOM/XOP [RAD-68]	PHI-export	Imaging Document Source
Retrieve Imaging Document Set [RAD-69]	Instances-Stored	Imaging Document Source, Initiating Imaging Gateway
	Study-used	Imaging Document Consumer, Responding Imaging Gateway
Cross Gateway Retrieve Imaging Document Set [RAD-75]	Instances-Stored	Responding Imaging Gateway
	Study-used	Initiating Imaging Gateway