Integrating the Healthcare Enterprise

5 # IHE IT Infrastructure
Technical Framework Supplement

10 # Document Metadata Subscription
(DSUB)

15 # Trial Implementation

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Foreword

This is a supplement to the IHE IT Infrastructure Technical Framework V11.0. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

This supplement is published on October 13, 2014 for trial implementation and may 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 IT Infrastructure Technical Framework. Comments are invited and may be submitted at http://www.ihe.net/ITI_Public_Comments.

This document is a new version of DSUB supplement. This new version integrates changes related to:

- a new supplement developed by the ITI Technical Committee with name "Extending DSUB filters and topics";

- a new supplement developed by the ITI Technical Committee with name "Pull-Style Notification";

- updates associated to a series of CPs approved during the 2012/2013 **and 2013/2014** cycle**s**: CP-610-00, CP-611-01, CP-647-01, CP-615-02, CP-649-03 CP-710-00 CP-728-03 CP-754-02 and CP-629-04.

Changes in the new supplements are described in a synthetic way below:

"Extending DSUB filters and topics":

- Three new use-cases are added to the previous version of the supplement (sections 26.4.4, 26.4.5, and 26.4.6).

- A new option is defined for the Document Metadata Notification Broker (section 26.2.2).

- Expected Actions for the Subscribe Request Message (transaction [ITI-52]) are changed (section 3.52.4.1.3).

- Two new filter expressions are defined allowing the subscription of folder metadata and submissionSet metadata (section 3.52.5.2).

- Two new topics are defined allowing the creation of notification payload with Folder metadata or SubmissionSet metadata (sections 3.52.5.1.3, 3.52.5.1.4, and 3.53.4.1.2).

"Pull-Style Notification":

- Introduces a new modality to convey notification between actors involved.

- Definition of two new actors: Notification Pull Point and Notification Puller. These actors are grouped with other DSUB actors (respectively Document Metadata Notification Recipient Actor and Document Metadata Subscriber Actor).

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- Definition of two new transactions that need to be implemented by the new actors introduced: Pull Notification and Create Destroy Pull Point.

- Definition of a new use-case: GP's EHR notification.

- Removal of the publish and subscribe infrastructure ITI TF-3: 4.4.

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This supplement describes changes to the existing technical framework documents.

"Boxed" instructions like the sample below indicate to the Volume Editor how to integrate the relevant section(s) into the relevant Technical Framework volume.

Amend section X.X by the following:

70 Where the amendment adds text, make the added text **bold underline**. Where the amendment removes text, make the removed text **bold strikethrough**. When entire new sections are added, introduce with editor's instructions to "add new text" or similar, which for readability are not bolded or underlined.

75 General information about IHE can be found at: http://www.ihe.net.

Information about the IHE IT Infrastructure domain can be found at: http://www.ihe.net/IHE_Domains.

Information about the structure of IHE Technical Frameworks and Supplements can be found at: http://www.ihe.net/IHE_Process and http://www.ihe.net/Profiles.

80 The current version of the IHE Technical Framework can be found at: http://www.ihe.net/Technical_Frameworks.

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Introduction to this Supplement

The DSUB profiles allows the definition of a system of notification that can involve any kind of application (Laboratory Informative Systems, Local Health Authorities application, GP's EHR, etc.). Two methods of subscription and notification are defined.

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1. In the "Push-style" method, a Document Metadata Subscriber may subscribe on behalf of the Document Metadata Notification Recipient to receive notifications about the availability of documents based on specific criteria. A Document Metadata Notification Broker keeps track of the subscriptions and sends the appropriate notifications based on the registration of objects in an XDS Document Registry. Subscriptions exist for a certain period of time and can be cancelled.

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   However, as defined in WS-BaseNotification standard section 5 "Pull-Style Notification", there are certain circumstances in which the basic "push-style" of notification message delivery is not appropriate. For example, certain Document Metadata Notification Recipients are behind a firewall such that the Document Metadata Notification Broker cannot initiate a message exchange to send the notification. A similar circumstance exists for Document Metadata Notification Recipient that is unable or unwilling to provide an endpoint to which the Notification Broker can send notification messages. In other situations, the Notification Recipient prefers to control the timing of receipt of notification messages, instead of receiving notification messages at unpredictable intervals, it may prefer to "pull" (retrieve) the notification messages at a time of its own choosing.

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2. In the "Pull-style" method, a Notification Puller Actor creates a Pull Point resource able to store notification generated by the Document Metadata Notification Broker Actor. This Pull Point resource is a resource managed by the Pull Point Actor that allows the storing of notification targeted to a specific recipient. Notifications stored in the Pull Point Actor can be retrieved by the Notification Puller Actor using a specific transaction.

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200 **General Introduction**

Appendix A - Actor Summary Definitions

Add the following actors to the IHE Technical Frameworks General Introduction list of Actors:

Actor	Definition
Document Metadata Subscriber	The Document Metadata Subscriber Actor initiates and terminates subscriptions on behalf of a Document Metadata Notification Recipient. Within an XDS Affinity Domain the Document Metadata Subscriber will most likely be grouped with a Document Consumer Actor. In a cross-community environment, the subscriber will most likely be grouped with an Initiating Gateway Actor.
Document Metadata Publisher	The Document Metadata Publisher Actor sends a Document Metadata Publish transaction to the Document Metadata Notification Broker for any event for which a subscription exists. Within an XDS Affinity Domain, the Document Metadata Publisher Actor will most likely be grouped with a Document Registry Actor.
Document Metadata Notification Recipient	The Document Metadata Notification Recipient Actor receives the notification about an event, when the subscription filters specified for this Document Metadata Notification Recipient are satisfied. Within an XDS Affinity Domain this actor will likely be grouped with a Document Consumer. In a cross-community environment the Document Metadata Notification Recipient will most likely be grouped with a Responding Gateway Actor.
Document Metadata Notification Broker	The Document Metadata Notification Broker is the receiver of the Document Metadata Subscribe transaction containing a subscription request, or a subscription cancellation. It keeps track of all subscriptions in the Metadata Notification domain, including the time limits of subscriptions. Based on the metadata associated with document registrations, this actor sends notifications to interested subscribers. This actor may optionally receive Document Metadata Publish transactions representing the stream of events against which the existing subscriptions are matched. Within an XDS Affinity Domain, the Document Metadata Notification Broker will most likely be grouped with a Document Registry Actor. In a cross-community environment, this actor will most likely be grouped with Initiating and Responding Gateway actors.
Notification Pull Point	The Notification Pull Point is the actor that stores notifications targeted to a specific Document Metadata Notification Recipient that cannot be directly notified. This actor delivers notifications to the Notification Puller when requested.
Notification Puller	The Notification Puller is the actor that can create a pull point resource for the storing of notifications. It pulls notifications stored in a Notification Pull point Actor when requested.

Appendix B - Transaction Summary Definitions

205 *Add the following transactions to the IHE Technical Frameworks General Introduction list of Transactions:*

Transaction	Definition

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Transaction	Definition
ITI- 52 Document Metadata Subscribe	This transaction is sent by the Document Metadata Subscriber to the Document Metadata Notification Broker in order to start a subscription for a particular set of topics, indicating possible start and end time for the subscription. Subscriptions cannot be modified. Any Document Metadata Subscriber Actor can cancel a subscription, as long as it has the subscription id. The subscription request shall specify whether a document full notification, a document minimal notification, a folder metadata notification, or a submissionSet metadata notification will be sent when there is a match to the subscription's filter.
ITI-53 Document Metadata Notify	This is a transaction from the Document Metadata Notification Broker to the Document Metadata Notification Recipients, sending a notification about the availability of a document or documents of interest, based on the subscribers' filters on selected topics.
ITI-54 Document Metadata Publish	This transaction is sent from the Document Metadata Publisher to the Document Metadata Notification Broker when an event occurs for which there may be a subscription.
ITI-69 Create Destroy Pull Point	This transaction is used to create a pull point resource. This resource is used for the creation of subscriptions and for the pulling of the notifications stored. This transaction is also used to destroy the pull point resource when it is no longer needed.
ITI-70 Pull Notification	This transaction is used to retrieve pending notifications.

Glossary

210 *Add the following glossary terms to the IHE Technical Frameworks General Introduction Glossary:*

Glossary Term	Definition
Notification Broker	a system or a module in a publish/subscribe framework, the purpose of which is to process subscription/un-subscription requests, to keep track of existing subscriptions, to receive publish information, and based on the set of filters for each subscription, to send a notification about the published information to the appropriate notification recipients.
Publisher	a system or a module in a publish/subscribe framework, the purpose of which is to publish information to the notification broker about events for which there may be existing subscriptions.
Subscriber	a system or a module in a publish/subscribe framework, the purpose of which is to send subscribe and unsubscribe requests to the notification broker on the behalf of a notification recipient. The subscribe request contains a set of filters to determine the information for which the subscription applies.
Notification Recipient	a system or a module in a publish/subscribe framework, the purpose of which is to receive and process notifications from the notification broker.
Pull Point resource	is a resource managed by the Pull Point Actor that allows the storing of notification targeted to a specific recipient.

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Volume 1 – Integration Profiles

1.7 History of Annual Changes

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- Added the Document Metadata Subscription Profile which describes the use of subscription and notification mechanism within an XDS Affinity Domain and across communities.

220 ## 2.1 Dependencies among Integration Profiles

DSUB	Audit Trail and Node Authentication	Each DSUB Actor shall be grouped with Secure Node or Secure Application Actor	- Required to manage audit trail of exported PHI, node authentication and transport security.
DSUB	Consistent Time	Each DSUB Actor shall be grouped with the Time Client Actor	- Required due to ATNA grouping.

225 ### 2.2.26 Document Metadata Subscription Integration Profile

This profile describes the use of subscription and notification mechanism for use within an XDS Affinity Domain and across communities. The subscription allows for the matching of metadata during the publication of a new document for a given patient, and results in the delivery of a notification.

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26 Document Metadata Subscription Integration Profile

This profile describes the use of subscription and notification mechanism for use within an XDS Affinity Domain and across communities. The subscription allows for the matching of metadata
235 during the publication of a new document for a given patient, and results in the delivery of a notification. This profile is based on the OASIS WS-BaseNotification standard and, in accordance to that, defines two methods of subscription and notification:

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1. In the "Push-style" method, a Document Metadata Subscriber may subscribe on behalf of the Document Metadata Notification Recipient to receive notifications about the availability of documents based on specific criteria. A Document Metadata Notification Broker keeps track of the subscriptions and sends the appropriate notifications based on the registration of objects in an XDS Document Registry. Subscriptions exist for a certain period of time and can be cancelled.

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2. In the "Pull-style" method, a Notification Puller Actor creates a Pull Point resource able to store notification generated by the Document Metadata Notification Broker Actor. This Pull Point resource is a resource managed by the Pull Point Actor that allows the storing of notification targeted to a specific recipient.Notifications stored in the Pull Point Actor can be retrieved by the Notification Puller Actor using a specific transaction.

26.1 DSUB Actors and Transactions

250 Figure 26.1-1 shows the actors directly involved in the Document Metadata Subscription Integration Profile and the relevant transactions between them. Other actors that may be indirectly involved due to their participation in the XDS Integration Profile, etc. are not necessarily shown.
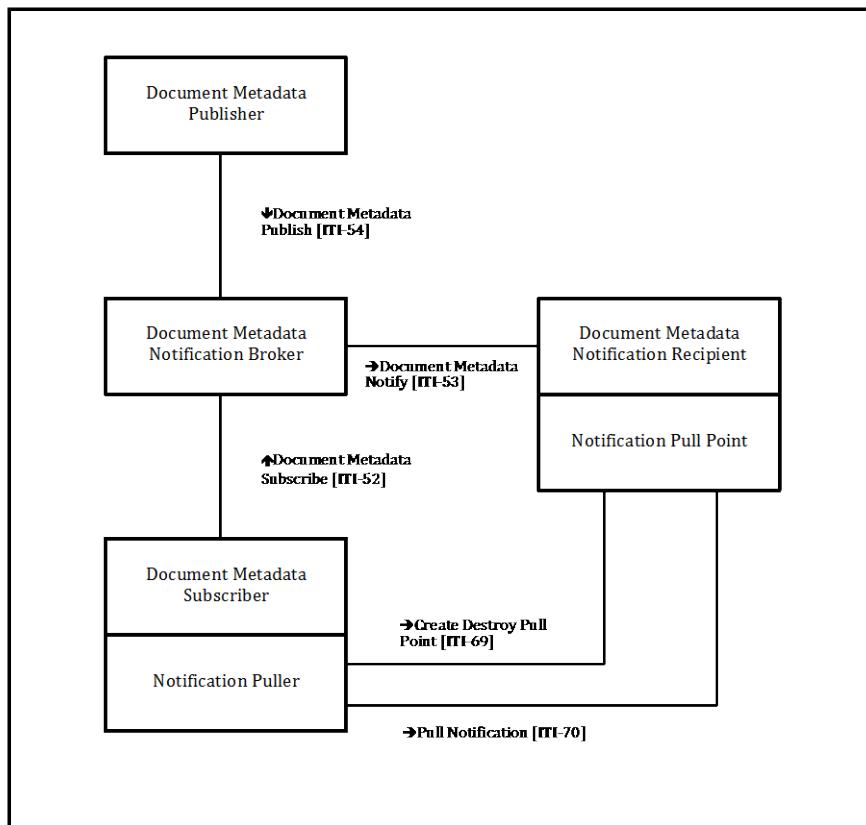
255 **Figure 26.1-1: Document Metadata Subscription Actor Diagram**

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Table 26.1-1 lists the transactions for each actor directly involved in the Document Metadata Subscription Profile. In order to claim support of this Integration 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
260   to support is listed in Section 26.2.

Table 26.1-1: Document Metadata Subscription Integration Profile - Actors and Transactions

Actors	Transactions	Optionality	Reference
Document Metadata Notification Broker	Document Metadata Subscribe	R	ITI TF-2b:3.52
	Document Metadata Notify	R	ITI TF-2b:3.53
	Document Metadata Publish	O	ITI TF-2b:3.54
Document Metadata Subscriber	Document Metadata Subscribe	R	ITI TF-2b:3.52
Document Metadata Publisher	Document Metadata Publish	R	ITI TF-2b:3.54
Document Metadata Notification Recipient	Document Metadata Notify	R	ITI TF-2b:3.53
Notification Puller	Pull Notification	R	ITI TF-2c:3.70
	Create Destroy Pull Point	O	ITI TF-2c:3.69
Notification Pull Point	Pull Notification	R	ITI TF-2c:3.70
	Create Destroy Pull Point	O	ITI TF-2c:3.69

26.1.1 Actor Descriptions and Actor Profile Requirements

265   Most requirements are documented in Transactions (Volume 2). This section documents any additional requirements on profile's actors

26.1.1.1 Document Metadata Notification Broker

The Document Metadata Notification Broker is the receiver of the Document Metadata Subscribe transaction containing a subscription request, or a subscription cancellation. It keeps
270   track of all subscriptions it receives, including the time limits of subscriptions. Based on the metadata associated with document registrations, this actor sends notifications to interested subscribers. This actor may optionally receive Document Metadata Publish transactions representing the stream of events against which the existing subscriptions are matched.

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26.1.1.2 Document Metadata Subscriber

275 The Document Metadata Subscriber Actor initiates and terminates subscriptions on behalf of a
Document Metadata Notification Recipient.

26.1.1.3 Document Metadata Publisher

The Document Metadata Publisher Actor sends a Document Metadata Publish transaction to the
Document Metadata Notification Broker for any event for which a subscription exists. This
280 profile does not specify how the Document Metadata Publisher becomes aware of new
documents becoming available.

26.1.1.4 Document Metadata Notification Recipient

The Document Metadata Notification Recipient Actor receives the notification about an event,
when the subscription filters specified for this Document Metadata Notification Recipient are
285 satisfied.

26.1.1.5 Notification Puller

The Notification Puller is the actor that is involved in a notification system using a pull-style
approach. This actor "activates" the Notification Pull Point Actor using the Create Destroy Pull
Point transaction [ITI-69] to create (and destroy) the Pull Point resource.

290 The Notification Puller SHALL be grouped with a Document Metadata Subscriber.

When using the "pull-style" method of notification, the order of the transactions SHALL be:

1. The Notification Puller (grouped with a Document Metadata Subscriber) sends the Create
   Destroy Pull Point transaction [ITI-69]. In response the Notification Pull Point Actor
   (grouped with the Document Metadata Notification Recipient) returns the endpoint of the
295 Pull Point resource. The Notification Puller/Document Metadata Subscriber now knows
   from where to "pull" notifications.

2. The Document Metadata Subscriber/Notification Puller sends the Document Metadata
   Subscribe [ITI-52] transaction to the Document Metadata Notification Broker, identifying
   the endpoint where the notification is to be sent (the Notification Pull Point/Document
300 Metadata Notification Recipient).

3. Over time, the Notification Pull Point/Document Metadata Notification Recipient will
   receive notifications via Document Metadata Notify [ITI-53].

4. Later, the Notification Puller sends the Notification Pull transaction [ITI-70] to the
   Notification Pull Point/Document Metadata Notification Recipient to retrieve
305 notifications it subscribed to.

The order of the transaction for the destroy of the Pull Point resource SHALL be:

1. The Notification Puller (grouped with a Document Metadata Subscriber) sends
   unsubscribe Requests (Document Metadata Subscribe [ITI-52] transaction) to delete all

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subscriptions created using the endpoint of the Pull Point resource that needs to be destroyed.

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2. The Notification Puller Actor can proceed with the destroying of the Pull Point resource using Create Destroy Pull Point transaction [ITI-69].

If the Notification Puller Actor does not support the optional Create Destroy Pull Point [ITI-69] transaction, it SHALL be able to support the following configuration requirements:

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- It SHALL be configurable with the endpoints for the Pull Point resources already created for it.

- It SHALL configure the endpoint for Notification Pull transaction.

26.1.1.6 Notification Pull Point

The Notification Pull Point is the actor that stores notifications targeted to systems which cannot
320 be directly notified. The intended recipient for the notifications received by the Notification Pull Point is the Notification Puller that creates a Pull Point resource using the Create Destroy Pull Point transaction. A Pull Point resource is created in response to each Create Pull Point request (it is possible to have many Pull Point resources for the same Notification Puller Actor) and is used to collect all notifications destined for the requesting Notification Puller Actor.

325 The Notification Pull Point Actor can manage Pull Point resources created by many different Notification Puller actors.

The Notification Pull Point Actor SHALL be grouped with a Document Metadata Notification Recipient in order to receive notifications from a Document Metadata Notification Broker Actor.

In order to not lose nor duplicate notifications:

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- After the creation of a Pull Point resource, the Notification Pull Point Actor receives and stores all notifications in the target Pull Point resource. The Notification Puller Actor can then retrieve the notifications stored in a target Pull Point resource.

- Notifications returned to the Notification Puller Actor are deleted from the Pull Point resource in accordance to the WS-BaseNotification standard.

335 If the Notification Pull Point Actor does not support the optional Create Destroy Pull Point [ITI-69] transaction, it SHALL be able to support the following configuration requirements:

- At least one Pull Point resource needs to be pre-created for each Notification Puller Actor involved in the notification system.

- The endpoints of these Pull Point resources need to be disclosed to the correct
340   Notification Puller Actor.

26.2 DSUB Actor Options

Options that may be selected for this Integration Profile are listed in the Table 26.2-1 along with the Actors to which they apply. Dependencies between options when applicable are specified in notes.

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Table 26.2-1: Document Metadata Subscription - Actors and Options

Actor	Option Name	Reference
Document Metadata Notification Broker	Document Metadata Publish Recipient	ITI TF-1: 26.2.1
	Folder Subscription	ITI TF-1: 26.2.2
Document Metadata Subscriber	*No options defined*	- -
Document Metadata Publisher	*No options defined*	- -
Document Metadata Notification Recipient	*No options defined*	- -

26.2.1 Document Metadata Publish Recipient Option

The Document Metadata Notification Broker Actor that supports this option shall accept and process Document Metadata Publish transactions, representing applicable events for which there
350   may be valid subscriptions.

26.2.2 Folder Subscription Option

The Document Metadata Notification Broker that supports this option shall accept and process subscriptions that use Folder metadata as filter parameters and shall be able to send notifications when the content of the folder changes. A notification is sent if a new document is added to an
355   existing folder or if a document in an existing folder is replaced. Refer to ITI TF-2b:3.52.4.1.3.1 and 3.52.5.2.2 and 3.53.4.1.2 for details. It is likely that the Document Metadata Notification Broker Actor will maintain status of existing folders rather than making GetFolders queries [ITI-18] to determine folder status.

26.3 DSUB Required Actor Groupings

360   An actor from this profile (Column 1) shall implement all of the required transactions and/or content modules in this profile ***in addition to*** all of the transactions required for the grouped actor (Column 2).

