Integrating the Healthcare Enterprise

IHE IT Infrastructure Technical Framework Supplement

Extensions to the Document Metadata Subscription (DSUB) Profile

Rev. 2.1 – Trial Implementation

Date: March 13, 2025

Author: IHE IT Infrastructure Technical Committee

Email: iti@ihe.net

Please verify you have the most recent version of this document. See here for Trial Implementation and Final Text versions and here for Public Comment versions.

Foreword

This is a supplement to the IHE IT Infrastructure Technical Framework V20.1. 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 March 13, 2025 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 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:

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.

General information about IHE can be found at IHE.net.

Information about the IHE IT Infrastructure domain can be found at IHE Domains.

Information about the organization of IHE Technical Frameworks and Supplements and the process used to create them can be found at Profiles and IHE Process.

The current version of the IHE IT Infrastructure Technical Framework can be found at https://profiles.ihe.net/ITI/index.html.

CONTENTS

Introduction to this Supplement

This trial implementation supplement extends the notification infrastructure defined in the DSUB Profile (integrated into the Final Text ITI Technical Framework in September 2016) adding the following functionalities:

1. Subscription to Folders objects and Folder's updates (ITI TF-1: 26.2.2 see "Folder Subscription Option").
2. Patient independent subscriptions for DocumentEntry and SubmissionSet objects (see ITI TF-1: 26.2.3 "Patient-Independent Subscription Option").
3. Pull-style notification approach (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. In the "Pull-style" method, a Notification Puller creates a Pull Point resource able to store notification generated by the Document Metadata Notification Broker. This Pull Point resource is a resource managed by the Pull Point that allows the storing of notification targeted to a specific recipient. Notifications stored in the Pull Point can be retrieved by the Notification Puller using a specific transaction.
4. Subscription Search through the [ITI-120] transaction: the Document Metadata Subscriber can search for subscriptions when it wants to discover subscriptions and be aware of their status from the Document Metadata Notification Broker (ITI TF-1: 26.2.4 see "Subscription Search Option").
5. Notification in case of Subscription Deactivation. The Document Metadata Subscriber that supports this functionality can receive a notification from the Document Metadata Notification Broker in case of a Subscription deactivation (ITI TF-1: 26.2.5 see "Subscription Deactivation Option").
6. Patient-Dependent and Patient-Independent Subscription to metadata update and delete events performed on DocumentEntry objects (ITI TF-1: 26.2.6 see "Extended Events Document Metadata Subscription Option").
7. Subscription for update and delete events performed on Folder objects (ITI TF-1: 26.2.7 see "Update Events Folder Subscription Option" and 26.2.8 see "Extended Events Folder Subscription Option").

Open Issues and Questions

None

Closed Issues

[DSUB-001] Is it possible to introduce the functionality of reactivating a subscription after it has been deactivated through an [ITI-52] Document Metadata Subscribe Transaction?

DECISION: According to the OASIS standard, it is not possible to reactivate that has been deactivated through the Unsubscribe Request Message.

On the other hand, the OASIS standard defines the possibility to pause a subscription and then resume it.

Since, as described in the use-cases below, the scope of activating a subscription is to receive almost real-time notifications when an event that matches the parameters of the subscription happens, it would not be useful to insert the possibility to pause a subscription.

IHE Technical Frameworks General Introduction

The IHE Technical Framework General Introduction is shared by all of the IHE domain technical frameworks. Each technical framework volume contains links to this document where appropriate.

9 Copyright Licenses

IHE technical documents refer to, and make use of, a number of standards developed and published by several standards development organizations. Please refer to the IHE Technical Frameworks General Introduction, Chapter 9 - Copyright Licenses for copyright license information for frequently referenced base standards. Information pertaining to the use of IHE International copyrighted materials is also available there.

10 Trademark

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IHE Technical Frameworks General Introduction Appendices

The IHE Technical Framework General Introduction Appendices are components shared by all of the IHE domain technical frameworks. Each technical framework volume contains links to these documents where appropriate.