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365 **Table 26.3-1: DSUB - Required Actor Groupings**

DSUB Actor	Profile/Actor to be grouped with	Reference
Document Metadata Notification Broker	ATNA / Secure Node or Secure Application	ITI TF-1:9.4
	CT / Time Client	ITI TF-1:7.1
Document Metadata Subscriber	ATNA / Secure Node or Secure Application	ITI TF-1:9.4
	CT / Time Client	ITI TF-1:7.1
Document Metadata Publisher	ATNA / Secure Node or Secure Application	ITI TF-1:9.4
	CT / Time Client	ITI TF-1:7.1
Document Metadata Notification Recipient	ATNA / Secure Node or Secure Application	ITI TF-1:9.4
	CT / Time Client	ITI TF-1:7.1
Notification Pull Point	DSUB / Document Metadata Notification Recipient	ITI TF-1:26.1
Notification Puller	DSUB / Document Metadata Subscriber	ITI TF-1:26.1

26.4 DSUB Overview

26.4.1 Concepts

This profile describes the use of subscription and notification mechanisms for use within an XDS Affinity Domain and across communities. The subscription allows for the matching of metadata
370 during the publication of a new document for a given patient, and results in the delivery of a notification.

If a system can implement the Document Metadata Notification Recipient, it can be directly notified using a push-style method.

In other scenarios, a system that cannot be notified using the push-style delivery approach
375 implements the pull-style approach because, for example,

- a system that receives notifications is behind a firewall

- a system is unable or unwilling to provide an endpoint to which the Document Metadata Notification Broker can send notifications.

- a system doesn't want to be notified at unpredictable times but rather at a time of its own
380   choosing.

The use-cases below describe both of these scenarios.

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26.4.2 Use Cases

26.4.2.1 Use Case #1: Unexpected Notification

26.4.2.1.1 Unexpected Notification Use Case Description

385 A patient in the emergency department has all her relevant available documents retrieved via XDS transactions. As initial triage of the patient is done, an additional document regarding diagnostic results for this patient is registered in the XDS Document Registry. Currently, there is no way for the Emergency department to learn about the existence of this new information. With a publish/subscribe infrastructure, the initial query to the XDS Document Registry would be
390 accompanied with a subscription request, as a result of which a notification would be sent to the emergency department. The subscription will be terminated once the patient is no longer under the care of the emergency department's institution.

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26.4.2.1.2 Unexpected Notification Process Flow

Document Metadata Publisher	Document Metadata Subscriber	Document Metadata Notification Broker	Document Metadata Notification Recipient

Subscribe

Publish

Notify

Publish

Notify

Unsubscribe

Publish
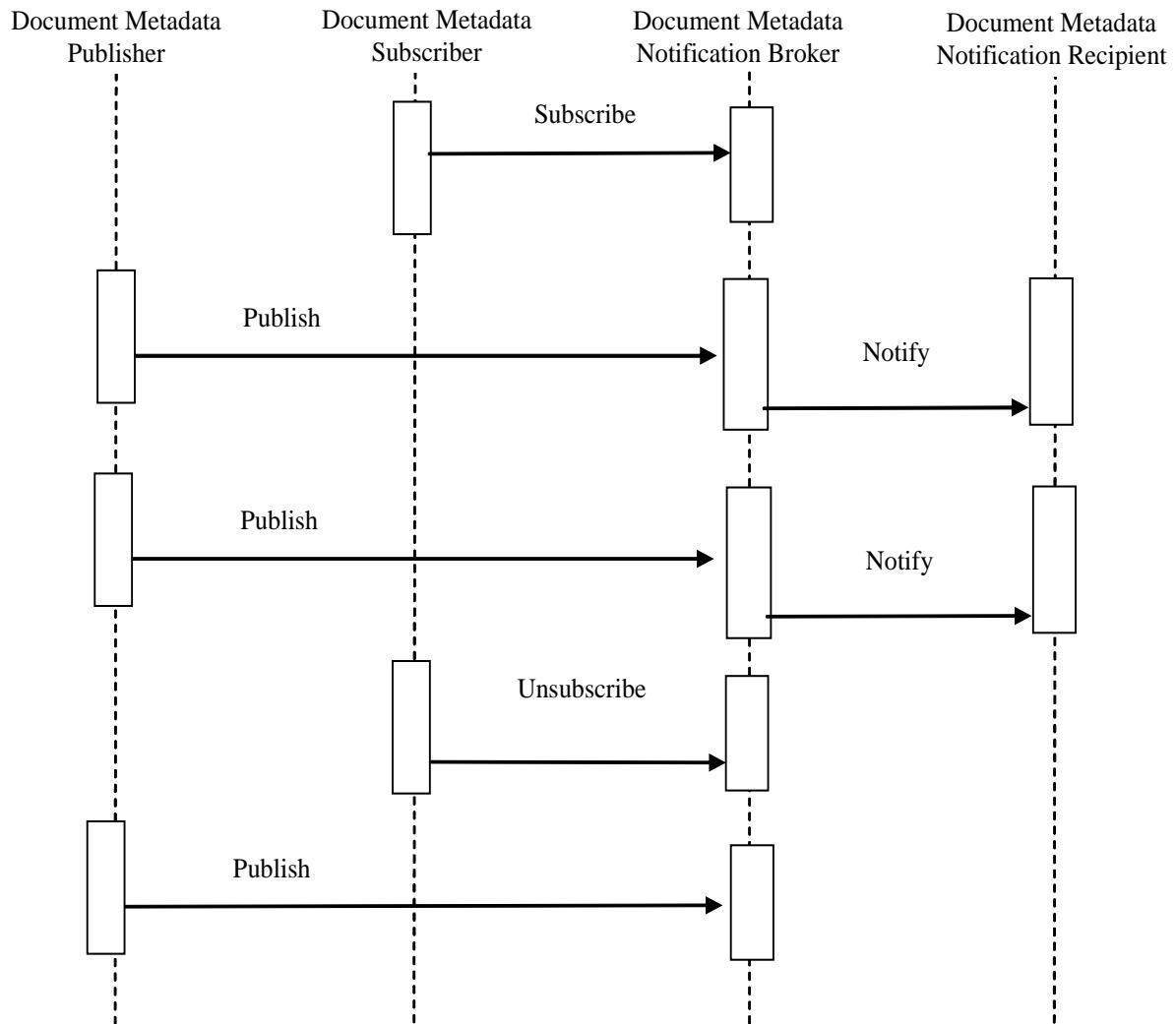
Figure 26.4.2.1.2-1: Interaction Diagram for Unexpected Notification Use Case

26.4.2.2 Use Case #2: Long-term Subscription

26.4.2.2.1 Long-term Subscription Use Case Description

A patient visits his PCP after being discharged from a hospital that belongs to the same XDS Affinity Domain as the provider's organization. The provider sends a query to the XDS
400 Document Registry, and retrieves the hospital discharge summary. The patient also has follow-up visits with a specialist at the hospital, and these visit summaries (including diagnostic test

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results) are registered in the XDS Document Registry. Currently, the PCP would have to periodically query the Document Registry for documents about the patient in order to retrieve the follow-up visit summaries. With a publish/subscribe infrastructure, the PCP would have a subscription for all his patients, so that notifications would have been received as the summaries were registered in the XDS Document Registry.

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26.4.2.2.2 Long-term Subscription Process Flow
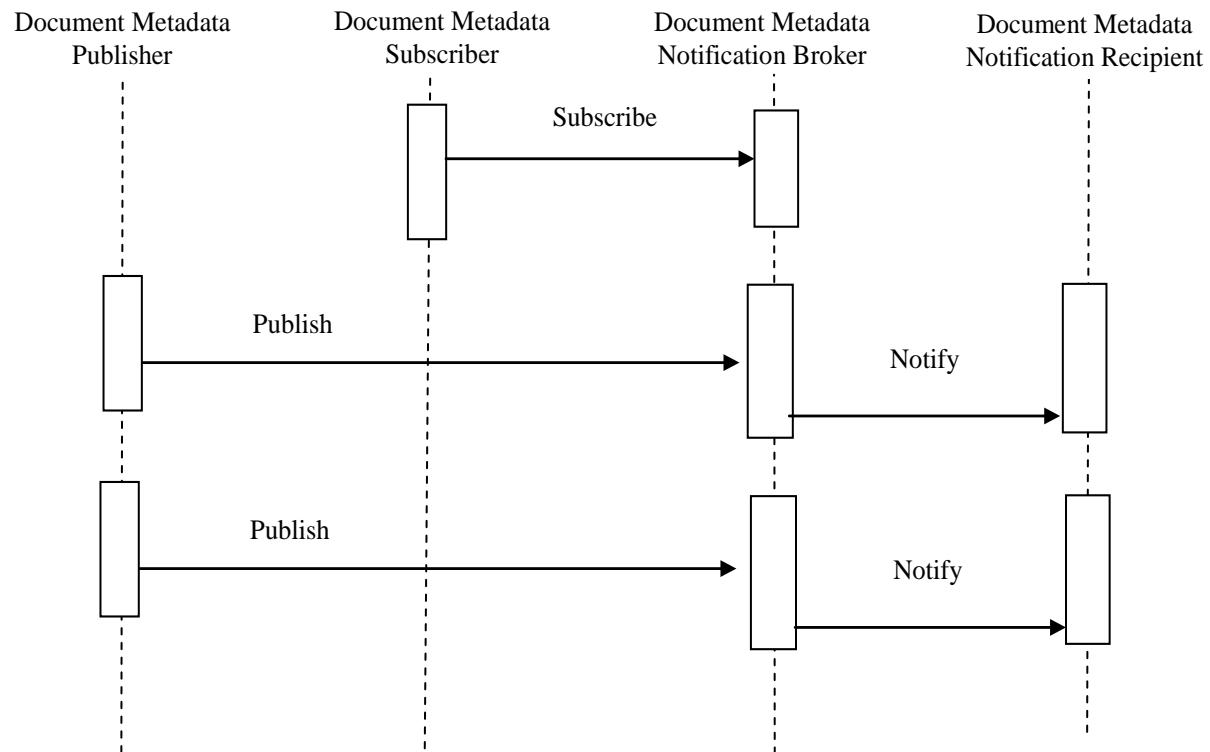
Figure 26.4.2.2.2-1: Interaction Diagram for Long-term Subscription Use Case

410 ### 26.4.2.3 Use Case #3: Antepartum Record Availability

26.4.2.3.1 Long-term Subscription Use Case Description

From the set of Antepartum Record profiles in the PCC domain:

During the 40 weeks of a typical pregnancy duration, the patient will have an initial History and Physical Examination, followed by repetitive office visits with multiple laboratory studies, imaging (usually ultrasound) studies, and serial physical examinations with recordings of vital signs, fundal height, and the fetal heart rate. As the patient is seen over a finite period in the office, aggregation of specific relevant data important to the evaluation of the obstetric patient upon presentation to Labor and Delivery is captured on paper forms. The antepartum documents

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> contain the most critical information needed including the ongoing Medical Diagnoses, the Estimated Due Date, outcomes of any prior pregnancies, serial visit data on the appropriate growth of the uterus and assessments of fetal well-being, authorizations, laboratory and imaging studies. This data must all be presented and evaluated upon entry to the Labor and Delivery Suite to ensure optimal care for the patient and the fetus.

The ability of the PCC Content Consumer to establish a subscription for the updates to the antepartum documents for a given expectant mother will enhance the ability to automate the delivery of the information in a timely manner.

26.4.2.3.2 Long-term Subscription Use Case Process Flow

The following diagram illustrates the process flow within an XDS Affinity Domain reflecting the use case presented in Section 26.4.2.3.1:

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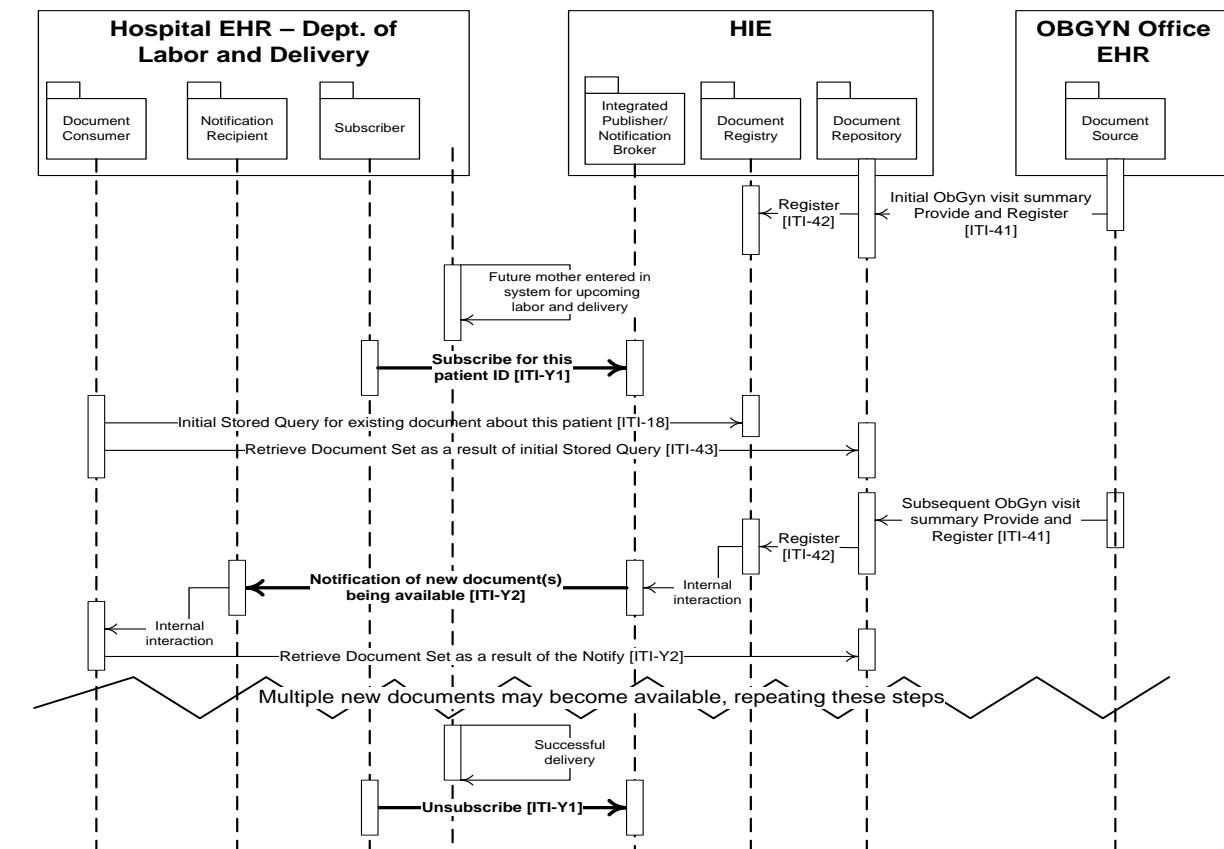
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Figure 26.4.2.3.2-1: Interaction diagram for Long-term Subscription Use Case

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The above interaction diagram is showing a grouping of a Document Consumer, a Document Metadata Notification Recipient, and a Document Metadata Subscriber Actor on one side, and a
425   grouping of a Document Registry, a Document Repository and an Integrated Document Metadata Publisher/Notification Broker Actor on the other side. The emphasized transactions are described in this profile, while the interactions with the grouped XDS actors are also shown. Note that the grouping presented here is not required.

26.4.2.4 Use Case #4: Targeted Document Publication

430   In this use case, a system desires to subscribe to a submissionSet with a specific intended recipient of clinical information. A source of clinical content can identify the intended target for a submissionSet using the XDSSubmissionSet.IntendedRecipient metadata attribute.

26.4.2.4.1 Targeted Document Publication Use Case Description

Dr. Brown is a clinician and can request exams for many patients. His system can create a
435   subscriptions for documents produced that are intended for him (the subscription created has the intendedRecipient as filter parameter).

Mr. White attends a consultation with Dr. Brown, who requests a Laboratory Report for the patient. The EMR system creates a subscription with an intendedRecipient of Dr. Brown.

The patient receives the exam in a Clinical Laboratory. The Laboratory Information System
440   produces a report and submits the document in the Document Sharing Infrastructure identifying Dr. Brown as intendedRecipient for the submission. This publishing event matches the existing subscription and a notification is sent by the Document Metadata Notification Broker to Dr. Brown's system (identified as Document Metadata Notification Recipient Actor in the subscription created). Dr. Brown can quickly analyze the report published and can make other
445   clinical decisions in an efficient way.

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26.4.2.4.2 Targeted Document Publication Process Flow
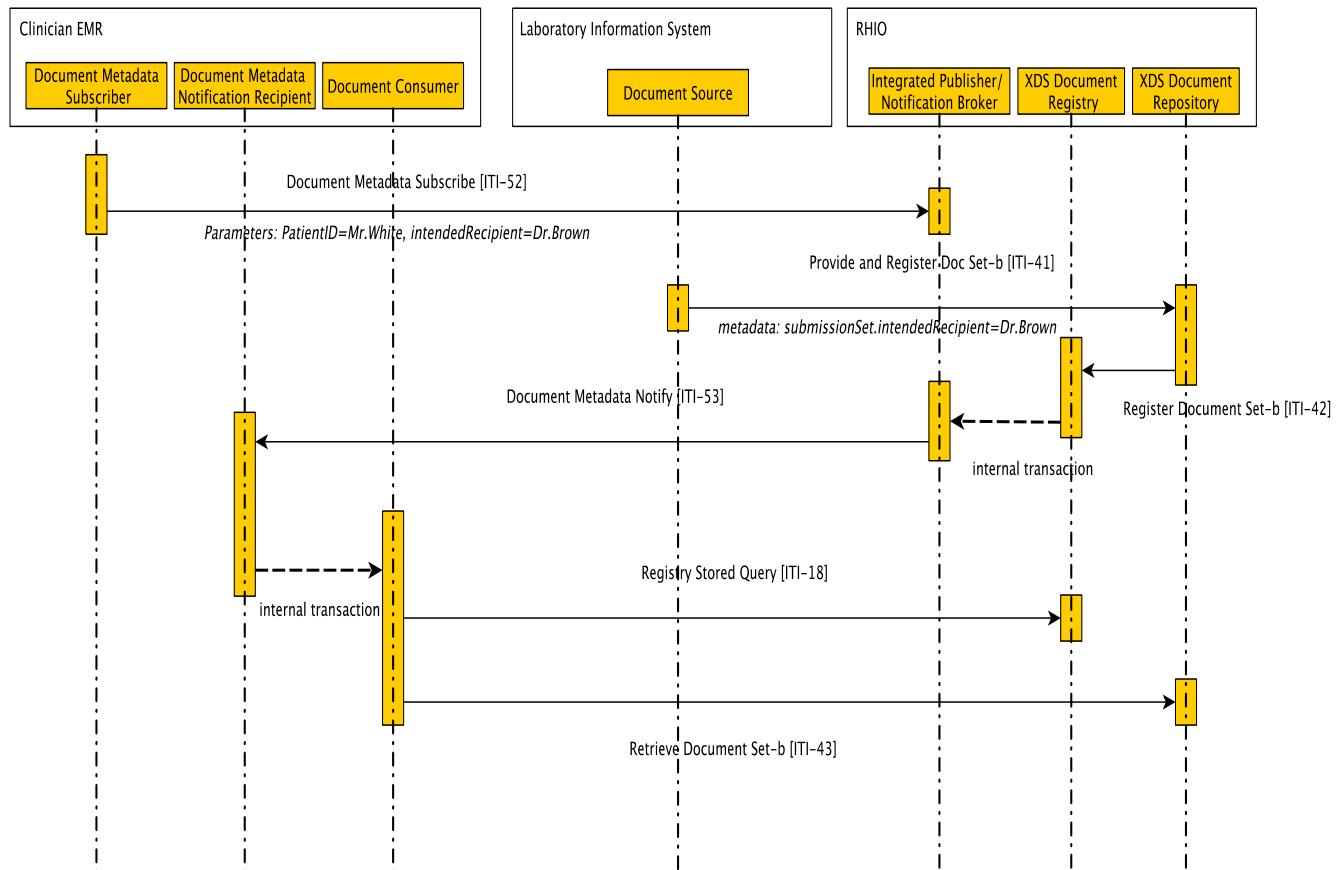
Figure 26.4.2.4.2-1: Interaction Diagram for IntendedRecipient subscription

26.4.2.5 Use Case #5: Folder subscription

This use case recognizes that it is often not possible to identify in advance the type of document that will be produced during a clinical event, so a subscription using the findDocuments filter expression is useless. In many cases it is only possible to identify the specific clinical event of interest (e.g., Hospitalization, Clinical Day Service, etc.).

26.4.2.5.1 Folder subscription Use Case Description

Mr. White is admitted in hospital for a complex diagnostic study pathway. Dr. Brown is the clinician responsible for the "Day Service" of this patient. Any document produced by LIS, RIS, and ward Informative Systems should be collected in a Folder object used for keeping and for managing the evolution of the clinical pathway. Dr. Brown wants to be notified of any content

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published in this folder. The Dr. Brown's system can create a subscription selecting as filter parameter the XDSFolder.uniqueId of the folder just created.

465 During the "Day Service", a Laboratory Report and a Radiology Report are produced. Both the documents are submitted into the folder created for the clinical event. Each publishing event results in a match with the subscription created by Dr. Brown's system. The Document Metadata Notification Broker creates two notifications and they are sent to the Document Metadata Notification Recipient referenced in the subscription (i.e., Dr. Brown's system). The Dr. Brown is kept up to date during the clinical processes.