Update the following appendices to the General Introduction as indicated below. Note that these are ***not*** *appendices to this domain's Technical Framework (TF-1, TF-2, TF-3 or TF-4) but rather, they are appendices to the IHE Technical Frameworks General Introduction located here.*

Appendix A – Actors

Add the following ***new or modified*** *actors to the IHE Technical Frameworks General Introduction Appendix A:*

Actor	Definition
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 when requested.

Appendix B – Transactions

Add the following ***new or modified*** *transactions to the IHE Technical Frameworks General Introduction Appendix B:*

Transaction	Definition
Create Destroy Pull Point [ITI-69]	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.
Pull Notification [ITI-70]	This transaction is used to retrieve pending notifications.
Document Subscription Search [ITI-120]	This transaction is used to search for information about subscription status and contents.

Appendix D – Glossary

*Add the following **new or modified glossary** terms to the IHE Technical Frameworks General Introduction Appendix D:*

Glossary Term	Definition
Pull Point resource	A resource managed by the Pull Point that allows the storing of notification targeted to a specific recipient.

Volume 1 – Profiles

Copyright Permission

None

Domain-specific additions

None

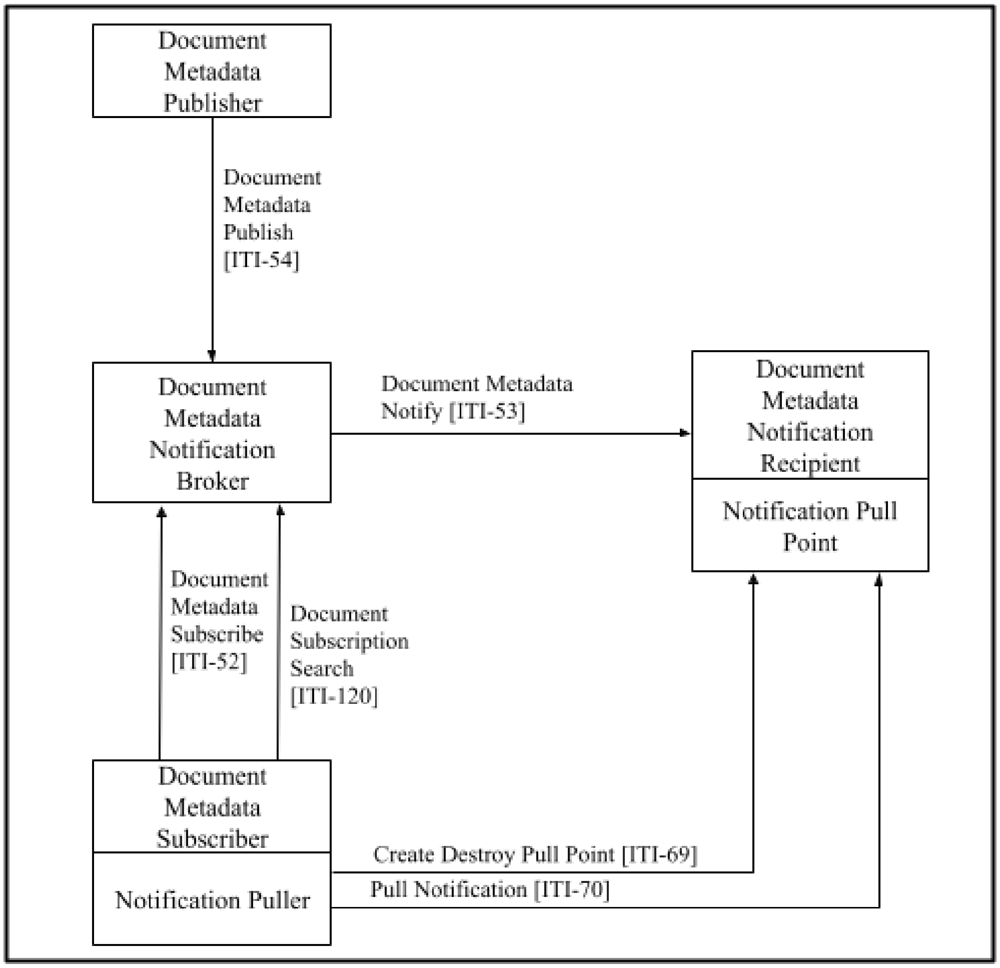
Editor: Make the following changes in Section 26

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 **and the update, or deletion of a document** for a given patient, and results in the delivery of a notification. This profile is based on the OASIS WS-BaseNotification standard and **defines two methods of subscription and notification**:

1. **In the** ~~defines a~~ “Push-style” method ~~for notification.~~ **, a** ~~Using a push-style method of notification, the~~ 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**, update or deletion** of objects in an XDS Document Registry. Subscriptions exist for a certain period of time and can be cancelled.
2. **In the “Pull-style” method, a Notification Puller creates a Pull Point resource able to store notification generated by the Document Metadata Notification Broker. This Pull Point resource is a resource managed by the Notification Pull Point that allows the storing of notification targeted to a specific recipient. Notifications stored in the Notification Pull Point can be retrieved by the Notification Puller using a specific transaction.**

Editor: Replace Figure 26.1-1 with the following:


Document Metadata Publisher
Document Metadata Publish [ITI-54]
Document Metadata Notification Broker
Document Metadata Notify [ITI-53]
Document Metadata Notification Recipient
Notification Pull Point
Document Metadata Subscribe [ITI-52]
Document Subscription Search [ITI-120]
Document Metadata Subscriber
Notification Puller
Create Destroy Pull Point [ITI-69]
Pull Notification [ITI-70]

Editor: Apply the following updates to Table 26.1-1 and add notes:

345 **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-2: 3.52
	Document Metadata Notify	R	ITI TF-2: 3.53
	Document Metadata Publish	O	ITI TF-2: 3.54
	Document Subscription Search	**O (Note 1)**	**ITI TF-2: 3.120**

Actors	Transactions	Optionality	Reference
Document Metadata Subscriber	Document Metadata Subscribe	R	ITI TF-2: 3.52
	Document Subscription Search	**O (Note 1)**	**ITI TF-2: 3.120**
Document Metadata Publisher	Document Metadata Publish	R	ITI TF-2: 3.54
Document Metadata Notification Recipient	Document Metadata Notify	R	ITI TF-2:3.53
Notification Puller	**Pull Notification**	**R**	**ITI TF-2: 3.70**
	Create Destroy Pull Point	**O**	**ITI TF-2: 3.69**
Notification Pull Point	**Pull Notification**	**R**	**ITI TF-2: 3.70**
	Create Destroy Pull Point	**O**	**ITI TF-2: 3.69**

Note 1: Document Metadata Notification Broker and Document Metadata Subscriber shall implement the Document Subscription Search [ITI-120] transaction if they support the Subscription Search Option

Editor: Add Sections 26.1.1.5 and 26.1.1.6

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 using the Create Destroy Pull Point [ITI-69] transaction to create (and destroy) the Pull Point resource.

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 [ITI-69] transaction. In response, the Notification Pull Point (grouped with the Document Metadata Notification Recipient) returns the endpoint of the 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 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 Pull Notification [ITI-70] transaction to the Notification Pull Point/Document Metadata Notification Recipient to retrieve 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 subscriptions created using the endpoint of the Pull Point resource that needs to be destroyed.
2. The Notification Puller can proceed with the destroying of the Pull Point resource using Create Destroy Pull Point [ITI-69] transaction.

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

- It SHALL be configurable with the endpoints for the Pull Point resources already created for it.
- It SHALL configure the endpoint for Pull Notification [ITI-70] transaction.

26.1.1.6 Notification Pull Point

The Notification Pull Point is the actor that stores notifications targeted to systems which cannot 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) and is used to collect all notifications destined for the requesting Notification Puller.

The Notification Pull Point can manage Pull Point resources created by many different Notification Puller Actors.

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

In order to not lose nor duplicate notifications:

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

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

If the Notification Pull Point 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 involved in the notification system.
- The endpoints of these Pull Point resources need to be disclosed to the correct Notification Puller.