26.4.2.5.2. Folder subscription Process Flow
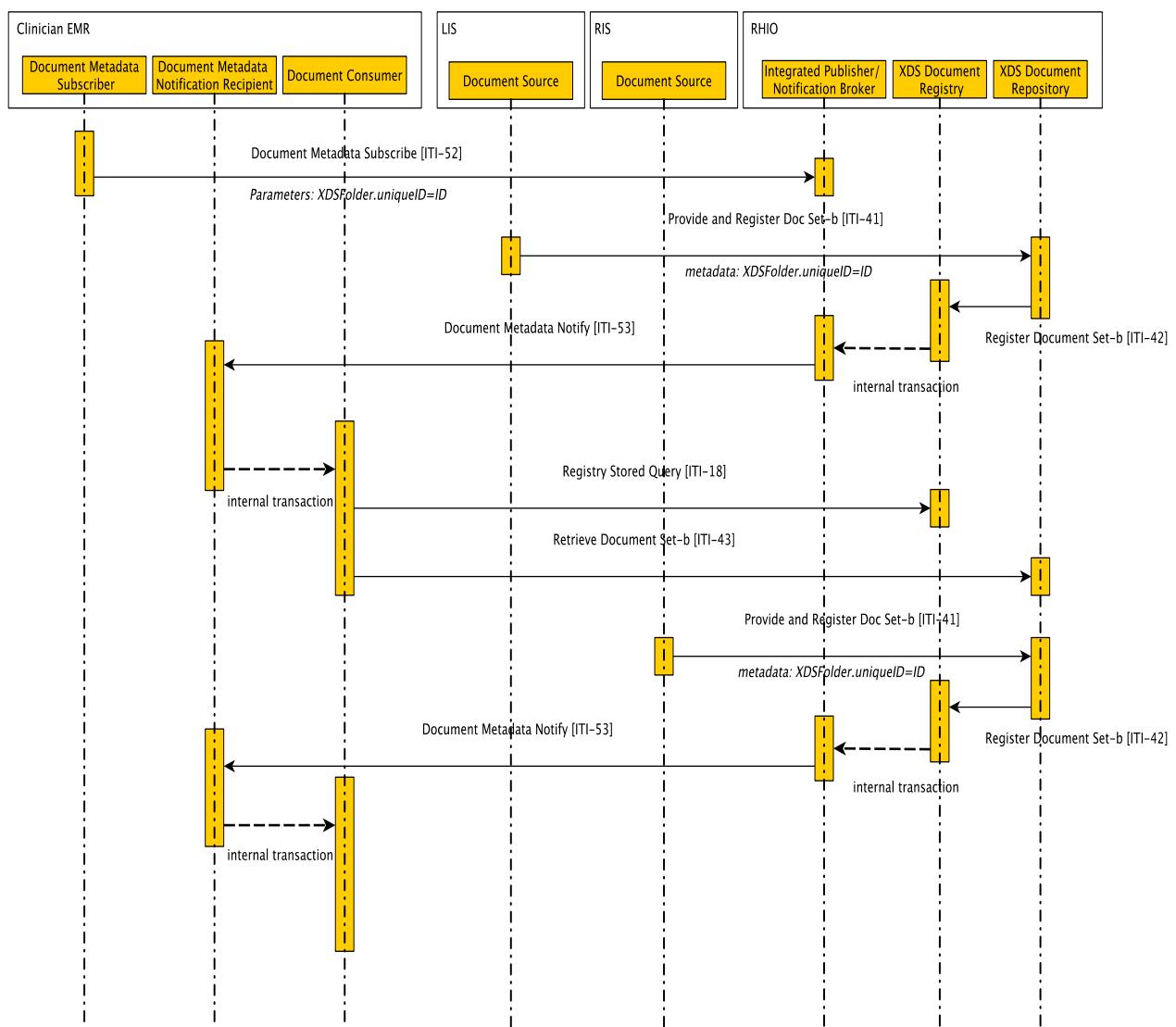
470 **Figure 26.4.2.5.2-1: Interaction Diagram for Folder subscription Use Case**

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26.4.2.6 Use Case #6: Workflow Id subscription

In this use case a clinician creates a subscription for a specific instance of workflow (e.g., eReferral Workflow) because he wants to be notified of any updates that occurred to the
475   workflow. The workflow Id is stored in the metadata XDSDocumentEntry.ReferenceIdList.

26.4.2.6.1 Workflow Id subscription Use Case Description

Dr. Brown is a GP. He decides to refer his patient Mr. White to another healthcare provider to have a specialist's consultation. Dr. Brown does not take part in subsequent steps of the Referral process, but he wants to be notified of any relevant progress related to the workflow. Mr. White
480   calls the specialist, Dr. Green, to schedule the specialist consultation. Dr. Brown is notified of this event.

On the day of the visit, the patient is admitted in Dr. Green's office. Dr. Green analyzes the referral request created by Dr. White and any useful Clinical Documents related to the request. When the visit is completed, Dr. Green publishes a report and Dr. Brown is notified of the
485   completion of the eReferral process so that he can analyze the whole workflow and all related documents.

26.4.2.6.1.1 Technical Aspects (Workflow Id and XDSDocumentEntry ReferenceIdList subscription)

The eReferral process is managed and tracked by the creation of a specific Workflow Document
490   (e.g., as defined in the IHE PCC Cross-enterprise Basic eReferral Workflow Definition Profile (XBeR-WD)). The Workflow Document has a unique fixed reference, the workflow Id, which is stored in the XDSDocumentEntry.ReferenceIdList metadata.

The GP's system creates this Workflow Document and a related subscription that identifies the specific workflow Id as filter parameter for the creation of notifications. From this time, any
495   update of the workflow document will result in the creation and the delivery of a notification to the GP, because the Workflow Id remains the same during the whole evolution of the workflow. For example, the scheduling phase involves the creation of a new version of the Workflow Document characterized by the same workflow Id. This scheduling event triggers the creation of a notification that is sent to the GP.

500   The execution of the visit involves another update of the workflow document and, as consequence, a new notification is sent to the GP.

This notification framework allows the GP to be active participant in the process started by him.

_____

26.4.2.6.2 Workflow Id subscription Process Flow
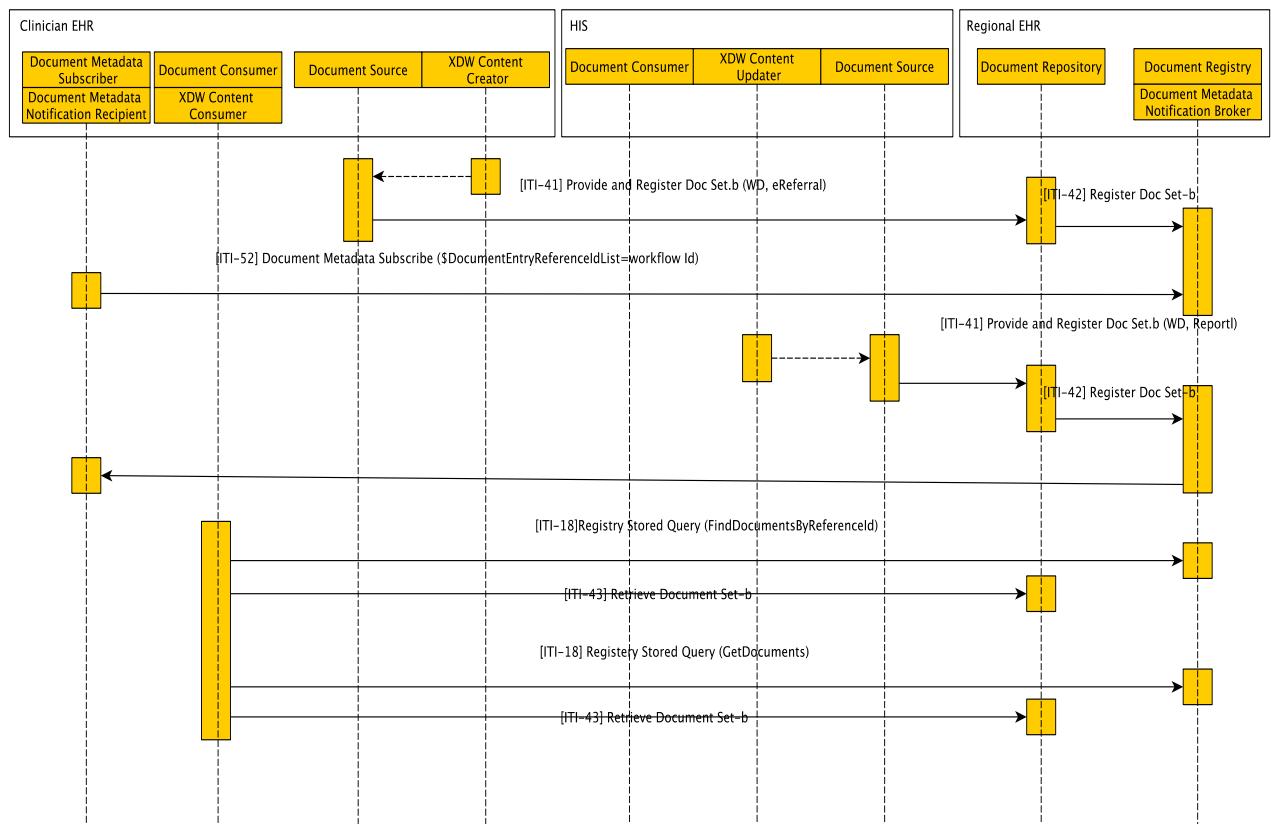
505   **Figure 26.4.2.6.2-1: Interaction Diagram for Workflow Id subscription Use Case**

26.4.2.7 Use Case #7: GP's EHR notification

This use-case describes the scenario in which a General Practitioner (GP) would like to be notified for hospitalizations of patients assisted, even though the GP's EHR system is on-line
510   only for a restricted time interval.

26.4.2.7.1 GP's EHR notification Use Case Description

Dr. Brown is a GP. He assists many patients and he is very interested in receiving notifications of their eventual hospitalization. This ready acknowledgment and the direct communication between the GP and the hospital can be fundamental for granting a complete and secure clinical
515   approach in solving the health problems of the patient.

The GP's EHR is not on-line when a clinical event occurs such as a hospitalization. When a pull-style EHR goes on-line it can immediately retrieve outstanding notifications. When a push-style EHR goes on-line it must wait until the Document Metadata Notification Broker retries a push. This retry might not be in time before the EHR goes off-line again.

_____

520   In this use-case the GP's EHR creates a Pull Point resource able to store notifications on behalf of his EHR. The EHR receives in the Response message the endpoint of the pull point resource just created. The EHR system can use this endpoint for any of the supported subscription.

Mr. White is one of the Dr. Brown patients. During the night he becomes sick and he is hospitalized. A diagnosis for the admission of the patient is formulated, and a document is
525   created by the Emergency Department Information System and registered in XDS Document Registry. The Document Metadata Notification Broker discovers a match with a subscription created by the Dr. Brown's EHR, and sends a notification to the Document Metadata Notification Recipient grouped with the Notification Pull Point referenced in the subscription. The Notification Pull Point Actor stores this and other notifications. The next morning Dr.
530   Brown's EHR pulls all pending notifications. The EHR receives the notification that was created after the publication of the Admission Document. Dr. Brown reads the Admission Document and analyzes notes gathered during the last weeks and discovers some symptoms or findings that can be useful for focusing the diagnostic and therapeutic phases during the current hospitalization.

26.4.2.7.2 GP's EHR notification Process Flow

535
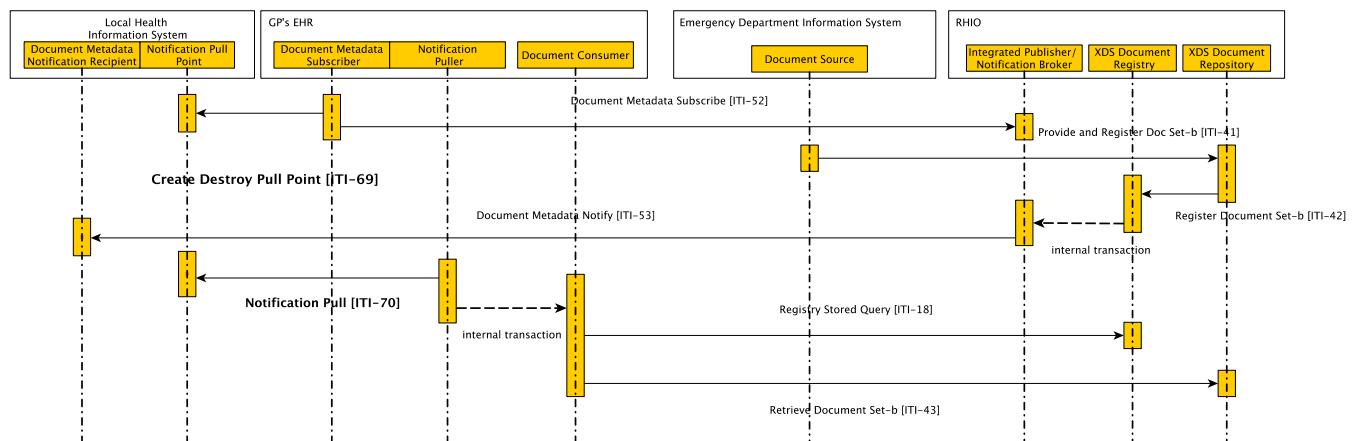
Figure 26.4.2.7.2-1: Sequence Diagram for GP's EHR notification

The Document Metadata Subscriber Actor that is grouped with the Notification Puller Actor creates the pull point resource by the Create Destroy Pull Point transaction [ITI-69]. The
540   response message of this transaction contains the endpoint of the Document Metadata Notification Recipient Actor grouped with the Notification Pull Point Actor.

The Document Metadata Subscriber creates a subscription for a specific patient with the Document Metadata Subscribe transaction [ITI-52] identifying the Document Metadata Notification Recipient/Notification Pull Point as target for notifications created

545   A document published in the XDS environment (using the transactions Provide and Register Document Set-b [ITI-41] and Register Document Set-b [ITI-42]) matches with a subscription already created. The Document Metadata Notification Broker creates and sends a notification to

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the Document Metadata Notification Recipient/Notification Pull Point using the Document Metadata Notify transaction [ITI-53]

550   Without any specific trigger event, the Notification Puller can pull notifications stored in the Notification Pull Point using a Pull Notification transaction [ITI-70].

The notification payload might then be used for querying and retrieving documents using the XDS transactions Register Stored Query [ITI-18] and Retrieve Document Set-b [ITI-43].

26.5 DSUB Security Considerations

555   The risk analysis for this profile enumerates assets, threats, and mitigations. The risk assessment spreadsheet is stored and available from IHE at http://wiki.ihe.net/images/4/46/DSUB_risk_assesment.xls.

The purpose of this risk assessment is to notify implementers of some of the risks that they need to consider in implementing DSUB actors. For general IHE risks and threats please see ITI TF-1:
560   Appendix L. The implementers are also advised that many risks cannot be mitigated by the IHE profile and instead the responsibility for mitigation is transferred to the implementer, and occasionally to the XDS Affinity Domain and enterprises. In these instances, IHE's responsibility to notify affected parties is fulfilled through the following section.

A policy decision can be made during the Subscribe transaction, whether the subscription is an
565   authorized subscription and whether a notification/type of notification is authorized. (This could be based on the XUA identity, the consumer address value, etc.)

This profile does not include the solution to changes of policy between the subscribe time and notify time (which can be substantial). The recommendation is that the policy is enforced conservatively (i.e., the length of subscription can be determined by the Document Metadata
570   Notification Broker). The need to convey submissionSet metadata or Folder metadata can be related to access policies to content published. An approach allows the access of content published in accordance to consent given by the patient. The consent is dynamic and can change during time. The availability of content can be discovered only asking the document-sharing infrastructure. The creation of subscription is not dependent to access policies rules. If the
575   Document Metadata Notification Broker sends the references, than the control of access policies is in query/retrieve transactions of the Document Metadata Notification Recipient. It is suggested to use ihe:FolderMetadata topic or ihe:SubmissionSetMetadata topics when it is not desirable to convey more sensible content (wrapped in documentEntry metadata) using notification.

Specific security considerations are presented in the Security Considerations section of each
580   transaction in Volume 2.

26.6 DSUB Cross Profile Considerations

Within an XDS Affinity Domain:

- the Document Metadata Notification Broker will most likely be grouped with a Document Registry Actor

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- the Document Metadata Subscriber will most likely be grouped with a Document Consumer Actor

- the Document Metadata Publisher Actor will most likely be grouped with a Document Registry Actor.

- the Document Metadata Notification Recipient Actor will likely be grouped with a
590   Document Consumer.

In an XCA environment:

- the Document Metadata Notification Broker Actor will most likely be grouped with Initiating and Responding Gateway actors.

- the Document Metadata Subscriber will most likely be grouped with an Initiating
595   Gateway Actor.

- the Document Metadata Notification Recipient will most likely be grouped with a Responding Gateway Actor.

600 # Volume 2 - Transactions

Add Section 3.52

3.52 Document Metadata Subscribe

This section corresponds to Transaction ITI-52 of the IHE IT Infrastructure Technical Framework. Transaction ITI-52 is used by the Document Metadata Subscriber and the Document
605 Metadata Notification Broker actors.

3.52.1 Scope

This transaction involves a request by the Document Metadata Subscriber Actor to the Document Metadata Notification Broker to start a subscription using a particular set of filters, or to cancel an existing subscription.

610 ### 3.52.2 Use Case Roles
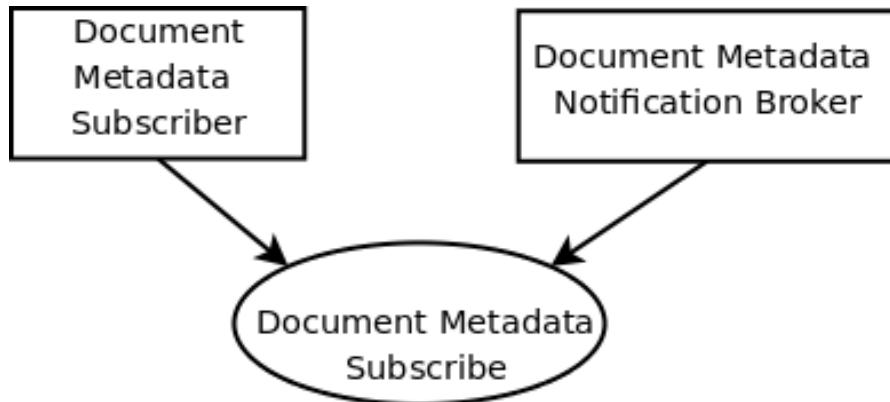
Actor: Document Metadata Subscriber

Role: Sends, on the behalf of Document Metadata Notification Recipients, subscription requests, or subscription cancellation messages to the Document Metadata Notification Broker

615 **Actor:** Document Metadata Notification Broker

Role: Manages subscriptions of Document Metadata Notification Recipients

3.52.3 Referenced Standards

- OASIS Web Services Notification Family of Standards
- WS-BaseNotification 1.3 OASIS Standard
620 - WS-BrokeredNotification 1.3 OASIS Standard
- WS-Topics 1.3 OASIS Standard

- IHE ITI TF-2a: 3.18 - Registry Stored Query Transaction

- IHE ITI TF-2x: Appendix V

3.52.4 Interaction Diagram
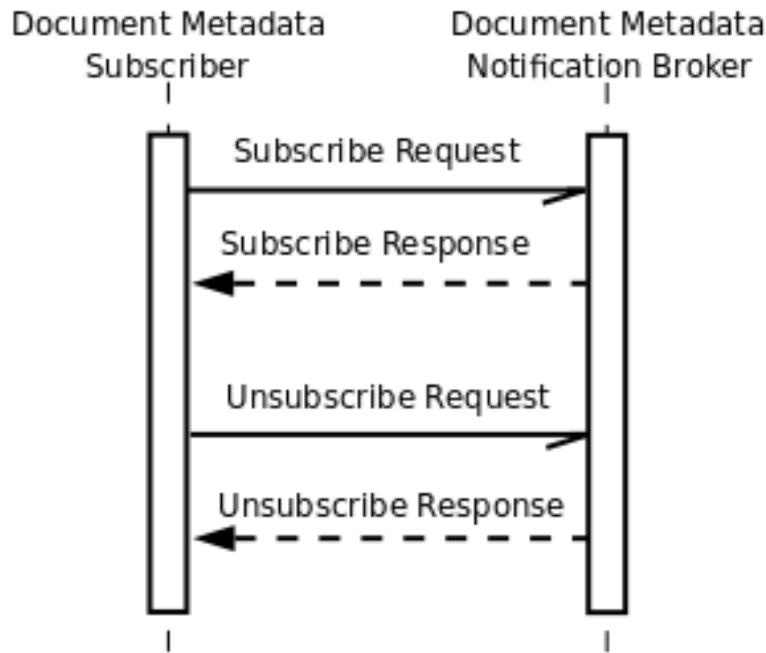
625

Figure 3.52.4-1: Document Metadata Subscribe Sequence

3.52.4.1 Subscribe Request Message

3.52.4.1.1 Trigger

A Document Metadata Notification Recipient's need to initiate a subscription will cause the
630 Document Metadata Subscriber to trigger a Subscribe Request message.