Editor: apply the following changes in Table 26.2-1

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**
	Patient-Independent Subscription	**ITI TF-1: 26.2.3**
	Subscription Search	**ITI TF-1: 26.2.4**
	Subscription Deactivation Notify	**ITI TF-1: 26.2.5**
	Extended Events Document Metadata Subscription	**ITI TF-1: 26.2.6**
	Update Events Folder Subscription	**ITI TF-1: 26.2.7**
	Extended Events Folder Subscription	**ITI TF-1: 26.2.8**
Document Metadata Subscriber	~~*No options defined*~~ **Patient-Independent Subscription**	**ITI TF-1: 26.2.3**
	Folder Subscription	**ITI TF-1: 26.2.2**
	Subscription Search	**ITI TF-1: 26.2.4**
	Extended Events Document Metadata Subscription	**ITI TF-1: 26.2.6**
	Update Events Folder Subscription	**ITI TF-1: 26.2.7**
	Extended Events Folder Subscription	**ITI TF-1: 26.2.8**
Document Metadata Publisher	**No options defined Folder Subscription**	**ITI TF-1: 26.2.2**
	Extended Events Document Metadata Subscription	**ITI TF-1: 26.2.6**
	Update Events Folder Subscription	**ITI TF-1: 26.2.7**
	Extended Events Folder Subscription	**ITI TF-1: 26.2.8**
Document Metadata Notification Recipient	**No options defined Folder Subscription**	**ITI TF-1: 26.2.2**
	Subscription Deactivation Notify	**ITI TF-1: 26.2.5**

Actor	Option Name	Reference
	Extended Events Document Metadata Subscription	**ITI TF-1: 26.2.6**
	Update Events Folder Subscription	**ITI TF-1: 26.2.7**
	Extended Events Folder Subscription	**ITI TF-1: 26.2.8**
Notification Pull Point	***No options defined***	**- -**
Notification Puller	***No options defined***	**- -**

Editor: add Sections 26.2.2, 26.2.3, 26.2.4, 26.2.5, 26.2.6, and 26.2.7

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 existing folder or if a document in an existing folder is replaced. Refer to ITI TF-2: 3.52.4.1.3.1 and 3.53.4.1.2 for details. It is likely that the Document Metadata Notification Broker will maintain status of existing folders rather than making GetFolders queries from the Register Stored Query [ITI-18] transaction to determine folder status.

A Document Metadata Subscriber that supports this option shall be able to create subscriptions that use Folder metadata as filter parameters.

A Document Metadata Notification Recipient that supports this option shall be able to receive notifications when a new document is added to or replaced in an existing folder.

26.2.3 Patient-Independent Subscription Option

A Patient-Independent Subscription does not specify a patientId parameter. This type of subscription may be applied to DocumentEntry objects or SubmissionSets.

A Document Metadata Subscriber that supports this option shall be able to create patient-independent subscription filters.

A Document Metadata Notification Broker that supports this option shall be able to accept patient-independent subscriptions.

See ITI TF-2: 3.52.5.2.4 and 3.52.5.2.5 for use cases related to patient-independent subscriptions.

26.2.4 Subscription Search Option

A Document Metadata Notification Broker that supports this option shall support responding to subscription search requests submitted using the Document Subscription Search [ITI-120] transaction.

A Document Metadata Subscriber that supports this option shall support performing searches for existing subscriptions using the Document Subscription Search [ITI-120] transaction.

26.2.5 Subscription Deactivation Notify Option

A Document Metadata Notification Broker that supports this option shall send the notification when the subscription is deactivated to the Document Metadata Notification Recipient.

A Document Metadata Notification Recipient that supports this option shall be able to accept the notification from the Document Metadata Notification Broker when the subscription is deactivated.

Actors that support this Option shall support the Subscription Deactivation Message (see Section 3.53.4.2).

26.2.6 Extended Events Document Metadata Subscription Option

This option extends the triggers for the creation of a DocumentEntry object to include all possible update events and delete events of a DocumentEntry object.

A Document Metadata Subscriber that supports this option shall be able to create subscriptions that use DocumentEntry metadata as filter parameters.

A Document Metadata Notification Recipient that supports this option shall be able to receive notifications when the metadata of a Document Entry object are updated or deleted.

A Document Metadata Notification Broker that declares support for this option shall accept and process subscriptions that use DocumentEntry metadata as filter parameters and shall be able to send notifications when the metadata of the Document Entry are updated or deleted.