3.52.4.1.2 Message Semantics

The Subscribe Request message shall comply with the requirements in the WS-BaseNotification standard. Note that the value of the WS-Addressing Action element is prescribed in the standard, and differs from the requirements of Appendix V. The *wsnt:ConsumerReference* element
635 describes the Web Servicesendpoint where notifications must be sent. The *wsnt:Filter* element shall contain the topics and values for these topics for which a notification shall be sent. Implementers of the pattern shall specify the topic content to be put within the *wsnt:Filter* element. The wsnt:Filter element shall contain a *TopicExpression* element.

This transaction uses simple topics in accordance with the WS-Topics standard and as specified
640 in ITI TF-2b: 3.52.5.

This transaction uses a filter based on the-Registry Stored Query [ITI-18] transaction syntax and semantics as specified in ITI TF-2b: 3.52.5 Subscription Topics and Filter Expressions.

3.52.4.1.3 Expected Actions

The Notification Broker shall be capable of maintaining multiple concurrent Subscriptions.

645 The Notification Broker shall keep track of each unique subscription and will provide a unique subscription reference which shall be used by the Subscriber to send subsequent cancellations

The Subscriber may indicate the duration of the subscription using the *wsnt:InitialTerminationTime* element, where a time stamp (expressed as an XML Schema *dateTime* data type value) or a duration (expressed as an XML Schema *duration* data type value)
650 can be used.

If the Document Metadata Notification Broker is not able to understand a filter expression it SHALL create faults in accordance with the following rules:

- InvalidFilterFault: the Subscribe message contained a filter that was not understood or supported by the Document Metadata Notification Broker. For example the
655 ReferenceIdList filter parameter exists and the Document Metadata Notification Broker cannot satisfy it.

- TopicExpressionDialectUnknownFault: the Subscribe message contained a TopicExpression filter having a dialect that was not understood or supported by the Document Metadata Notification Broker.

660 - InvalidTopicExpressionFault: the Subscribe message contained a TopicExpression filter where the contents of the filter did not match the dialect specified.

- TopicNotSupportedFault: the Subscribe message contained a TopicExpression filter that referenced a topic that was not supported by the Document Metadata Notification Broker. This Fault SHALL be generated by a Document Metadata Notification Broker that does
665 not support the Folder Subscription option if it receives a request for a subscription using the topic ihe:FolderMetadata.

- SubscribeCreationFailedFault: The Document Metadata Notification Broker failed to process the Subscribe message. The Document Metadata Notification Broker SHOULD use a more specific fault message if possible. The Document Metadata Notification
670 Broker MAY include a hint in the fault message indicating why it failed to process the Subscribe message.

3.52.4.1.3.1 Folder Subscription Option

A Document Metadata Notification Broker supporting the Folder Subscription option shall accept and understand a subscription created for an existing folder.

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675 **3.52.4.1.4 Example Subscribe Request Message (subscription on a document filter)**

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd
urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0 ../schema/ebRS/rim.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
2/NotificationProducer/SubscribeRequest</a:Action>
        <a:MessageID>382dcdc7-8e84-9fdc-8443-48fd83bca938</a:MessageID>
        <a:To s:mustUnderstand="1">http://localhost:8080/services/initiatingGateway/query</a:To>
    </s:Header>
    <s:Body>
        <wsnt:Subscribe>
            <!-- The Recipient on whose behalf the subscription is requested - the address where
the notification is to be sent -->
            <wsnt:ConsumerReference>
                <a:Address>https://NotificationRecipientServer/xdsBnotification</a:Address>
            </wsnt:ConsumerReference>
            <wsnt:Filter>
                <wsnt:TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-
1/TopicExpression/Simple">ihe:MinimalDocumentEntry</wsnt:TopicExpression>
                <rim:AdhocQuery id="urn:uuid:aa2332d0-f8fe-11e0-be50-0800200c9a66">
                    <rim:Slot name="$XDSDocumentEntryPatientId">
                        <rim:ValueList>

<rim:Value>'st3498702^^^&amp;1.3.6.1.4.1.21367.2005.3.7&amp;ISO'</rim:Value>
                        </rim:ValueList>
                    </rim:Slot>
                    <rim:Slot name="$XDSDocumentEntryHealthcareFacilityTypeCode">
                        <rim:ValueList>
                            <rim:Value>('Emergency
Department^^healthcareFacilityCodingScheme')</rim:Value>
                        </rim:ValueList>
                    </rim:Slot>
                </rim:AdhocQuery>
            </wsnt:Filter>
            <wsnt:InitialTerminationTime>2010-05-31T00:00:00.00000Z</wsnt:InitialTerminationTime>
        </wsnt:Subscribe>
    </s:Body>
</s:Envelope>
```

3.52.4.2 Subscribe Response Message

3.52.4.2.1 Trigger

This message is an immediate response to a Subscribe Request, and it is sent from the Document
725 Metadata Notification Broker to the Document Metadata Subscriber.

3.52.4.2.2 Message Semantics

The Subscribe Response message shall comply with the requirements in the WS-
BaseNotification standard, including the use of the appropriate SOAP Fault messages. Note that

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the value of the WS-Addressing Action element is prescribed in the standard, and differs from
730 the requirements of ITI TF-2x:Appendix V.

The subscription identifier is assigned by the Notification Broker as a subscription reference, communicated in the response in the SOAP body in wsnt:SubscribeResponse/wsnt:SubscriptionReference (a WS-Addressingendpoint). The subscription reference shall consist of:

735 • an *Address* element, containing a webservices endpoint

In order to unsubscribe, the request shall be sent to the endpoint specified in the Address component of the SubscriptionReference.

3.52.4.2.3 Expected Actions

If the Document Metadata Subscriber had indicated a requested duration for the subscription, the
740 Document Metadata Notification Broker shall send the assigned duration for the subscription using the *wsnt:TerminationTime* element.

If the Document Metadata Subscriber had not indicated a requested duration for the subscription, the Document Metadata Notification Broker may send an assigned duration for the subscription (if any), using the *wsnt:TerminationTime* element.

745 If the Document Metadata Notification Broker sends an assigned duration for the subscription, the Subscriber shall associate the assigned duration with the accepted subscription request.

The Document Metadata Subscriber shall associate the accepted subscription request with the subscription reference address assigned by the Document Metadata Notification Broker in order to be able to send cancellations for existing subscriptions.

750 ### 3.52.4.2.4 Example

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
2/NotificationProducer/SubscribeResponse</a:Action>
    </s:Header>
    <s:Body>
        <wsnt:SubscribeResponse>
            <!-- A WS-Addressing endpoint, where modification and cancelation requests for this
subscription must be sent -->
            <wsnt:SubscriptionReference>
                <a:Address>https://NotificationBrokerServer/Subscription/382dcdc7-8e84-9fdc-
8443</a:Address>
            </wsnt:SubscriptionReference>
            <wsnt:TerminationTime>2008-05-31T00:00:00Z</wsnt:TerminationTime>
        </wsnt:SubscribeResponse>
    </s:Body>
</s:Envelope>
```

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775 **3.52.4.3 Unsubscribe Request Message**

3.52.4.3.1 Trigger

When a subscription is no longer needed, a Document Metadata Subscriber will trigger an Unsubscribe Request message.

3.52.4.3.2 Message Semantics

780 The Unsubscribe Request message shall comply with the requirements in the WS-BaseNotification standard. The message conveys the request to cancel an existing subscription. Note that the value of the WS-Addressing Action element is prescribed in the standard, and differs from the requirements of ITI TF-2x:Appendix V.

3.52.4.3.3 Expected Actions

785 The Document Metadata Subscriber shall send this message to the endpoint associated with the existing subscription.

The Document Metadata Notification Broker shall cancel the corresponding subscription, and respond with an Unsubscribe Response message. In the case when, for whatever reason, the subscription cannot be canceled, the Document Metadata Notification Broker shall respond with
790 a ResourceUnknownFault or an UnableToDestroySubscriptionFault SOAP Fault message as appropriate.

3.52.4.3.4 Example

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
2/SubscriptionManager/UnsubscribeRequest</a:Action>
        <a:MessageID>382dcdc9-8e86-9fde-8445-48fd83bca93a</a:MessageID>
        <a:To>https://NotificationBrokerServer/Subscription/382dcdc7-8e84-9fdc-8443</a:To>
    </s:Header>
    <s:Body>
        <wsnt:Unsubscribe/>
    </s:Body>
</s:Envelope>
```

3.52.4.4 Unsubscribe Response Message

3.52.4.4.1 Trigger

This message is an immediate response to an Unsubscribe Request message, and it is sent from the Document Metadata Notification Broker to the Document Metadata Subscriber.

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815 **3.52.4.4.2 Message Semantics**

The Unsubscribe Response message shall comply with the requirements in the WS-BaseNotification standard. This message indicates that an Unsubscribe message was successfully processed. Note that the value of the WS-Addressing Action element is prescribed in the standard, and differs from the requirements of ITI TF-2x:Appendix V.

820 **3.52.4.4.3 Expected Actions**

The Document Metadata Notification Broker shall cancel the corresponding subscription.

The Document Metadata Subscriber shall mark the corresponding subscription as successfully terminated.

3.52.4.4.4 Example

825
```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
830    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
835  2/SubscriptionManager/UnsubscribeResponse</a:Action>
    </s:Header>
    <s:Body>
        <wsnt:UnsubscribeResponse/>
    </s:Body>
840 </s:Envelope>
```

3.52.5 Subscription Topics and Filter Expressions

This transaction restricts the subscription topic to be one of FullDocumentEntry or MinimalDocumentEntry (ITI TF-2b: 3.52.5.1) and restricts the semantics of filter expressions to the semantics of a subset (ITI TF-2b: 3.52.5.2) of the Registry Stored Query [ITI-18].

845 **3.52.5.1 Topics**

This transaction defines simple topics as described in the WS-Topics specification. If the Document Metadata Notification Broker supports the Folder Subscription option it shall support all the following topics in a Document Metadata Subscribe Request; otherwise it shall reject subscription Request which specify folder's topic generating a fault (see section 3.52.4.1.3
850 "Expected Actions"). The Document Metadata Subscriber may support a subset of these topics:

3.52.5.1.1 ihe:FullDocumentEntry

This topic indicates that the events for which the subscription is made shall be Document Entry registrations, and that the notification shall contain the full metadata describing each matching Document Entry as described in the Notification transaction in ITI TF-2b: 3.53.4.1.2.

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855   3.52.5.1.2 ihe:MinimalDocumentEntry

This topic indicates that the events for which the subscription is made shall be Document Entry registrations, and that the notification shall contain the minimal set of data describing each matching Document Entry as described in the Document Metadata Notify transaction in ITI TF-2b: 3.53.4.1.2.

860   3.52.5.1.3 ihe:FolderMetadata

This topic indicates that the events for which the subscription is made shall be creating or updating a Folder, and that the notification shall contain the full metadata describing each matching Folder object, as described in the Document Metadata Notify transaction in ITI TF-2b: 3.53.4.1.2.

865   3.52.5.1.4 ihe:SubmissionSetMetadata

This topic indicates that the event for which the subscription is made shall be creating a SubmissionSet and that the notification shall contain the full metadata describing the match with the SubmissionSet object, as described in the Document Metadata Notify transaction in ITI TF-2b: 3.53.4.1.2.

870   3.52.5.2 Building Filter Expressions

The XDS metadata, specified in ITI TF-3: 4.1, describes the objects which are used in a document registration. The Registry Stored Query transaction [ITI-18] uses a subset of the metadata to build a list of queries available to a XDS Document Consumer to search for documents with specific characteristics. The list of queries is in ITI TF-2a: 3.18.4.1.2.3.7. The

875   transaction Document Metadata Subscribe uses the syntax of the Registry Stored Query [ITI-18] transaction for the creation of the filtering expression.

Filters can be created using the parameters of the FindDocuments, FindDocumentsByReferenceId, GetFolders, FindFolders, FindSubmissionSet queries defined within the Registry Stored Query transaction and use the syntax of the FindDocuments

880   FindDocumentsByReferenceId, FindSubmissionSets, GetFolders, FindFolders queries to express the filter.

The evaluation of filter expressions is based on the XDS metadata model. In this transaction, the stream of events for which subscriptions are possible is limited to events representing the existence of Folder, SubmissionSet and documentEntry Objects. The Document Metadata

885   Notification Broker becomes aware of such events either via a Document Metadata Publish transaction [ITI-54], or via other mechanisms not specified by IHE. The Document Metadata Notification Broker shall determine if there is a subscription which matches any of the Document Entry Objects, Folder Objects or SubmissionSet Object in an event.

A match means that if a Registry Stored Query, with the same parameters as the filter expression

890   in the subscription, were sent to a XDS Document Registry containing the Document Entry

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Objects, SubmissionSet Object or Folder Object from the event, the result of this Stored Query would contain one or more of these Objects.

In an XDS Affinity Domain context, the applicable events are likely to be Register Document Set [ITI-42] transaction containing one or more Document Entry objects. In this case, the Document Metadata Notification Broker may have to map between the model within which the events took place, and the XDS metadata model.

895

A good understanding of the Registry Stored Query transaction and the XDS metadata is necessary to understand how the filter expressions work. For example, if the filter expression below were implemented as a stored query on the registry

900

```
<rim:AdhocQuery id="urn:uuid:aa2332d0-f8fe-11e0-be50-0800200c9a66"
xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0">
    <rim:Slot name="$XDSDocumentEntryPatientId">
        <rim:ValueList>
            <rim:Value>'st3498702^^^&amp;1.3.6.1.4.1.21367.2005.3.7&amp;ISO'</rim:Value>
        </rim:ValueList>
    </rim:Slot>
    <rim:Slot name="$XDSDocumentEntryEventCodeList">
        <rim:ValueList>
            <rim:Value>('44950^^codScheme','44955^^codScheme','44960^^codScheme','
44970^^codScheme','44979^^codScheme')</rim:Value>
        </rim:ValueList>
    </rim:Slot>
</rim:AdhocQuery>
```

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it will return all document entries for patient with ID st3498702 (assigned by an authority identified by the OID 1.3.6.1.4.1.21367.2005.3.7) where the event code metadata contains at least one of the codes listed (in this case CPT codes for various appendectomies). When used as a filter expression, the same structure will yield a match against a document entry in an XDS registry submission, where the document entry is for patient with ID st3498702 and the event code is "44970". The following snippet shows an example of such a submission:

915

920

```
<lcm:SubmitObjectsRequest>
    <rim:RegistryObjectList>
        <rim:ExtrinsicObject id="Document01" mimeType="text/xml" objectType="urn:uuid:7edca82f-
054d-47f2-a032-9b2a5b5186c1">
...
            <rim:Classification classificationScheme="urn:uuid:2c6b8cb7-8b2a-4051-b291-
b1ae6a575ef4" classifiedObject="Document01" nodeRepresentation="44950">
                <rim:Name>
                    <rim:LocalizedString value="Appendectomy"/>
                </rim:Name>
                <rim:Slot name="codingScheme">
                    <rim:ValueList>
                        <rim:Value>CPT codes</rim:Value>
                    </rim:ValueList>
                </rim:Slot>
            </rim:Classification>
...
            <rim:ExternalIdentifier id="ei01" registryObject="Document01"
identificationScheme="urn:uuid:58a6f841-87b3-4a3e-92fd-a8ffeff98427"
value="'st3498702^^^&amp;1.3.6.1.4.1.21367.2005.3.7&amp;ISO'">
                <rim:Name>
```

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```
                   <rim:LocalizedString value="XDSDocumentEntry.patientId"/>
                </rim:Name>
            </rim:ExternalIdentifier>
945  ...
        <rim:ExtrinsicObject>
    </rim:RegistryObjectList>
</lcm:SubmitObjectsRequest>
```

When a Document Metadata Notification Subscriber constructs a filter expression, it shall
950 include the whole stored query expression (as shown above) directly in the Subscribe Request
message as a child of the wsnt:Filter element:

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
955     xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
960 envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd
urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0 ../schema/ebRS/rim.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
965 2/NotificationProducer/SubscribeRequest</a:Action>
        <a:MessageID>382dcdc7-8e84-9fdc-8443-48fd83bca938</a:MessageID>
    </s:Header>
    <s:Body>
        <wsnt:Subscribe>
970         <!-- The Recipient on whose behalf the subscription is requested - the address where
the notification is to be sent -->
            <wsnt:ConsumerReference>
                <a:Address>https://NotificationRecipientServer/xdsBnotification</a:Address>
            </wsnt:ConsumerReference>
975         <wsnt:Filter>
                <wsnt:TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-
1/TopicExpression/Simple">ihe:FullDocumentEntry</wsnt:TopicExpression>
                <rim:AdhocQuery id="urn:uuid:aa2332d0-f8fe-11e0-be50-0800200c9a66">
                    <rim:Slot name="$XDSDocumentEntryPatientId">
980                     <rim:ValueList>

<rim:Value>'st3498702^^^&amp;1.3.6.1.4.1.21367.2005.3.7&amp;ISO'</rim:Value>
                        </rim:ValueList>
                    </rim:Slot>
985                 <rim:Slot name="$XDSDocumentEntryEventCodeList">
                        <rim:ValueList>

<rim:Value>('44950^^codScheme','44955^^codScheme','44960^^codScheme','
44970^^codScheme','44979^^codScheme')</rim:Value>
990                     </rim:ValueList>
                    </rim:Slot>
                </rim:AdhocQuery>
            </wsnt:Filter>
            <wsnt:InitialTerminationTime>2008-07-31T00:00:00.00000Z</wsnt:InitialTerminationTime>
995         </wsnt:Subscribe>
    </s:Body>
</s:Envelope>
```

How the Document Metadata Notification Broker evaluates the filter expression, and how it
performs the matching against the existing subscriptions, is out of scope of this transaction. It is

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1000 expected that such implementation details will allow vendors to differentiate themselves in the
marketplace.

It is important to note that not all stored queries, and not all parameters defined for the stored
queries, are suitable for filter expressions. The Document Metadata Notification Broker shall
support the following filters and associated parameters when used in subscription requests, and
1005 the Document Metadata Subscriber may support a subset of these:

3.52.5.2.1 Subscriptions for DocumentEntry metadata

A Document Metadata Notification Broker that accepts a Subscribe Request containing filter
expressions based on FindDocumentsByReferenceID query shall yield a match as described in
section 3.52.5.2. Parameters that can be used for creating the filter expression are described
1010 below:

1. **$XDSDocumentEntryPatientId**: this required parameter contains the patient ID for
   which a document entry is being registered in the XDS Document Registry

2. **$XDSDocumentEntryClassCode**: this parameter matches against the
   XDSDocumentEntry.classCode metadata elements in a given registry submission

1015 3. **$XDSDocumentEntryTypeCode**: this parameter matches against the
   XDSDocumentEntry.typeCode metadata elements in a given registry submission

4. **$XDSDocumentEntryReferenceIdList**: this parameter matches against the
   XDSDocumentEntry.referenceIdList metadata elements in a given registry submission

Note: The ReferenceIdList attribute is optional. If the parameter is specified, the filter matches only documents where the
1020 ID contains the value conveyed in the parameter. If the document does not contain a value in the ReferenceIdList,
there is no match.

5. **$XDSDocumentEntryPracticeSettingCode**: this parameter matches against the
   XDSDocumentEntry.practiceSettingCode metadata elements in a given registry
   submission

1025 6. **$XDSDocumentEntryHealthcareFacilityTypeCode**: this parameter matches against
   the **XDSDocumentEntry.healthcareFacilityTypeCode** metadata elements in a given
   registry submission

7. **$XDSDocumentEntryEventCodeList**: this parameter matches against the
   XDSDocumentEntry.eventCodeList metadata elements in a given registry submission

1030 8. **$XDSDocumentEntryConfidentialityCode**: this parameter matches against the
   XDSDocumentEntry.confidentialityCode metadata elements in a given registry
   submission

9. **$XDSDocumentEntryFormatCode**: this parameter matches against the
   XDSDocumentEntry.formatCode metadata elements in a given registry submission

1035 10. **$XDSDocumentEntryAuthorPerson**: this parameter matches against the
   XDSDocumentEntry.author metadata elements in a given registry submission. All

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properties of this parameter specified in ITI TF-2a: 3.18.4.1.2.3.7.1 are applicable in this
transaction.

1040 The AdHocQuery/@id attribute SHALL store an identifier specific for the type of filter used in
creating the subscription. The UUID that identifies subscriptions for DocumentEntry's metadata
is:

"urn:uuid:aa2332d0-f8fe-11e0-be50-0800200c9a66".

An example of subscription on a document filter is presented below:

```
1045  <?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
1050    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd
urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0 ../schema/ebRS/rim.xsd">
1055    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
2/NotificationProducer/SubscribeRequest</a:Action>
        <a:MessageID>382dcdc7-8e84-9fdc-8443-48fd83bca938</a:MessageID>
        <a:To s:mustUnderstand="1">http://localhost:8080/services/initiatingGateway/query</a:To>
1060    </s:Header>
    <s:Body>
        <wsnt:Subscribe>
            <!-- The Recipient on whose behalf the subscription is requested - the address where
the notification is to be sent -->
1065        <wsnt:ConsumerReference>
                <a:Address>https://NotificationRecipientServer/xdsBnotification</a:Address>
            </wsnt:ConsumerReference>
            <wsnt:Filter>
                <wsnt:TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-
1070  1/TopicExpression/Simple">ihe:MinimalDocumentEntry</wsnt:TopicExpression>
                <rim:AdhocQuery id="urn:uuid:aa2332d0-f8fe-11e0-be50-0800200c9a66">
                    <rim:Slot name="$XDSDocumentEntryPatientId">
                        <rim:ValueList>
                            <rim:Value>'st3498702^^^&amp;1.3.6.1.4.1.21367.2005.3.7&amp;ISO'</rim
1075  :Value>
                        </rim:ValueList>
                    </rim:Slot>
                    <rim:Slot name="$XDSDocumentEntryHealthcareFacilityTypeCode">
                        <rim:ValueList>
1080                        <rim:Value>('Emergency
Department^^healthcareFacilityCodingScheme')</rim:Value>
                        </rim:ValueList>
                    </rim:Slot>
                </rim:AdhocQuery>
1085        </wsnt:Filter>
            <wsnt:InitialTerminationTime>2010-05-31T00:00:00.00000Z</wsnt:InitialTerminationTime>
        </wsnt:Subscribe>
    </s:Body>
</s:Envelope>
```

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1090 **3.52.5.2.2 Subscriptions for folders metadata**

This type of filter shall be accepted by a Document Metadata Notification Broker Actor that
supports the Folder Subscription option. Document Metadata Notification Broker that accepts a
Subscribe Request containing a filter expression based on the GetFolders and FindFolders stored
queries shall yield a match as described in section 3.52.5.2. A Document Metadata Subscriber

1095 Actor MAY be able to create a filter expression that includes XDSFolder.uniqueId,
XDSFolder.patientId, XDSFolder.codeList. Parameters that can be used for creating the filter
expression are described below:

   1. **$XDSFolderPatientId**: this is a required parameter that matches with the metadata
      XDSFolder.patientId;

1100   2. **$XDSFolderUniqueId:** this parameter matches with the metadata XDSFolder.uniqueId.
      This is an optional parameter that contains the identifier defined for the Folder Object
      subscribed;

   3. **$XDSFolderCodeList**: this parameter matches with the metadata XDSFolder.codeList.
      This allows creating a filter specifying the type of clinical activity that resulted in placing
1105   XDS Documents in an XDSFolder.

The AdHocQuery/@id attribute SHALL contain an identifier specific for the type of filter used
in creating the subscription. The UUID that identifies subscriptions for Folder's metadata is:

"urn:uuid:9376254e-da05-41f5-9af3-ac56d63d8ebd"

An example of subscription on a folder filter is presented below:

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```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd
urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0 ../schema/ebRS/rim.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
2/NotificationProducer/SubscribeRequest</a:Action>
        <a:MessageID>382dcdc7-8e84-9fdc-8443-48fd83bca938</a:MessageID>
        <a:To s:mustUnderstand="1">http://localhost:8080/services/initiatingGateway/query</a:To>
    </s:Header>
    <s:Body>
        <wsnt:Subscribe>
            <!-- The Recipient on whose behalf the subscription is requested - the address where
the notification is to be sent -->
            <wsnt:ConsumerReference>
                <a:Address>https://NotificationRecipientServer/xdsBnotification</a:Address>
            </wsnt:ConsumerReference>
            <wsnt:Filter>
                <wsnt:TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-
1/TopicExpression/Simple">ihe:FolderMetadata</wsnt:TopicExpression>
                <rim:AdhocQuery id="urn:uuid:9376254e-da05-41f5-9af3-ac56d63d8ebd">
                    <rim:Slot name="$XDSFolderPatientId">
```

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```
1140                    <rim:ValueList>
                           <rim:Value>'st3498702^^^&amp;1.3.6.1.4.1.21367.2005.3.7&amp;ISO'</rim
      :Value>
                        </rim:ValueList>
                   </rim:Slot>
                   <rim:Slot name="$XDSFolderCodeList">
1145                    <rim:ValueList>
                           <rim:Value>('FolderCodeExample^^folderCodeListCodingScheme')</rim:Val
      ue>
                        </rim:ValueList>
                   </rim:Slot>
1150            </rim:AdhocQuery>
            </wsnt:Filter>
            <wsnt:InitialTerminationTime>2010-05-31T00:00:00.00000Z</wsnt:InitialTerminationTime>
         </wsnt:Subscribe>
      </s:Body>
1155  </s:Envelope>
```

3.52.5.2.3 Subscriptions for SubmissionSets metadata

Document Metadata Notification Broker that accepts a Subscribe Request containing a filter
expression based on the FindSubmissionSets stored query shall yield a match as described in
1160 section 3.52.5.2. The subscription filter expression represents a subset of the FindSubmissionSets
query parameters, with a specific extension. A Document Metadata Subscriber Actor MAY be
able to create a filter expression that includes XDSSubmissionSet.patientId,
XDSSubmissionSet.sourceId, XDSSubmissionSet.author and
XDSSubmissionSet.intendedRecipient. Parameters that can be used for this type of filter are
1165 described below:

1. **$XDSSubmissionSetPatientId**: this is a required parameter that contains the identifier of
   the patient target of the clinical content published by a submission and represent the value
   of the XDSSubmissionSet.PatientId metadata;

2. **$XDSSubmissionSetSourceId**: this optional parameter identifies the source of the
1170   content published by the submission and represent the value of the
   XDSSubmissionSets.sourceId metadata;

3. **$XDSSubmissionSetAuthor**: this optional parameter identifies the author person of the
   content published by the submission and represents the value of the
   XDSSubmissionSets.author metadata. This parameter may be multi-valued;

1175 4. **$XDSSubmissionSetIntendedRecipient**: this is an optional parameter for the
   subscription. A Document Metadata Subscriber shall be able to subscribe this parameter
   in addition to other parameters which have direct correspondence with query parameters.
   This parameter represents the value of the XDSSubmissionSet.intendedRecipient
   metadata. This parameter identifies initial targets intended for a submission. This
1180 parameter may be multi-valued.

Note: intendedRecipient attribute is optional. If the parameter is specified, the filter matches only submissionSets where the
intendedRecipient contains the value conveyed in the parameter. If the document does not contain a value in the
intendedRecipient, there is no match.

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The AdHocQuery/@id attribute SHALL contain an identifier specific for the type of filter used
1185 in creating the subscription. The UUID that identifies subscriptions for SubmissionSet's
metadata is:

"urn:uuid:fbede94e-dbdc-4f6b-bc1f-d730e677cece".

An example of subscription on a SubmissionSet filter is presented below:

```
1190  <?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
1195    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd
urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0 ../schema/ebRS/rim.xsd">
1200    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
2/NotificationProducer/SubscribeRequest</a:Action>
        <a:MessageID>382dcdc7-8e84-9fdc-8443-48fd83bca938</a:MessageID>
        <a:To s:mustUnderstand="1">http://localhost:8080/services/initiatingGateway/query</a:To>
1205    </s:Header>
    <s:Body>
        <wsnt:Subscribe>
            <!-- The Recipient on whose behalf the subscription is requested - the address where
the notification is to be sent -->
1210            <wsnt:ConsumerReference>
                <a:Address>https://NotificationRecipientServer/xdsBnotification</a:Address>
            </wsnt:ConsumerReference>
            <wsnt:Filter>
                <wsnt:TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-
1215  1/TopicExpression/Simple">ihe:SubmissionSetMetadata</wsnt:TopicExpression>
                <rim:AdhocQuery id="urn:uuid:fbede94e-dbdc-4f6b-bc1f-d730e677cece">
                    <rim:Slot name="$XDSSubmissionSetPatientId">
                        <rim:ValueList>
                            <rim:Value>'st3498702^^^&amp;1.3.6.1.4.1.21367.2005.3.7&amp;ISO'</rim
1220  :Value>
                        </rim:ValueList>
                    </rim:Slot>
                    <rim:Slot name="$XDSSubmissionSetIntendedRecipient">
                        <rim:ValueList>
1225                            <rim:Value>('Some Hospital%')</rim:Value>
                            <rim:Value>('|Welby%')</rim:Value>
                        </rim:ValueList>
                    </rim:Slot>
                </rim:AdhocQuery>
1230            </wsnt:Filter>
            <wsnt:InitialTerminationTime>2010-05-31T00:00:00.00000Z</wsnt:InitialTerminationTime>
        </wsnt:Subscribe>
    </s:Body>
</s:Envelope>
```

1235 ### 3.52.5.3 Combining topics and filter expressions

A topic defines static rules for creating notifications. This transaction defines four topics in ITI
TF-2b: 3.52.5.1. Each subscription request shall contain exactly one topic expression.

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A filter expression is equivalent to a specific stored query with certain parameters. Filter conditions expressed as query parameters and used in the expressions must satisfy the same
1240 requirements as a corresponding Registry Stored Query:

- the values for all specified query parameters must match (AND all different parameters)

- at least one of the values of multi-valued parameters must match (OR the values in a multi-valued query parameter)

Topics, defined in Section 3.52.5.1 and filter expressions, defined in Section 3.52.5.3, can only
1245 be used in specific combinations. These combinations are described in Table 3.52.5.3-1:

Table 3.52.5.3-1: Topics and Filter Expression Combinations

Filter Expression	Topic Expression
subscription for DocumentEntry	ihe:FullDocumentEntry
	ihe:MinimalDocumentEntry
subscription for Folders	ihe:FolderMetadata
subscription for SubmissionSets	ihe:SubmissionSetMetadata

3.52.6 Security Considerations

1250 The risk assessment for the Document Metadata Subscribe transaction is described in the risk assessment spreadsheet for the Document Metadata Subscription Profile, which is available from IHE at http://wiki.ihe.net/images/4/46/DSUB_risk_assesment.xls. The derived mitigations are as follows:

- Document Metadata Subscriber and Document Metadata Notification Broker shall be
1255   grouped with an ATNA Secure Node or Secure Application Actor for Node Authentication and Audit Trails

- The use of encrypted TLS is recommended when the transmission is not otherwise secured (e.g., transmission over a secure network)

As it is possible through the document metadata subscribe transaction to maliciously overload
1260 the Document Metadata Notification Recipient actors, it is recommended that a strong authentication be used in combination with access rights enforcement and that authentication data should be conveyed through XUA. This recommendation also addresses the possibility of malicious cancellations of subscriptions.

Additionally, it is recommended that organizational measures be taken to avoid:

1265 - overload of a Document Metadata Notification Recipient through subscription which cannot be cancelled because the subscription id has been lost e.g., through an administrative service allowing cancellation of subscription under well-defined circumstances

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- cancellation of a subscription unnoticed by the intended document metadata notification recipient e.g., through an informative message (out of the scope of this profile) sent to the intended recipient

3.52.6.1 Audit Record Considerations

The Document Metadata Subscribe transaction is a Query Information event as defined in table ITI TF-2a: 3.20.6-1. The Actors involved shall record audit events according to the following:

1275 ### 3.52.6.1.1 Document Metadata Subscriber audit message:

	Field Name	Opt	Value Constraints
Event **AuditMessage/** **EventIdentification**	EventID	M	EV(110112, DCM, "Query")
	EventActionCode	M	"C" (Create) for Subscription message exchange "D" (Delete) for Unsubscribe message exchange
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-52", "IHE Transactions", "Document Metadata Subscribe")
Source (Document Metadata Subscriber) (1)			
Human Requestor (0..n)			
Destination (Document Metadata Notification Broker) (1)			
Audit Source (Document Metadata Subscriber) (1)			
Patient (0..1)			
Query Parameters(1)			

Where:

Source **AuditMessage/** **ActiveParticipant**	UserID	C	When WS-Addressing is used: <ReplyTo/>
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

Human Requestor (if known) **AuditMessage/** **ActiveParticipant**	UserID	M	Identity of the human that initiated the transaction.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	U	Access Control role(s) the user holds that allows this transaction.
	NetworkAccessPointTypeCode	*U*	*not specialized*
	NetworkAccessPointID	*U*	*not specialized*

Destination	UserID	M	SOAP endpoint URI.

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	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

Audit Source **AuditMessage/** **AuditSourceIdentification**	*AuditSourceID*	*U*	*not specialized.*
	AuditEnterpriseSiteID	*U*	*not specialized*
	AuditSourceTypeCode	*U*	*not specialized*

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Patient **(if known)** **(AuditMessage/** **ParticipantObjectIdenti** **fication)**	ParticipantObjectTypeCode	M	"1" (Person)
	ParticipantObjectTypeCodeRole	M	"1" (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV(2, RFC-3881, "Patient Number")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The patient ID in HL7 CX format.
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	*U*	*not specialized*

Query **Parameters** **(AuditMessage/** **ParticipantObjectIdenti** **fication)**	ParticipantObjectTypeCode	M	"2" (system object)
	ParticipantObjectTypeCodeRole	M	"24" (query)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV("ITI-52", "IHE Transactions", "Document Metadata Subscribe")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	*U*	*not specialized*
	ParticipantObjectName	*C*	If known the value of <ihe:HomeCommunityId/>
	ParticipantObjectQuery	*M*	the value of <wsnt:Filter> element, base64 encoded.
	ParticipantObjectDetail	*U*	*not specialized*

3.52.6.1.2 Document Metadata Notification Broker audit message:

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	Field Name	**Opt**	**Value Constraints**
Event	EventID	M	EV(110112, DCM, "Query")

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	EventActionCode	M	"C" (Create) for Subscription message exchange "D" (Delete) for Unsubscribe message exchange
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-52", "IHE Transactions", "Document Metadata Subscribe")
Source (Document Metadata Subscriber) (1)			
Destination (Document Metadata Notification Broker) (1)			
Audit Source (Document Metadata Notification Broker) (1)			
Patient (0..1)			
Query Parameters(1)			

Where:

Source **AuditMessage/** **ActiveParticipant**	UserID	C	When WS-Addressing is used: <ReplyTo/>
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

Destination **AuditMessage/** **ActiveParticipant**	UserID	M	SOAP endpoint URI.
	AlternativeUserID	*M*	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

Audit Source **AuditMessage/** **AuditSourceIdentification**	*AuditSourceID*	*U*	*not specialized*
	AuditEnterpriseSiteID	*U*	*not specialized*
	AuditSourceTypeCode	*U*	*not specialized*

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Patient **(If known)** **(AuditMessage/** **ParticipantObjectIdenti** **fication)**	ParticipantObjectTypeCode	M	"1" (Person)
	ParticipantObjectTypeCodeRole	M	"1" (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV(2, RFC-3881, "Patient Number")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The patient ID in HL7 CX format.
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*

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	ParticipantObjectDetail	*U*	*not specialized*

Query Parameters (AuditMessage/ ParticipantObjectIdentification)	ParticipantObjectTypeCode	M	"2" (system object)
	ParticipantObjectTypeCodeRole	M	"24" (query)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV("ITI-52", "IHE Transactions", "Document Metadata Subscribe")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	*U*	*not specialized*
	ParticipantObjectQuery	M	the value of <wsnt:Filter> element, base64 encoded.
	ParticipantObjectDetail	*U*	*not specialized*

3.53 Document Metadata Notify

This section corresponds to Transaction ITI-53 of the IHE IT Infrastructure Technical
Framework. Transaction ITI-53 is used by the Document Metadata Notification Recipient and
the Document Metadata Notification Broker actors.

3.53.1 Scope

This transaction delivers a notification from the Document Metadata Notification Broker to the
Document Metadata Notification Recipient about an event which matches an existing
subscription.

3.53.2 Use Case Roles
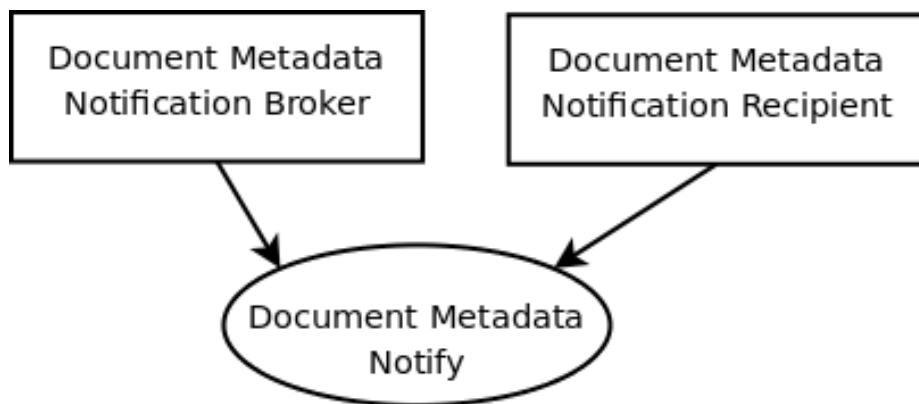
Actor: Document Metadata Notification Broker

Role: Sends notifications to subscribed Document Metadata Notification Recipients based on
received Publish transactions

Actor: Document Metadata Notification Recipient

Role: Receives and processes notifications about events matching a set of filter expressions.

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3.53.3 Referenced Standards

- [OASIS Web Services Notification Family of Standards](#)

1310
- [WS-BaseNotification 1.3 OASIS Standard](#)

- [WS-BrokeredNotification 1.3 OASIS Standard](#)

- [WS-Topics 1.3 OASIS Standard](#)

- IHE ITI TF-2b: 3.43.4.2.2

- IHE ITI TF-2x: Appendix V

1315 ### 3.53.4 Interaction Diagram
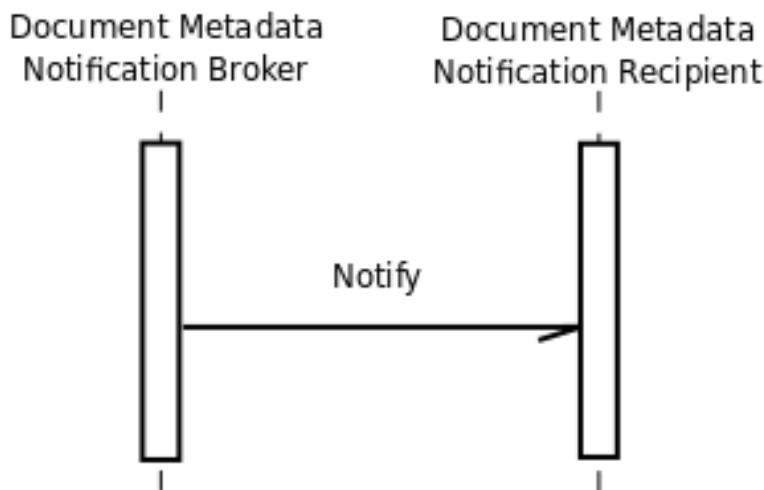
Figure 3.53.4-1: Document Metadata Notify Sequence

3.53.4.1 Notify Message

3.53.4.1.1 Trigger

1320 When an event occurs where the topics of the event match the filter requirements of one or more existing subscriptions, the Document Metadata Notification Broker will trigger a Notification message to the corresponding Document Metadata Notification Recipient. The description of matching subscriptions to events can be found in ITI TF-2b: 3.52.5.2.

3.53.4.1.2 Message Semantics

1325 The Notify message shall comply with the requirements in the WS-BaseNotification standard. Note that the value of the WS-Addressing Action element is prescribed in the standard, and differs from the requirements of ITI TF-2x:Appendix V.

The Notify message convey in the *wsnt:Notify/wsnt:NotificationMessage/wsnt:Message* the event that matched with a subscription. Depending on the event which triggered the notification,

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1330   there may be one or more Document Entry Objects, Folder Objects, or SubmissionSet Objects
whose metadata matches the filter conditions of any particular subscription. This transaction
defines the following structures for conveying a Notify message:

A Full Notification, which shall be sent if the subscription request included the topic
ihe:FullDocumentEntry (see ITI TF-2b: 3.52.5.1). In this case, the notification
1335   shall consist of parts of the payload of a Register Document Set-b Transaction as
defined in ITI TF-2b: 3.42.4.1. The <lcm:SubmitObjectsRequest> element is the
only child of the wsnt:Notify/wsnt:NotificationMessage/wsnt:Message element in
this message. The <rim:RegistryObjectList> element shall be the only child of the
<lcm:SubmitObjectsRequest> element. Only <rim:ExtrinsicObject> elements
1340   representing Document Entries shall be sent within the <rim:RegistryObjectList>
element.

A Minimal Notification, which shall be sent if the subscription request included the topic
ihe:MinimalDocumentEntry. In this case, the notification shall consist of parts of
the payload of a Register Document Set-b Transaction as defined in ITI TF-2b:
1345   3.42.4.1. The <lcm:SubmitObjectsRequest> element is the only child of the
wsnt:Notify/wsnt:NotificationMessage/wsnt:Message element in this message.
The <rim:RegistryObjectList> element shall be the only child of the
<lcm:SubmitObjectsRequest> element. Only <rim:ObjectRef> elements
representing Document Entries shall be sent within the <rim:RegistryObjectList>
1350   element.

A Folder Notification, which shall be sent if the subscription request included the topic
ihe:FolderMetadata. A Document Metadata Notification Broker Actor that
supports Folder Subscription option shall be able to create this type of
notification. In this case, the response consists of parts of the payload of a
1355   Register Document Set-b Transaction as defined in ITI TF-2b:3.42.4.1. The
<lcm:SubmitObjectsRequest> element is the only child of the
wsnt:Notify/wsnt:NotificationMessage/wsnt:Message element in this
message.The <rim:RegistryObjectList> element shall be the only child of the
<lcm:SubmitObjectsRequest> element. Only one <rim:RegistryPackage> element
1360   representing the folder object shall be sent within the <rim:RegistryObjectList>
element and shall be characterized by classification scheme:
classificationScheme="urn:uuid:d9d542f3-6cc4-48b6-8870-ea235fbc94c2" (that
represents an object of Folder type).

A submissionSet Notification, which shall be sent if the subscription request included the
1365   topic ihe:SubmissionSetMetadata. In this case the response consists of parts of the
payload of a Register Document Set-b Transaction as defined in ITI TF-
2b:3.42.4.1. The <lcm:SubmitObjectsRequest> element is the only child of the
wsnt:Notify/wsnt:NotificationMessage/wsnt:Message element in this message.
The <rim:RegistryObjectList> element shall be the only child of the
1370   <lcm:SubmitObjectsRequest> element. Only one <rim:RegistryPackage> element

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representing the submissionSet object shall be sent within the
<rim:RegistryObjectList> element and shall be characterized by classification
scheme: classificationScheme="urn:uuid:a54d6aa5-d40d-43f9-88c5-
b4633d873bdd" (that represents an object of submissionSet type).

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There shall be a single wsnt:Notify/wsnt:NotificationMessage/wsnt:Message element in this
transaction. If multiple objects need to be represented in a single notification, the WS-
BaseNotification standard allows this to be done.

3.53.4.1.3 Expected Actions

1380 The Document Metadata Notification Recipient shall accept the Notify message. The Notify
message shall be processed according to the configuration and business logic of the actor.
Possibilities include conveying the notification information to other systems and/or users.

The Document Metadata Notification Broker may send the filter conditions of the subscription,
and/or the address of the producer reference from where the Document Metadata Publish
1385 transaction originated. Both of these alternatives increase certain security risks, their use should
be determined by local policy for security and confidentiality.

If the Document Metadata Notification Recipient Actor is grouped with a Notification Pull Point
Actor, the notification received SHALL be stored in the related Pull Point resource.

3.53.4.1.4 Examples

1390 #### 3.53.4.1.4.1 Full Notification Example (ihe:FullDocumentEntry)