A Document Metadata Publisher that declares support for this option shall specify the type of event (registration, update, or delete of Document Entry objects) that led to metadata publishing for which a subscription may exist.

Actors that support this Option shall support the Extended Notify Message in the [ITI-53] Document Metadata Notify and [ITI-54] Document Metadata Publish transactions (see Section 3.53.4.3 and Section 3.54.4.2).

26.2.7 Update Events Folder Subscription Option

This option extends the trigger events for the Folder object when a document is added or replaced to include all possible update events of a Folder object.

All possible update events include the removal of a document from the Folder, the update of the status of the Folder object, or the update of metadata attributes of a Folder object.

A Document Metadata Subscriber that supports this option shall be able to create subscriptions that use Folder metadata as filter parameters.

A Document Metadata Notification Recipient that supports this option shall be able to receive notifications when an event triggers according to this option.

A Document Metadata Notification Broker that declares support for this option shall accept and process subscriptions that use Folder metadata as filter parameters and shall be able to send notifications when a trigger event included in this option happens.

A Document Metadata Publisher that declares support for this option shall specify the type of event (registration or update of Folder objects), that led to metadata publish, for which a subscription may exist.

Actors that support this Option shall support the Extended Notify Message in the ITI-53 and ITI-54 transactions (see Section 3.53.4.3 and Section 3.54.4.2).

26.2.8 Extended Events Folder Subscription Option

This option extends the triggers for the Folder object when a document is added or replaced or the Folder is updated, to include delete events of a Folder object.

A Document Metadata Subscriber that supports this option shall be able to create subscriptions that use Folder metadata as filter parameters and shall be able to receive notifications when the Folder is deleted.

A Document Metadata Notification Broker that declares support for this option shall accept and process subscriptions that use Folder metadata as filter parameters and shall be able to send notifications when the Folder is deleted.

A Document Metadata Publisher that declares support for this option shall specify the type of event (registration or update or delete of Folder objects) that led to metadata publishing for which a subscription may exist.

Actors that support this Option shall support the Extended Notify Message in the [ITI-53] Document Metadata Notify and [ITI-54] Document Metadata Publish transactions (see Section 3.53.4.3 and Section 3.54.4.2).

26.2.9 Overview of Events and Options

In this paragraph an overview of events on DocumentEntry, SubmissionSet and Folder objects that can trigger a notification is summarized and compared to the options that allow these events to be notified.

Table 26.9-1 shows the events related to the DocumentEntry and SubmissionSet objects.

The “Basic implementation” column represents the actors that don’t declare support for any option.

Table 26.9-2 shows the events related to the Folder objects.

Table 26.9-1: Events and Options for DocumentEntry and SubmissionSet objects

Event	Basic Implementation (No Option supported)	Extended Events Document Metadata Subscription Option
Creation of a new SubmissionSet (i.e., the creation of a SubmissionSet)	X	X
New document available (i.e., registration of a Document Entry object)	X	X
Update of the metadata status of a document (i.e., update of the Document Entry status)		X
Delete of a document (i.e., delete of a Document Entry object)		X
Update of all the metadata of a document (i.e., of the confidentialityCode of a Document Entry object)		X

Note that actors that support the Patient-Independent Subscription Option may comply with the “Basic Implementation”, not supporting any option, or declare support for the Extended Events Document Metadata Subscription Option.

In both cases, the events for which these actors have to manage notifications are not dependent on the support of the Patient-Independent Subscription Option.

Table 26.9-2: Events and Options for Folder objects

Event	Folder Subscription Option	Update Events Folder Subscription Option	Extended Events Folder Subscription Option
Creation of a new Folder (i.e., the creation of a Folder object)	X	X	X
Insert of a new document in a Folder (i.e., update a Folder object with a new link to a Document Entry object)	X	X	X
Replace of a document in a Folder (i.e., update a Folder object with a new link to a Document Entry object and with the link to the Document Entry object replaced)	X	X	X

Event	Folder Subscription Option	Update Events Folder Subscription Option	Extended Events Folder Subscription Option
Removal of a document from a Folder (i.e., update a Folder object erasing a Document Entry link)		X	X
Update of the metadata a Folder (i.e., the update of a Folder object)		X	X
Update of the metadata status of a Folder (i.e., update of the Folder status)		X	X
Deletion of a Folder (i.e., the delete of a Folder object)			X

Editor: apply the following changes to Table 26.3-1

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**

Editor: make the following changes to Section 26.4.1

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 during the publication of a new document for a given patient and for patient-independent events, and results in the delivery of a notification.