```xml
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd
urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0 ../schema/ebRS/rim.xsd" urn:oasis:names:tc:ebxml-
regrep:xsd:lcm:3.0 ../schema/ebRS/lcm.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-2/NotificationConsumer/Notify</a:Action>
        <a:MessageID>382dcdca-8e87-9fdf-8446-48fd83bca93b</a:MessageID>
        <a:To>https://NotificationRecipientServer/xdsBnotification</a:To>
    </s:Header>
    <s:Body>
        <wsnt:Notify>
            <wsnt:NotificationMessage>
                <wsnt:SubscriptionReference>
                    <a:Address>https://NotificationBrokerServer/Subscription/382dcdc7-8e84-9fdc-
8443-48fd83bca938</a:Address>
                </wsnt:SubscriptionReference>
                <wsnt:Topic Dialect="http://docs.oasis-open.org/wsn/t-
1/TopicExpression/Simple">ihe:FullDocumentEntry</wsnt:Topic>
                <wsnt:ProducerReference>
```

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```
                                <a:Address>https://ProducerReference</a:Address>
                        </wsnt:ProducerReference>
                        <wsnt:Message>
                            <lcm:SubmitObjectsRequest>
                                <rim:RegistryObjectList>
                                    <rim:ExtrinsicObject id="Document01" mimeType="text/xml"
objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1">
...
                                        <rim:Classification classificationScheme="urn:uuid:2c6b8cb7-8b2a-
4051-b291-b1ae6a575ef4" classifiedObject="Document01" nodeRepresentation="44950">
                                            <rim:Name>
                                                <rim:LocalizedString value="Appendectomy"/>
                                            </rim:Name>
                                            <rim:Slot name="codingScheme">
                                                <rim:ValueList>
                                                    <rim:Value>CPT codes</rim:Value>
                                                </rim:ValueList>
                                            </rim:Slot>
                                        </rim:Classification>
...
                                        <rim:ExternalIdentifier id="ei01" registryObject="Document01"
identificationScheme="urn:uuid:58a6f841-87b3-4a3e-92fd-a8ffeff98427"
value="'st3498702^^^&amp;1.3.6.1.4.1.21367.2005.3.7&amp;ISO'">
                                            <rim:Name>
                                                <rim:LocalizedString value="XDSDocumentEntry.patientId"/>
                                            </rim:Name>
                                        </rim:ExternalIdentifier>
...
                                    <rim:ExtrinsicObject>
                                </rim:RegistryObjectList>
                            </lcm:SubmitObjectsRequest>
                        </wsnt:Message>
                    </wsnt:NotificationMessage>
            </wsnt:Notify>
    </s:Body>
</s:Envelope>
```

3.53.4.1.4.2 Minimal Notification Example (ihe:MinimalDocumentEntry)

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xmlns:xds="urn:ihe:iti:xds-b:2007"
    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd urn:ihe:iti:xds-b:2007
../../schema/IHE/XDS.b_DocumentRepository.xsd urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0
../../schema/ebRS/rim.xsd">
    <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-2/NotificationConsumer/Notify</a:Action>
        <a:MessageID>382dcdca-8e87-9fdf-8446-48fd83bca93b</a:MessageID>
        <a:To>https://NotificationRecipientServer/xdsBnotification</a:To>
    </s:Header>
    <s:Body>
        <wsnt:Notify>
            <wsnt:NotificationMessage>
                <wsnt:SubscriptionReference>
                    <a:Address>https://NotificationBrokerServer/Subscription/382dcdc7-8e84-9fdc-
8443-48fd83bca938</a:Address>
                </wsnt:SubscriptionReference>
```

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```
1480              <wsnt:Topic Dialect="http://docs.oasis-open.org/wsn/t-
       1/TopicExpression/Simple">ihe:MinimalDocumentEntry</wsnt:Topic>
                  <wsnt:ProducerReference>
                      <a:Address>https://ProducerReference</a:Address>
                  </wsnt:ProducerReference>
1485              <wsnt:Message>
                    <lcm:SubmitObjectsRequest>
                        <rim:RegistryObjectList>
                            <rim:ObjectRef id="urn:uuid:93606bcf-9494-43ec-9b4e-a7748d1a838d" />
                        </rim:RegistryObjectList>
                    </lcm:SubmitObjectsRequest>
1490              </wsnt:Message>
              </wsnt:NotificationMessage>
          </wsnt:Notify>
      </s:Body>
</s:Envelope>
```

3.53.4.1.4.3 SubmissionSet Notification Example (ihe:SubmissionSetMetadata)

```
       <?xml version="1.0" encoding="UTF-8"?>
       <s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
           xmlns:a="http://www.w3.org/2005/08/addressing"
1500       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
           xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
           xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
           xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
           xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
1505   envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
       http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd
       urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0 ../schema/ebRS/rim.xsd" urn:oasis:names:tc:ebxml-
       regrep:xsd:lcm:3.0 ../schema/ebRS/lcm.xsd">
           <s:Header>
1510           <a:Action>http://docs.oasis-open.org/wsn/bw-2/NotificationConsumer/Notify</a:Action>
               <a:MessageID>382dcdca-8e87-9fdf-8446-48fd83bca93b</a:MessageID>
               <a:To>https://NotificationRecipientServer/xdsBnotification</a:To>
           </s:Header>
           <s:Body>
1515           <wsnt:Notify>
                   <wsnt:NotificationMessage>
                       <wsnt:SubscriptionReference>
                           <a:Address>https://NotificationBrokerServer/Subscription/382dcdc7-8e84-9fdc-
       8443-48fd83bca938</a:Address>
1520                   </wsnt:SubscriptionReference>
                       <wsnt:Topic Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple"
                           >ihe:SubmissionSetMetadata</wsnt:Topic>
                       <wsnt:ProducerReference>
                           <a:Address>https://ProducerReference</a:Address>
1525                   </wsnt:ProducerReference>
                       <wsnt:Message>
                           <lcm:SubmitObjectsRequest
                               xsi:schemaLocation="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0
       ../../schema/ebRS/lcm.xsd"
1530                           xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
                               xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                               xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
                               xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0">
                               <rim:RegistryObjectList>
1535                               <rim:RegistryPackage id="SubmissionSet01">

                                       <!-- here all the SubmissionSet metadata -->

                                   </rim:RegistryPackage>
```

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```
1540                                <rim:Classification id="cl10" classifiedObject="SubmissionSet01"
                                        classificationNode="urn:uuid:a54d6aa5-d40d-43f9-88c5-
        b4633d873bdd"/>
                                </rim:RegistryObjectList>
                            </lcm:SubmitObjectsRequest>
1545                    </wsnt:Message>
                    </wsnt:NotificationMessage>
                </wsnt:Notify>
            </s:Body>
        </s:Envelope>
1550
```

3.53.4.1.4.4 Folder Notification Example (ihe:FolderMetadata)

```
        <?xml version="1.0" encoding="UTF-8"?>
        <s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
1555        xmlns:a="http://www.w3.org/2005/08/addressing"
            xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
            xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
            xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
            xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
1560        xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
        envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
        http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd
        urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0 ../schema/ebRS/rim.xsd" urn:oasis:names:tc:ebxml-
        regrep:xsd:lcm:3.0 ../schema/ebRS/lcm.xsd">
1565        <s:Header>
                <a:Action>http://docs.oasis-open.org/wsn/bw-2/NotificationConsumer/Notify</a:Action>
                <a:MessageID>382dcdca-8e87-9fdf-8446-48fd83bca93b</a:MessageID>
                <a:To>https://NotificationRecipientServer/xdsBnotification</a:To>
            </s:Header>
1570        <s:Body>
                <wsnt:Notify>
                    <wsnt:NotificationMessage>
                        <wsnt:SubscriptionReference>
                            <a:Address>https://NotificationBrokerServer/Subscription/382dcdc7-8e84-9fdc-
1575        8443-48fd83bca938</a:Address>
                        </wsnt:SubscriptionReference>
                        <wsnt:Topic Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple"
                            >ihe:FolderMetadata</wsnt:Topic>
                        <wsnt:ProducerReference>
1580                        <a:Address>https://ProducerReference</a:Address>
                        </wsnt:ProducerReference>
                        <wsnt:Message>
                            <lcm:SubmitObjectsRequest
                                xsi:schemaLocation="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0
1585        ../../schema/ebRS/lcm.xsd"
                                xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
                                xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                                xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
                                xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0">
1590                        <rim:RegistryObjectList>
                                <rim:RegistryPackage id="Folder01">

                                    <!-- here all the Folder metadata -->

1595                            </rim:RegistryPackage>
                                <rim:Classification id="Fol" classifiedObject="Folder01"
                                    classificationNode="urn:uuid:d9d542f3-6cc4-48b6-8870-
        ea235fbc94c2"/>
                            </rim:RegistryObjectList>
1600                    </lcm:SubmitObjectsRequest>
```

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```
                </wsnt:Message>
            </wsnt:NotificationMessage>
          </wsnt:Notify>
       </s:Body>
1605  </s:Envelope>
```

3.53.5 Security Considerations

The risk assessment for the Document Metadata Notify transaction is described in the risk assessment spreadsheet for the Document Metadata Subscription Profile, which is available from IHE at http://wiki.ihe.net/images/4/46/DSUB_risk_assesment.xls. The derived mitigations are as follows:

> Document Metadata Notification Broker and Document Metadata Notification Recipient actors shall be grouped with an ATNA Secure Node or Secure Application for Node Authentication and Audit Trails

1615   The use of encrypted TLS is recommended when the transmission is not otherwise secured (e.g., transmission over a secure network)

Additionally, it is recommended that the Document Metadata Notify transaction be associated with a SAML assertion outlining authorizations to the notification content so that the Document Metadata Notification Recipient will be able to enforce these authorizations (for example, see the XUA Profile ITI TF-1: 13). This recommendation is highly dependent on an XDS Affinity Domain or a cross-community environment managing roles for its users correctly as most of the authorizations will be based on roles.

3.53.5.1 Audit Record Considerations

The Document Metadata Notify transaction is an Export event, as defined in ITI TF-2a: Table 3.20.6-1. The Actors involved in the transaction shall create audit data in conformance with DICOM Part 15 "Data Export"/"Data Import", with the following exceptions.

3.53.5.1.1 Document Metadata Notification Recipient audit message:

	Field Name	Opt	Value Constraints
Event **AuditMessage/** **EventIdentification**	EventID	M	EV(110107, DCM, "Import")
	EventActionCode	M	"C" (Create)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-53", "IHE Transactions", "Document Metadata Notify")
Source (Document Metadata Notification Broker) (1)			
Destination (Document Metadata Notification Recipient) (1)			
Human Requestor (0..n)			
Audit Source (Document Metadata Notification Recipient) (1)			
Patient (0..1)			
Document (1..n)			

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Where:

Source **AuditMessage/** **ActiveParticipant**	UserID	M	When WS-Addressing is used: <From/>
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

Destination **AuditMessage/** **ActiveParticipant**	UserID	C	When WS-Addressing is used: <ReplyTo/>
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

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Human Requestor (if known) **AuditMessage/** **ActiveParticipant**	UserID	M	Identity of the human that initiated the transaction.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	U	Access Control role(s) the user holds that allows this transaction.
	NetworkAccessPointTypeCode	*U*	*not specialized*
	NetworkAccessPointID	*U*	*not specialized*

Audit Source **AuditMessage/** **AuditSourceIdentification**	*AuditSourceID*	*U*	*not specialized*
	AuditEnterpriseSiteID	*U*	*not specialized*
	AuditSourceTypeCode	*U*	*not specialized*

Patient (if-known) **(AuditMessage/** **ParticipantObjectIdenti** **fication)**	ParticipantObjectTypeCode	M	"1" (Person)
	ParticipantObjectTypeCodeRole	M	"1" (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV(2, RFC-3881, "Patient Number")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The patient ID in HL7 CX format.
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*

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	ParticipantObjectDetail	U	not specialized

Document Folder Submission Set (AuditMessage/ ParticipantObjectIdenti fication)	ParticipantObjectTypeCode	M	"2" (System)
	ParticipantObjectTypeCodeRole	M	"3" (report)
	ParticipantObjectDataLifeCycle	U	not specialized
	ParticipantObjectIDTypeCode	M	EV("urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1", IHE, "DocumentEntry") EV("urn:uuid:d9d542f3-6cc4-48b6-8870-ea235fbc94c2", IHE, "Folder") EV(urn:uuid:a54d6aa5-d40d-43f9-88c5-b4633d873bdd, IHE,"SubmissionSet") The Document Metadata Notification Recipient Actor shall include one of these values in accordance with the specific topic used for the creation of the notification. These codes are already defined by IHE and they are the UUIDs which shall be used in constructing and interpreting XDS objects in a submission request.
	ParticipantObjectSensitivity	U	not specialized
	ParticipantObjectID	M	One of :<ihe:DocumentUniqueId/>, XDSFolder.uniqueId, or XDSSubmissionSet.uniqueId The Document Metadata Notification Recipient Actor shall include one of these values in accordance with the specific topic used for the creation of the notification
	ParticipantObjectName	C	If known the value of <ihe:HomeCommunityId/>
	ParticipantObjectQuery	U	not specialized
	ParticipantObjectDetail	U	not specialized

1635 **3.53.5.1.2 Document Metadata Notification Broker audit message:**

	Field Name	**Opt**	**Value Constraints**
Event AuditMessage/ EventIdentification	EventID	M	EV(110106, DCM, "Export")
	EventActionCode	M	"R" (Read)
	EventDateTime	M	not specialized
	EventOutcomeIndicator	M	not specialized
	EventTypeCode	M	EV("ITI-53", "IHE Transactions", "Document Metadata Notify")
Source (Document Metadata Notification Broker) (1)			
Destination (Document Metadata Notification Recipient) (1)			
Audit Source (Document Metadata Notification Broker) (1)			
Document (1..n)			

Where:

Source AuditMessage/ ActiveParticipant	UserID	M	When WS-Addressing is used: <From/>
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	U	not specialized
	UserIsRequestor	U	not specialized
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

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Destination **AuditMessage/** **ActiveParticipant**	UserID	C	When WS-Addressing is used: <ReplyTo/>
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	U	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

Audit Source **AuditMessage/** **AuditSourceIdentification**	*AuditSourceID*	*U*	*not specialized*
	AuditEnterpriseSiteID	*U*	*not specialized*
	AuditSourceTypeCode	*U*	*not specialized*

Document Folder Submission Set **(AuditMessage/** **ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	"2" (System)
	ParticipantObjectTypeCodeRole	M	"3" (report)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV("urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1", IHE, "DocumentEntry") EV("urn:uuid:d9d542f3-6cc4-48b6-8870-ea235fbc94c2", IHE, "Folder") EV(urn:uuid:a54d6aa5-d40d-43f9-88c5-b4633d873bdd, IHE,"SubmissionSet") The Document Metadata Notification Broker Actor shall include one of these values in accordance with the specific topic used for the creation of the notification. These codes are already defined by IHE and they are the UUIDs which shall be used in constructing and interpreting XDS objects in a submission request.
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The value of <ihe:DocumentUniqueId/>, XDSFolder.uniqueId, XDSSubmissionSet.uniqueId The Document Metadata Notification Broker Actor shall include values in accordance with the specific topic used for the creation of the notification
	ParticipantObjectName	C	If known the value of <ihe:HomeCommunityId/>
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	*U*	*not specialized*

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3.54 Document Metadata Publish

This section corresponds to Transaction ITI-54 of the IHE IT Infrastructure Technical Framework. Transaction ITI-54 is used by the Document Metadata Notification Broker and Document Metadata Publisher actors.

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3.54.1 Scope

1645

This transaction delivers information from the Document Metadata Publisher to the Document Metadata Notification Broker about an event which may have a subscription. The WS Brokered Notification PublisherRegistration requirements are out of scope for this transaction.

3.54.2 Use Case Roles
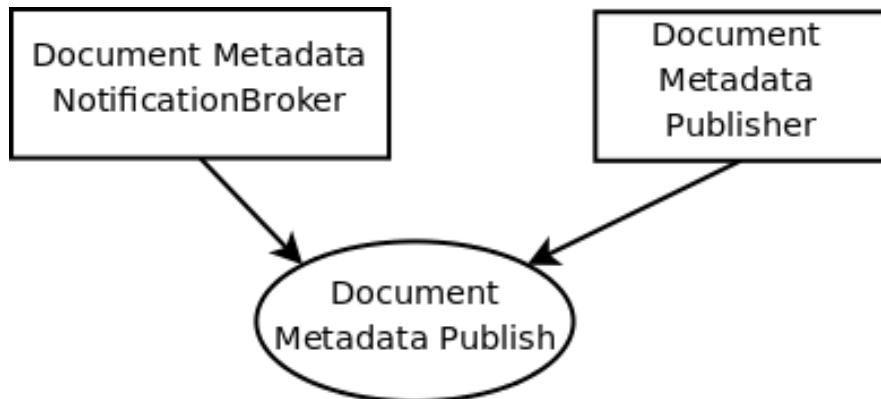
1650

Actor: Document Metadata Notification Broker

Role: Receives and processes information about events for which there may be a subscription.

Actor: Document Metadata Publisher

Role: Publishes information to the Document Metadata Notification Broker when new applicable events occur.

1655

3.54.3 Referenced Standards

- OASIS Web Services Notification Family of Standards
- WS-BaseNotification 1.3 OASIS Standard
- WS-BrokeredNotification 1.3 OASIS Standard

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- WS-Topics 1.3 OASIS Standard
- IHE ITI TF-2b: 3.43.4.2.2
- IHE ITI TF-2x: Appendix V

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3.54.4 Interaction Diagram
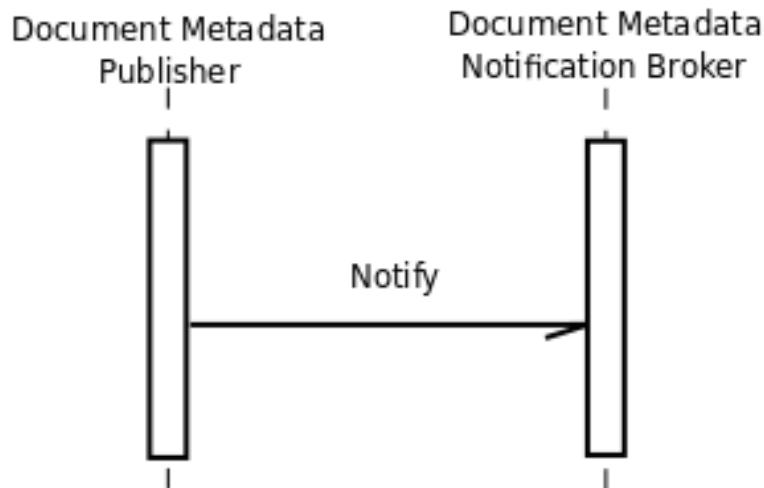
Figure 3.54.4-1: Document Metadata Publish Sequence

3.54.4.1 Notify Message

3.54.4.1.1 Trigger

When an event occurs of interest to the Document Metadata Notification Broker, the Document Metadata Publisher will trigger a Notification message to the configured Document Metadata Notification Broker.