The subscription also allows for the matching of metadata during the update or delete of a document for a given patient and the creation, update, or delete of a Folder, 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 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 does not want to be notified at unpredictable times but rather at a time of its own choosing.**

The use cases below describe both of these scenarios.

Editor: add Sections 26.4.2.6, 26.4.2.7, 26.2.4.8, 26.4.2.9, and 26.4.2.10

26.4.2.6 Use Case #6: 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.).

26.4.2.6.1 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 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.

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.

26.4.2.6.2. Folder subscription Process Flow

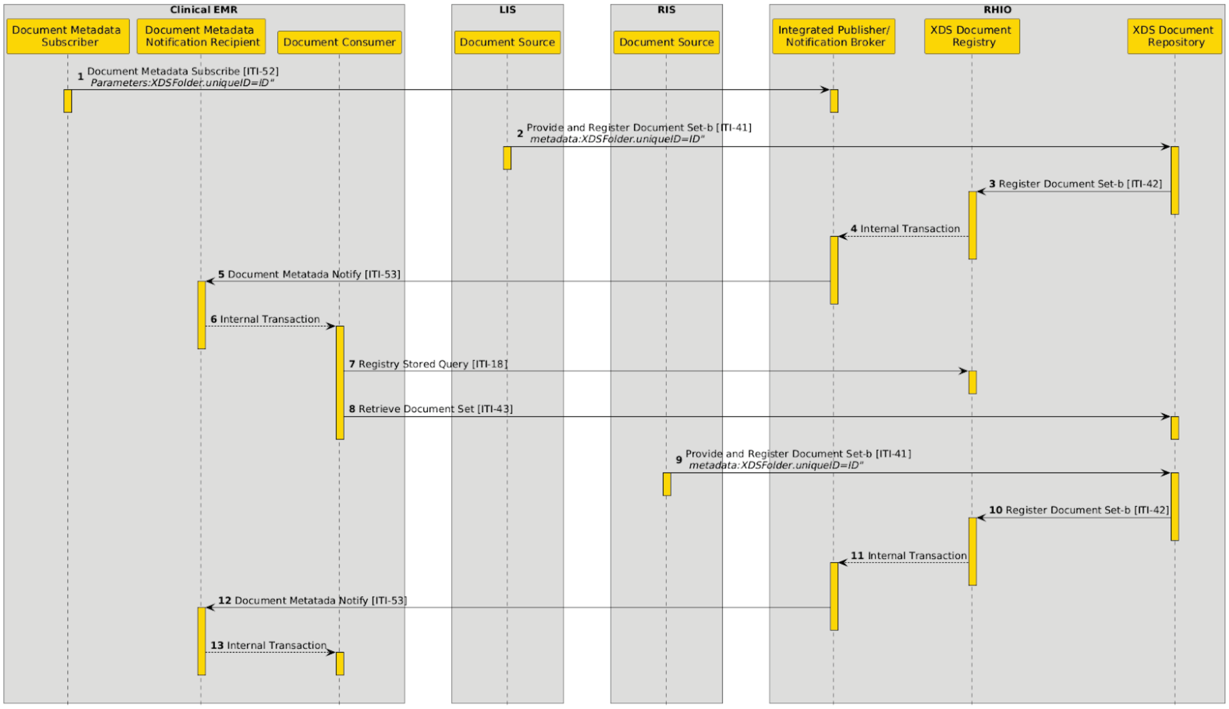

Clinical EMR
LIS
RIS
RHIO
Document Metadata Subscriber
Document Metadata Notification Recipient
Document Consumer
Document Source
Document Source
Integrated Publisher/ Notification Broker
XDS Document Registry
XDS Document Repository
1 Document Metadata Subscribe [ITI-52] Parameters:XDSFolder.uniqueID=ID"
2 Provide and Register Document Set-b [ITI-41] metadata:XDSFolder.uniqueID=ID"
3 Register Document Set-b [ITI-42]
4 Internal Transaction
5 Document Metatada Notify [ITI-53]
6 Internal Transaction
7 Registry Stored Query [ITI-18]
8 Retrieve Document Set [ITI-43]
9 Provide and Register Document Set-b [ITI-41] metadata:XDSFolder.uniqueID=ID"
10 Register Document Set-b [ITI-42]
11 Internal Transaction
12 Document Metatada Notify [ITI-53]
13 Internal Transaction