3.54.4.1.2 Message Semantics

The format of the Notify message used in the Document Metadata Publish transaction is identical to the format of the Full Notification structure of the Notify message used in the Document Metadata Notify transaction. The format is defined in ITI TF-2b: 3.53.4.1.2.

Note that there is no subscription information in the Notify message in the Publish transaction.

3.54.4.1.3 Expected Actions

The Notify message shall comply with the requirements in the WS-BaseNotification standard

The Document Metadata Notification Broker shall evaluate the Publish transaction, and if there are matching subscriptions, it shall send the corresponding Notification transaction to the appropriate Document Metadata Notification Recipients.

3.54.4.1.4 Example

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xmlns:ihe="urn:ihe:iti:pub-sub:2008"
```

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```
       xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
       xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
1690   envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
       http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd urn:ihe:iti:pub-
       sub:2008 ../schema/IHE/XDS.b_PublishSubscribe.xsd urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0
       ../schema/ebRS/rim.xsd">
       <s:Header>
1695       <a:Action>http://docs.oasis-open.org/wsn/bw-2/NotificationConsumer/Notify</a:Action>
           <a:MessageID>382dcdca-8e87-9fdf-8446-48fd83bca93b</a:MessageID>
           <a:To>https://NotificationBroker/xdsBpublish</a:To>
       </s:Header>
       <s:Body>
1700       <wsnt:Notify>
               <wsnt:NotificationMessage>
                   <wsnt:ProducerReference>
                       <a:Address>https://DocumentSource</a:Address>
                   </wsnt:ProducerReference>
1705           <wsnt:Message>
                   <lcm:SubmitObjectsRequest>
                       <rim:RegistryObjectList>
                           <!-- The list of extrinsic objects -->
                           <rim:ExtrinsicObject id="Document01" mimeType="text/xml"
1710   objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1">
                                   …
                           </rim:ExtrinsicObject>
                       </rim:RegistryObjectList>
                   </lcm:SubmitObjectsRequest>
1715           </wsnt:Message>
               </wsnt:NotificationMessage>
           </wsnt:Notify>
       </s:Body>
</s:Envelope>
```

1720 3.54.5 Security Considerations

The risk assessment for the Document Metadata Publish transaction is described in the risk assessment spreadsheet for the Document Metadata Subscription Profile, which is available from IHE at http://wiki.ihe.net/images/4/46/DSUB_risk_assesment.xls. The derived mitigations are as follows:

1725 • The Document Metadata Publisher and the Document Metadata Notification Broker shall be grouped with an ATNA Secure Node or Secure Application for Node Authentication and Audit Trails

• The use of encrypted TLS is recommended when the transmission is not otherwise secured (e.g., transmission over a secure network)

1730 3.54.5.1 Audit Record Considerations

The Document Metadata Publish Transaction is an Export event, as defined in ITI TF-2a: Table 3.20.6-1. The Actors involved in the transaction shall create audit data in conformance with DICOM Part 15 "Data Export"/"Data Import", with the following exceptions.

3.54.5.1.1 Document Metadata Publisher Audit Message:

	Field Name	**Opt**	**Value Constraints**
Event **AuditMessage/** **EventIdentification**	EventID	M	EV(110106, DCM, "Export")
	EventActionCode	M	"R" (Read)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-54", "IHE Transactions", "Document Metadata Publish")
Source (Document Metadata Publisher) (1)			
Human Requestor (0..n)			
Destination (Document Metadata Notification Broker) (1)			
Audit Source (Document Metadata Publisher) (1)			
Patient (0..1)			
Document (1..n)			

1735   Where:

	UserID	M	When WS-Addressing is used: <From/>
Source **AuditMessage/** **ActiveParticipant**	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

	UserID	M	Identity of the human that initiated the transaction.
Human Requestor (if known) **AuditMessage/** **ActiveParticipant**	*AlternativeUserID*	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	U	Access Control role(s) the user holds that allows this transaction.
	NetworkAccessPointTypeCode	*U*	*not specialized*
	NetworkAccessPointID	*U*	*not specialized*

	UserID	C	SOAP endpoint URI
Destination **AuditMessage/** **ActiveParticipant**	*AlternativeUserID*	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

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Audit Source	AuditSourceID	U	not specialized
AuditMessage/ AuditSourceIdentification	AuditEnterpriseSiteID	U	not specialized
	AuditSourceTypeCode	U	not specialized

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Patient (if-known)	ParticipantObjectTypeCode	M	"1" (Person)
(AuditMessage/ ParticipantObjectIdentification)	ParticipantObjectTypeCodeRole	M	"1" (Patient)
	ParticipantObjectDataLifeCycle	U	not specialized
	ParticipantObjectIDTypeCode	M	EV(2, RFC-3881, "Patient Number")
	ParticipantObjectSensitivity	U	not specialized
	ParticipantObjectID	M	The patient ID in HL7 CX format.
	ParticipantObjectName	U	not specialized
	ParticipantObjectQuery	U	not specialized
	ParticipantObjectDetail	U	not specialized

Document	ParticipantObjectTypeCode	M	"2" (System)
(AuditMessage/ ParticipantObjectIdentification)	ParticipantObjectTypeCodeRole	M	"3" (report)
	ParticipantObjectDataLifeCycle	U	not specialized
	ParticipantObjectIDTypeCode	M	EV(9, RFC-3881, "Report Number")
	ParticipantObjectSensitivity	U	not specialized
	ParticipantObjectID	M	The value of <ihe:DocumentUniqueId/>
	ParticipantObjectName	C	If known the value of <ihe:HomeCommunityId/>
	ParticipantObjectQuery	U	not specialized
	ParticipantObjectDetail	U	not specialized

3.54.5.1.2 Document Metadata Notification Broker audit message:

	Field Name	Opt	Value Constraints
Event	EventID	M	EV(110107, DCM, "Import")
AuditMessage/ EventIdentification	EventActionCode	M	"C" (Create)
	EventDateTime	M	not specialized
	EventOutcomeIndicator	M	not specialized
	EventTypeCode	M	EV("ITI-54", "IHE Transactions", "Document Metadata Publish")
Source (Document Metadata Publisher) (1)			
Destination (Document Metadata Notification Broker) (1)			
Audit Source (Document Metadata Notification Broker) (1)			
Document (1..n)			

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Where:

Source AuditMessage/ ActiveParticipant	UserID	M	When WS-Addressing is used: <From/>
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

Destination AuditMessage/ ActiveParticipant	UserID	C	SOAP endpoint URI
	AlternativeUserID	*M*	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

Audit Source AuditMessage/ AuditSourceIdentification	*AuditSourceID*	*U*	*not specialized*
	AuditEnterpriseSiteID	*U*	*not specialized*
	AuditSourceTypeCode	*U*	*not specialized*

1750

Document URI (AuditMessage/ ParticipantObjectIdentification)	ParticipantObjectTypeCode	M	"2" (System)
	ParticipantObjectTypeCodeRole	M	"3" (report)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV(9, RFC-3881, "Report Number")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The value of <ihe:DocumentUniqueId/>
	ParticipantObjectName	C	If known the value of <ihe:HomeCommunityId/>
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	*U*	*not specialized*

Add Section 3.69

3.69 Create Destroy Pull Point

1755   This section corresponds to the Transaction ITI-69 of the IHE IT Infrastructure Technical Framework. Transaction ITI-69 is used by the Notification Puller Actor and by the Notification Pull Point Actor.

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3.69.1 Scope

This transaction involves a Request by the Notification Puller Actor to the Notification Pull Point Actor to create a Pull Point resource, and a Response to convey the information that the Request was successfully processed. This Response identifies the endpoint where notifications are delivered.

The Notification Puller Actor also uses this transaction to destroy a Pull Point resource which is no longer needed.

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3.69.2 Actor Roles
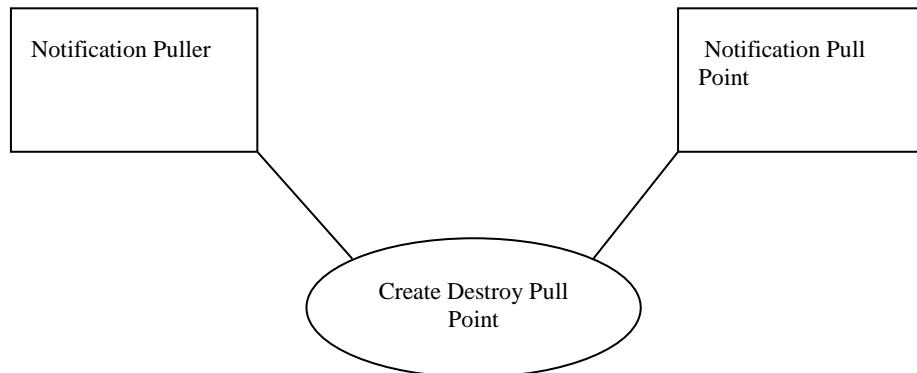
Actor:	Notification Puller
Role:	Sends a request to create (or delete) a Pull Point resource,
Actor:	Notification Pull Point
Role:	Manages the creation or the destruction of the Pull Point resource.

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3.69.3 Referenced Standards

- OASIS Web Services Notification Family of standards
- WS-BaseNotification 1.3 OASIS standard
- WS-BrokeredNotification 1.3 OASIS Standard
- WS-Topics 1.3 OASIS Standard

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- WS-BaseFaults
- IHE ITI TF-2x: Appendix V
- WS-Addressing OASIS Standard

3.69.4 Interaction Diagram

Notification Puller   Notification Pull Point

CreatePullPoint Request

CreatePullPoint Response

DestroyPullPoint Request

DestroyPullPoint Response
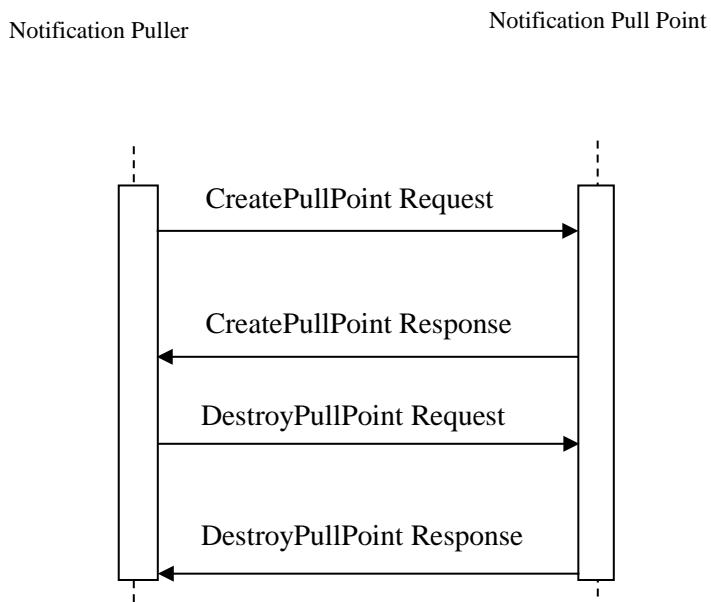
1780

3.69.4.1 CreatePullPoint Request message

A Notification Pull Point Actor creates a Pull Point resource in response to each CreatePullPoint Request and collects all notifications destined for the requesting Notification Puller Actor.

Within the Notification Pull Point Actor, each Pull Point resource allows the storing and
1785   managing of notifications.

A Pull Point resource is associated with a Notification Puller Actor. A Pull Point resource is an abstract concept that creates a relationship between a Notification Puller Actor and notifications stored for that actor in the Pull Point Actor.

The Notification Pull Point Actor serves as a Pull Point resource "factory" in processing
1790   CreatePullPoint Request messages. It can be asked to create Pull Point resources by many Notification Puller actors. The Notification Pull Point Actor can manage many Pull Point resources for each Notification Puller Actor.

The creation of a Pull Point resource requires grouping the Notification Pull Point Actor with a Document Metadata Notification Recipient for receiving notifications sent by the Document
1795   Metadata Notification Broker.

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If many Notification Puller actors are involved in the notification system, the Notification Pull Point Actor is grouped with many Document Metadata Notification Recipient actors (see Figure 3.69.4.1-1). When a Notification Puller Actor sends a CreatePullPoint Request message, the Notification Pull Point Actor returns an endpoint in the CreatePullPoint Response message. This endpoint is associated with a Document Metadata Notification Recipient Actor. The Document Metadata Notification Recipient SHALL store in the Pull Point resource the notifications received. This is an additional requirement for a Document Metadata Notification Recipient that is grouped with a Notification Pull Point Actor.

The Notification Puller Actor uses this endpoint for subsequent transactions (subscription requests, pulling of notifications and destroying of the Pull Point resource itself).

The way to store notifications and how to associate notifications to the specific Pull Point resources are not described and are out of scope of this transaction.
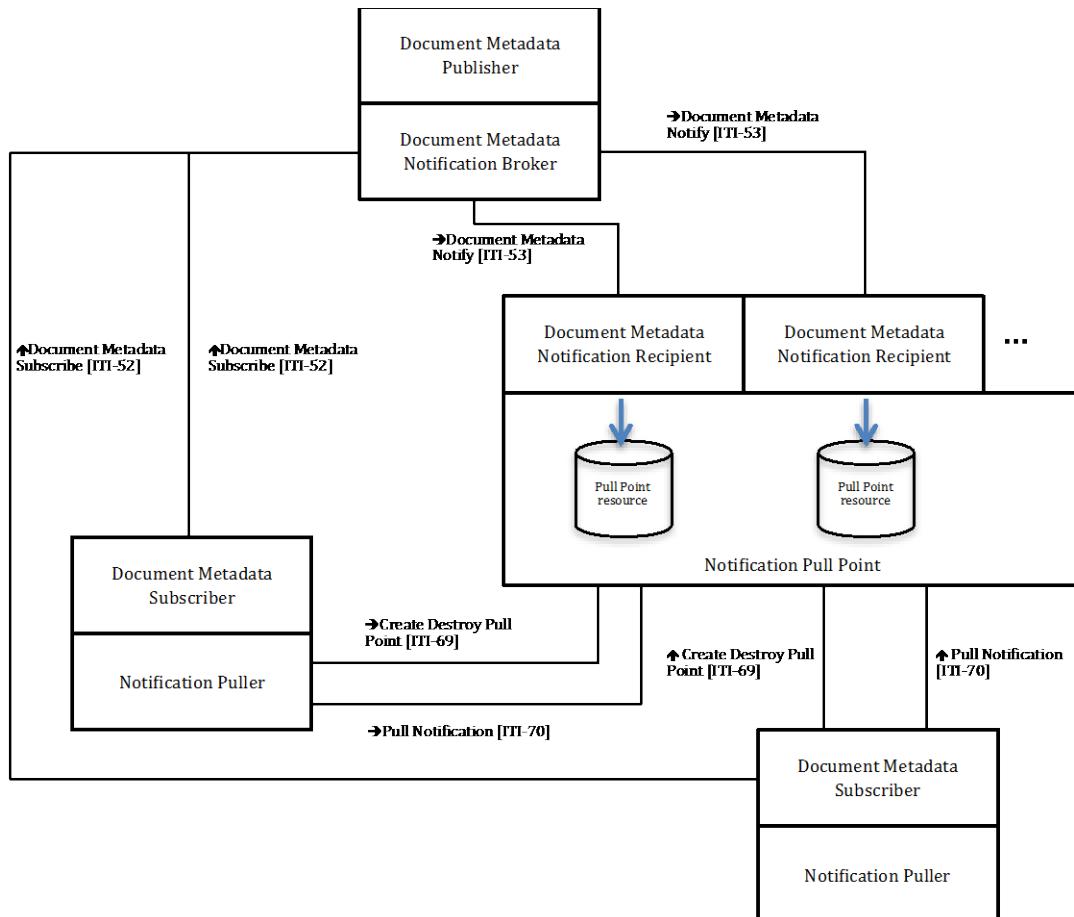
Figure 3.69.4.1-1: Pull-style Notification Framework

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3.69.4.1.1 Trigger Events

When the Notification Puller wishes to create a new Pull Point resource, it SHALL send a CreatePullPoint Request to a Notification Pull Point Actor.

3.69.4.1.2 Message Semantics

1815 The CreatePullPoint Request shall comply with the requirements in the WS-BaseNotification standard.

This message does not convey information to the Notification Pull Point Actor, but is used only as trigger for internal subsequent actions.

The WS-Addressing [action] Message Addressing Property MUST contain the URI

1820 http://docs.oasis-open.org/wsn/bw-2/CreatePullPoint/CreatePullPointRequest.

3.69.4.1.3 Expected Actions

Upon receipt of the CreatePullPoint Request, the Notification Pull Point Actor SHALL create a new Pull Point resource. The Document Metadata Notification Recipient/Notification Pull Point Actor can act in one of two ways:

1825　　1. If the CreatePullPoint Request message is successfully processed, the Notification Pull Point SHALL respond with CreatePullPoint Response message. The behavior of the Notification Pull Point Actor when it is no longer capable of accumulating notifications is out of scope for this profile.

1830　　2. If the Notification Pull Point Actor cannot respond to the CreatePullPoint Request message with the CreatePullPoint Response message for an application-level fault, then it SHALL send a SOAP fault in accordance to the WS-BaseFault specification. The WS-BaseNotification specification defines the following fault associated with failure to process the CreatePullPoint Request message:

1835　　　　• UnableToCreatePullPointFault.

3.69.4.1.4 Example SOAP Encoding of the CreatePullPoint Request Message

```
<s:Envelope ... >
  <s:Header>
    <wsa:Action>
    http://docs.oasis-open.org/wsn/bw2/PullPoint/CreatePullPointRequest
    </wsa:Action>
  ...
  </s:Header>
  <s:Body>
    <wsnt:CreatePullPoint/>
  </s:Body>
</s:Envelope>
```

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3.69.4.2 CreatePullPoint Response message

If the Notification Pull Point Actor can create a Pull Point resource dedicated to the specific
1840　Notification Puller Actor, the Notification Pull Point Actor SHALL respond to the request
received with a CreatePullPoint Response, as described in the WS-BaseNotification standard.

3.69.4.2.1 Trigger Events

This message is created in response to a request of creation of a Pull Point resource that is
successfully processed. The Response message can be created once the endpoint of the Pull Point
1845　resource is identified.

3.69.4.2.2 Message Semantics

The CreatePullPoint Response shall comply with the requirements in the WS-BaseNotification
standard.

This message, "The WS-Addressing [action] Message Addressing Property", SHALL contain the
1850　URI:

 http://docs.oasis-open.org/wsn/bw-2/CreatePullPoint/CreatePullPointResponse.

The CreatePullPoint response message SHALL contain the attribute:
/wsnt:CreatePullPointResponse/wsnt:PullPoint.

- This component is an EndpointReference, as defined by WS-Addressing, which is a
1855　reference to the Pull Point resource created during the processing of the CreatePullPoint
Request message.

- This SHALL be the Web-Service endpoint for the Document Metadata Notify transaction
[ITI-53] on the Document Metadata Notification Recipient Actor that is grouped with the
Notification Pull Point Actor.

1860　### 3.69.4.2.3 Expected Actions

The CreatePullPoint Response message provides to the Notification Puller Actor the endpoint
needed for creating subscriptions to the Document Metadata Notification Broker Actor. The
same endpoint SHALL be used for the pulling of the notification stored by the Notification Pull
Point Actor and/or the destroying of the Pull Point resource itself as needed using this
1865　transaction.

3.69.4.2.4 Example SOAP Encoding of the CreatePullPoint Response Message

```
<s:Envelope ... >
  <s:Header>
    <wsa:Action>
      http://docs.oasis-open.org/wsn/bw-2/PullPoint/CreatePullPointResponse
    </wsa:Action>
    ...
```

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```
  </s:Header>
  <s:Body>
    <wsnt:CreatePullPointResponse>
      <wsnt:PullPoint>
        <wsa:Address>...</wsa:Address>
          ...
      </wsnt:PullPoint>
    </wsnt:CreatePullPointResponse>
  </s:Body>
</s:Envelope>
```

3.69.4.3 DestroyPullPoint Request message

1870   If the Notification Puller Actor wants to terminate the Pull Point resource it SHALL send a DestroyPullPoint Request message. The request of destruction is directly targeted to the endpoint of reference that identifies the Pull Point resource and the grouped Notification Pull Point/Document Metadata Notification Recipient Actor.

3.69.4.3.1 Trigger Events

1875   This message is created when the Notification Puller Actor does not want to be involved in a notification system, or when it is necessary to remove a Pull Point resource for organizational reasons. The Document Metadata Subscriber Actor grouped with the Notification Puller Actor starts the process for unsubscribe filters created using the Pull Point resource endpoint as target for notifications created before to start the destruction.

1880   ### 3.69.4.3.2 Message Semantics

The DestroyPullPoint Request shall comply with the requirements in the WS-BaseNotification standard. The WS-Addressing [action] Message Addressing Property SHALL contain the URI:

http://docs.oasis-open.org/wsn/bw-2/PullPoint/DestroyPullPointRequest.

3.69.4.3.3 Expected Actions

1885   If the DestroyPullPoint Request is successfully processed, once this message is received by the Notification Pull Point Actor, the Pull Point resource SHALL attempt to destroy itself, responding with the DestroyPullPoint Response message. The Pull Point Actor SHALL discard all queued notifications.

If the Notification Pull Point Actor does not respond to the DestroyPullPoint Request message
1890   with the DestroyPullPointResponse message, then it SHALL send a fault. The WS-BaseNotification specification defines the following faults associated with failure to process the DestroyPullPoint Request message:

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1. If the Pull Point resource identified in the DestroyPullPoint Request message is not known to the Notification Pull Point Actor, it SHALL send a fault specified by the WS-
1895 Resource [WS-Resource] specification:

   - ResourceUnknownFault

2. If the Notification Pull Point was unable to destroy the Pull Point resource for some reason, it SHALL send a fault specified by the WS-BaseNotification specification:

   - UnableToDestroyPullPointFault.

1900

3.69.4.3.4 Example SOAP Encoding of the DestroyPullPoint Request Message

```
<s:Envelope ... >
  <s:Header>
    <wsa:Action>http://docs.oasis-open.org/wsn/bw-
2/PullPoint/DestroyPullPointRequest
    </wsa:Action>
...
  </s:Header>
  <s:Body>
    <wsnt:DestroyPullPoint/>
  </s:Body>
</s:Envelope>
```

3.69.4.4 DestroyPullPoint Response message

1905 The Notification Pull Point Actor responds to the Notification Puller Actor creating a DestroyPullPoint Response that attests to the success of the destruction process.

3.69.4.4.1 Trigger Events

If the DestroyPullPoint Request message is successfully processed, the Notification Pull Point Actor SHALL respond with the DestoryPullPoint Response message.

1910 ### 3.69.4.4.2 Message Semantics

The DestroyPullPoint Response shall comply with the requirements in the WS-BaseNotification standard. The WS-Addressing [action] Message Addressing Property SHALL contain the URI:

http://docs.oasis-open.org/wsn/bw-2/PullPoint/DestroyPullPointResponse.

3.69.4.4.3 Expected Actions

1915 The Notification Puller Actor should discard the endpoint of the Pull Point resources.

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3.69.4.4.4 Example SOAP Encoding of the DestroyPullPoint Response Message

```
<s:Envelope ... >
  <s:Header>
    <wsa:Action>
    http://docs.oasis-open.org/wsn/bw-
2/PullPoint/DestroyPullPointResponse
    </wsa:Action>
...
  </s:Header>
  <s:Body>
    <wsnt:DestroyPullPointResponse/>
  </s:Body>
</s:Envelope>
```

3.69.5 Security Considerations

1920   This section addresses security considerations related to the Create Destroy Pull Point transaction.

The risks connected to this transaction are:

Authentication of the Notification Puller is required. This avoids requests made by not reputable actors. The endpoint has to be used by the Puller for the creation of subscriptions
1925   that can be sent to a recognized Notification Recipient. If the authentication of the Puller was not required, the notifications will be sent anyway to the grouped Notification Pull Point Actor, because the Broker recognizes as a reputable actor the Document Metadata Notification Recipient Actor.

- Mitigation:

1930   - Node Authentication using ATNA: to assure that the requesting system is an authorized requesting system.

- User authentication using XUA: when it is necessary to know who the user is.

3.69.5.1 Security Audit Considerations

If a Request of creation of Pull Point or a Request of destruction is processed, the Notification
1935   Pull Point Actor and Notification Puller Actor SHALL create an Audit Record in accordance to the structure defined below. These events are of type "Application Activity".

3.69.5.1.1 Notification Pull Point audit message

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Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110100, DCM,"Application Activity")
	EventActionCode	M	Enumerated Value **C = Create** (in case of creation of the Pull Point) or **D= Delete** (in case of deletion of the Pull Point)
	EventDateTime	M	time of creation or deletion of the Pull Point resource
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-69", "IHE Transactions", "Create Destroy Pull Point")
Source (Notification Puller) (1)			
humanRequestor (0..1)			
Destination (Notification Pull Point) (1)			
Pull Point (1)			
Human Requestor (0..1)			

Source: AuditMessage/ ActiveParticipant (1)	UserID	M	The content of the <wsa:ReplyTo/> element
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointType Code	U	"1" for machine (DNS) name "2" for IP address
	NetworkAccessPointID	U	The machine name or IP address, as specified in RFC 3881

Destination: AuditMessage/ ActiveParticipant (1)	UserID	M	Metadata Notification Pull Point SOAP URI
	AlternativeUserID	U	the process ID as used within the local operating system in the local system of logs
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV (110152, DCM, "Destination")
	NetworkAccessPointType Code	U	"1" for machine (DNS) name "2" for IP address
	NetworkAccessPointID	U	The machine name or IP address, as specified in RFC 3881

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Human Requestor (if known) (0..1)	UserID	M	The person who wants to create (or destroying) a Pull Point resource
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	*M*	*not specialized*
	NetworkAccessPointTypeCode	*U*	*not specialized*
	NetworkAccessPointID	*U*	*not specialized*

Pull Point (AuditMessge/Participant ObjectIdentification)	ParticipantObjectTypeCode	M	"2" (SYSTEM)
	ParticipantObjectTypeCodeRole	M	"4" (Resource)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV(12, RFC-3881, "URI')
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The URL of the Pull Point resource
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	*U*	*not specialized*

3.69.5.1.2 Notification Puller audit message

Real World Entities	Field Name	Opt.	Value Constraints
Event	EventID	M	EV (110100, DCM,"Application Activity")
	EventActionCode	M	Enumerated Value **C = Create** (in case of creation of the Pull Point) or **D= Delete** (in case of deletion of the Pull Point)
	EventDateTime	M	time of creation or deletion of the Pull Point resource
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-69", "IHE Transactions", "Create Destroy Pull Point")
Source (Notification Puller) (1)			
humanRequestor (0..1)			
Destination (Notification Pull Point) (1)			
Pull Point (1)			
Human Requestor (0..1)			

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Source: **AuditMessage/ ActiveParticipant**	UserID	M	The content of the <wsa:ReplyTo/> element
	AlternativeUserID	U	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV (110153, DCM, "Source")
	NetworkAccessPointTypeCode	U	"1" for machine (DNS) name "2" for IP address
	NetworkAccessPointID	U	The machine name or IP address, as specified in RFC 3881

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Destination: **AuditMessage/ ActiveParticipant (1)**	UserID	M	Metadata Notification Pull Point SOAP URI
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV (110152, DCM, "Destination")
	NetworkAccessPointTypeCode	U	"1" for machine (DNS) name "2" for IP address
	NetworkAccessPointID	U	The machine name or IP address, as specified in RFC 3881

Human Requestor **(if known)** **(0..1)**	UserID	M	The person that wants to create (or destroying) a Pull Point resource
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	*M*	*not specialized*
	NetworkAccessPointTypeCode	*U*	*not specialized*
	NetworkAccessPointID	*U*	*not specialized*

Pull Point **(AuditMessge/Particip antObjectIdentificatio n)**	ParticipantObjectTypeCode	M	"2" (SYSTEM)
	ParticipantObjectTypeCodeRole	M	"4" (Resource)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	V(12, RFC-3881, "URI")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The URL of the Pull Point resource
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	*U*	*not specialized*

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3.69.5.1.3 Notification Pull Point Actor Specific Security Considerations

1960 For the receiving of notifications pushed by the Document Metadata Notification Broker Actor, the grouped Document Metadata Notification Recipient/Notification Pull Point Actor has to grant the requirement of Synchronous Web Services described in ITI TF-2x: Appendix V.

Add Section 3.70

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3.70 Pull Notification

This section corresponds to the Transaction ITI-70 of the IHE IT Infrastructure Technical Framework. Transaction ITI-70 is used by the Notification Puller and by the Notification Pull Point actors.

1970 **3.70.1 Scope**

The Pull Notification transaction provides a message exchange to allow a Notification Puller Actor to retrieve (or pull) notification messages from a Notification Pull Point Actor. This transaction involves a Request by the Notification Puller Actor for the retrieving of messages from Notification Pull Point Actor and a response conveying pending notifications targeted to
1975 the Notification Puller Actor.

3.70.2 Actor Roles

Actor:	Notification Puller

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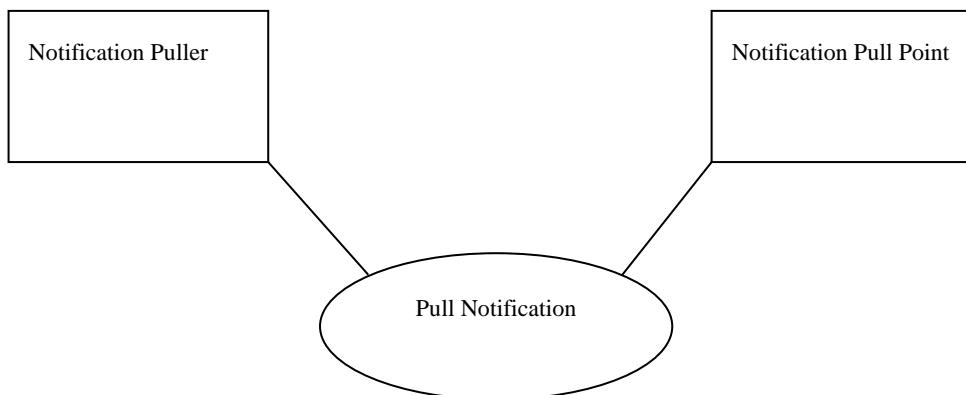
Role:	Sends a request to the Notification Pull Point Actor for pending notifications stored in a Pull Point resource.
Actor:	Notification Pull Point
Role:	Responds to the request to deliver pending messages for the Notification Puller Actor.

1980 ### 3.70.3 Referenced Standards

- OASIS Web Services Notification Family of standards

- WS-BaseNotification 1.3 OASIS standard

- WS-BrokeredNotification 1.3 OASIS Standard

- WS-BaseFaults

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- WS-Topics 1.3 OASIS Standard

- IHE ITI TF-2x: Appendix V

- WS-Addressing OASIS Standard

3.70.4 Interaction Diagram
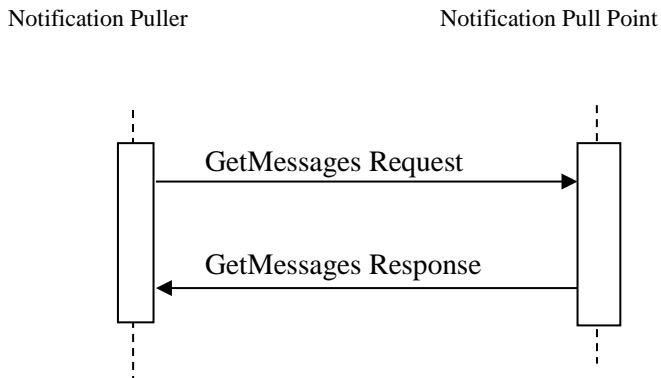
1990 ### 3.70.4.1 GetMessages Request message

The Notification Puller Actor asks for pending notifications on the Notification Pull Point Actor using the endpoint obtained after the creation of the Pull Point resource.

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3.70.4.1.1 Trigger Events

If the Notification Puller Actor wishes to retrieve pending notifications from the Pull Point
1995 resource, it SHALL send a GetMessages request to the endpoint returned in the response to the
Create Destroy Pull Point transaction [ITI-69].

3.70.4.1.2 Message Semantics

The GetMessages Request SHALL comply with the requirements in the WS-BaseNotification
standard.

2000 This is a request message to the Notification Pull Point Actor that allows the pulling of pending
notifications.

The WS-Addressing [action] Message Addressing Property MUST contain the URI:

http://docs.oasis-open.org/wsn/bw-2/PullPoint/GetMessagesRequest.

The components of the GetMessages request are:

2005 • **/wsnt:GetMessages:** This component, which is required, requests that notifications held
by the Pull Point resource be returned. Once the GetMessages message is received by the
Metadata Notification Pull Point Actor the request message is processed. The Pull Point
Actor shall respond to the Notification Puller Actor immediately when the request is
processed, returning content stored at that time without waiting for other notifications to
2010 be accumulated.

• **/wsnt:GetMessages/wsnt:MaximumNumber:** This non-negative integer that indicates
the maximum number of accumulated Notification Messages to be returned in the
response message. This element is default set to "1". This requirement is related to
auditing reasons and allows that Response messages convey data related to only one
2015 patient.

3.70.4.1.3 Expected Actions

Once the GetMessages Request message is received by the Notification Pull Point Actor, it
processes the request message. There are three possibilities:

1. *The Notification Pull Point resource has no notifications messages stored*. The
2020 Notification Pull Point Actor SHALL respond with a GetMessages Response message
containing zero Notification Response Messages

2. *The Notification Pull Point resource has one notification messages stored*. The
Notification Pull Point Actor SHALL respond with a GetMessage Response containing
only one Notification Message into a GetMessages Response message.

2025 3. *The Notification Pull Point resource stores more than one message*. The Response
message convey only one notification message but the Notification Puller Actor is
required to start another Notification Pull transaction in order to retrieve all notifications.

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4. ***The Pull Point resource is unable to respond to the request***. The Notification Pull Point Actor SHALL send one of these faults:

2030
- ResourceUnknownFault - The Pull Point resource is acting as a WS-Resource, and the resource identified in the request message is not known to the Web service. This fault is specified by the WS-Resource [WS-Resource] specification. UnableToGetMessagesFault -The Notification Pull Point Actor cannot return notifications messages for some unspecified reasons

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3.70.4.1.4 Example SOAP Encoding of the GetMessages Request message

```
<s:Envelope ... >
  <s:Header>
    <wsa:Action>
      http://docs.oasis-open.org/wsn/bw-2/PullPoint/GetMessagesRequest
    </wsa:Action>
    ...
  </s:Header>
  <s:Body>
    <wsnt:GetMessages>
      <wsnt:MaximumNumber>1</wsnt:MaximumNumber>
    </wsnt:GetMessages>
  </s:Body>
</s:Envelope>
```

3.70.4.2 GetMessages Response message

2040 If the Notification Pull Point Actor can process the request, it SHALL respond to the request received with a GetMessages Response, as described in the WS-BaseNotification standard.

3.70.4.2.1 Trigger Events

This message is created in response to a request of retrieving of notification messages stored in a specific Pull Point resource. A Pull Point resource is related to one Notification Puller Actor.

2045 ### 3.70.4.2.2 Message Semantics

The WS-Addressing [action] element of the response of the GetMessages request message MUST contain the URI:

http://docs.oasis-open.org/wsn/bw-2/PullPoint/GetMessagesResponse.

The contents of the GetMessages response message are further described as follows:

2050
- **/wsnt:GetMessagesResponse**: This component contains one Notification Message. The number of messages appearing is limited by the wsnt:MaximumNumber component of

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the GetMessages request message (that SHALL be equal to 1). The Notification Message
appearing in a GetMessagesResponse is "removed" from the PullPoint and SHALL NOT
appear in the response message of subsequent GetMessages requests.

2055
- **/wsnt:GetMessagesResponse/wsnt:NotificationMessage**: The content of this
  component is a Notification Message. The Notification Message component is described
  as part of the Notify message defined in the Document Metadata Notify transaction [ITI-
  53]. The GetMessagesResponse message does not define additional constraints on the
  Notification Message component. The content of the Notification Message is exactly the
2060
  content of the Notification Message component of the accumulated Notify messages
  using the Document Metadata Notify [ITI-53] transaction.

There shall be a single wsnt:Notify/wsnt:NotificationMessage/wsnt:Message element in this
transaction. If multiple objects need to be represented in a single notification, the WS-
BaseNotification standard allows this to be done.

2065 ### 3.70.4.2.3 Expected Actions

The Notification Puller Actor SHALL accept the GetMessages Response message and SHALL
be able to manage the Notify Message contained in the response according to the configuration
and business logic of the actor. Possibilities include conveying the notification information to
other systems and/or users.

2070 ### 3.70.4.2.4 Example SOAP Encoding of the GetMessage Response Message

```
<s:Envelope ... >
  <s:Header>
    <wsa:Action>
      http://docs.oasis-open.org/wsn/bw-2/PullPoint/GetMessagesResponse
    </wsa:Action>
    ...
  </s:Header>
  <s:Body>
    <wsnt:GetMessagesResponse>
      <wsnt:NotificationMessage>
          ...
      </wsnt:NotificationMessage>
    </wsnt:GetMessagesResponse>
  </s:Body>
</s:Envelope>
```

3.70.5 Security Considerations

Notification Puller and Notification Pull Point actors are required to log a "query" event
2075 associated to the Pull Notification transaction. The use of encrypted TLS is recommended when
the transmission is not otherwise secured (e.g., transmission over a secure network)

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Additionally, it is recommended that the Notification Pull transaction be associated with a
SAML assertion so that the Notification Puller Actor can outline authorizations to access the
notification content (for example, see the XUA Profile ITI TF-1: 13). Only the Notification
2080　　Puller that has created the Pull Point resource can ask it for pulling notification messages stored.

3.70.5.1 Security Audit Considerations

The Pull Notification transaction is a Query event, as defined in ITI TF-2a: Table 3.20.6-1. The
actors involved in the transaction SHALL create audit data in conformance with DICOM Part 15
"Query" because the GetMessages Request message allows the Notification Puller Actor to
2085　　query for instances stored in the Pull Point resource.

3.70.5.1.1 Notification Puller audit message

The Notification Puller Actor MUST send an audit message for each document conveyed in the
notificationMessage element of the GetMessage Response message.

	Field Name	Opt	Value Constraints
Event **AuditMessage/** **EventIdentification**	EventID	M	EV(110112, DCM, "Query")
	EventActionCode	M	"E" (Execute)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-70", "IHE Transactions", "Pull Notification")
Source (Notification Puller) (1)			
Human Requestor (0..1)			
Destination (Notification Pull Point) (1)			
Patient (0..1)			
document (1)			

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Where:

	UserID	M	The content of the <wsa:ReplyTo/> element.
Source **AuditMessage/ActiveP** **articipant**	AlternativeUserID	M	The process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

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Human Requestor (f known) **AuditMessage/ ActiveParticipant**	UserID	M	Identity of the human that initiated the transaction.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	U	Access Control role(s) the user holds that allows this transaction.
	NetworkAccessPointTypeCode	*U*	*not specialized*
	NetworkAccessPointID	*U*	*not specialized*

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Destination **AuditMessage/ ActiveParticipant**	UserID	M	SOAP endpoint URI.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

Patient **AuditMessage/ ActiveParticipant**	ParticipantObjectTypeCode	M	"1" (Person)
	ParticipantObjectTypeCodeRole	M	"1" (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV(2, RFC-3881, "Patient Number")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The patient ID in HL7 CX format.
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	*U*	*not specialized*

Document **AuditMessage/ ActiveParticipant**	ParticipantObjectTypeCode	M	"2" (system object)
	ParticipantObjectTypeCodeRole	M	"1" (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV("ITI-70", "IHE Transactions", Pull Notification")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The value of <ihe:DocumentUniqueID>
	ParticipantObjectName	C	If known the value of <ihe:HomeCommunityID/>
	ParticipantObjectQuery	*M*	*not specialized*
	ParticipantObjectDetail	*C*	*not specialized*

3.70.5.1.2 Notification Pull Point audit message

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	Field Name	Opt	Value Constraints
Event **AuditMessage/** **EventIdentification**	EventID	M	EV(110112, DCM, "Query")
	EventActionCode	M	"E" (Execute)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-70", "IHE Transactions", "Pull Notification")
Source (Notification Puller) (1)			
Human Requestor (0..1)			
Destination (Notification Pull Point) (1)			
Patient (0..1)			
document (1)			

Where:

Source **AuditMessage/** **ActiveParticipant**	UserID	M	The content of the <wsa:ReplyTo/> element.
	AlternativeUserID	M	The process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

Human **Requestor** **(if known)** **AuditMessage/** **ActiveParticipant**	UserID	M	Identity of the human that initiated the transaction.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	U	Access Control role(s) the user holds that allows this transaction.
	NetworkAccessPointTypeCode	*U*	*not specialized*
	NetworkAccessPointID	*U*	*not specialized*

Destination **AuditMessage/** **ActiveParticipant**	UserID	M	SOAP endpoint URI.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.

Patient **AuditMessage/** **ActiveParticipant**	ParticipantObjectTypeCode	M	"1" (Person)
	ParticipantObjectTypeCodeRole	M	"1" (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV(2, RFC-3881, "Patient Number")

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	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The patient ID in HL7 CX format.
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	*U*	*not specialized*

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Document AuditMessage/ ActiveParticipant	ParticipantObjectTypeCode	M	"2" (system object)
	ParticipantObjectTypeCodeRole	M	"1" (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV("ITI-70", "IHE Transactions", "Pull Notification")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The value of <ihe:DocumentUniqueID>
	ParticipantObjectName	C	If known the value of <ihe:HomeCommunityID/>
	ParticipantObjectQuery	*M*	*not specialized*
	ParticipantObjectDetail	*C*	*not specialized*

3.70.5.1.3 Metadata Notification Pull Point Specific Security Considerations

Notifications stored in the Pull Point should be managed in a secure way, but modalities to do this are not constrained by this supplement. The Pull Point resource is directly related to one
2110 Metadata Notification Puller. A system for the management of access policies can be created over this actor but these topics are not addressed by transactions.

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