Figure 26.4.2.6.2-1: Interaction Diagram for Folder 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 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 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.

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 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 stores this and other notifications. The next morning Dr. 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

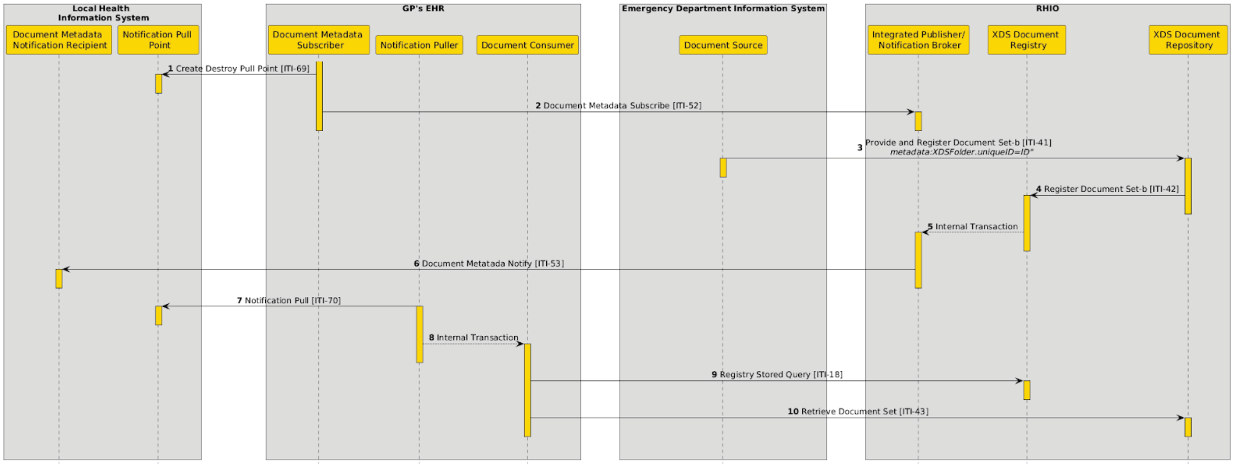

Local Health Information System
Document Metadata Notification Recipient
Notification Pull Point
GP's EHR
Document Metadata Subscriber
Notification Puller
Document Consumer
Emergency Department Information System
Document Source
RHIO
Integrated Publisher/ Notification Broker
XDS Document Registry
XDS Document Repository
1 Create Destroy Pull Point [ITI-69]
2 Document Metadata Subscribe [ITI-52]
3 Provide and Register Document Set-b [ITI-41] metadata:XDSFolder.uniqueID=ID"
4 Register Document Set-b [ITI-42]
5 Internal Transaction
6 Document Metatada Notify [ITI-53]
7 Notification Pull [ITI-70]
8 Internal Transaction
9 Registry Stored Query [ITI-18]
10 Retrieve Document Set [ITI-43]

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

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

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

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

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

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].

26.4.2.8 Use Case #8: Patient-independent tele-consultant notification

In this use case, a system used to provide tele-consulting services would be notified about Consult Requests published by Consult Requester systems. It is not possible to know in advance the patient for whom the consulting process is started and there are many consultants that can participate in the workflow. The consulting system can create just one patient-independent subscription for Consult Request documents.

26.4.2.8.1 Patient-independent tele-consultant scenario

Dr. Green is the clinician in charge of the consulting process. Dr. Green submits a subscription for documents with a document type of "Consult Request".

Dr. Brown is a Clinician who works for the Hope Clinic, a regional hospital specializing in neurological surgery treatment. This hospital and some other clinics provide tele-consulting services to many local hospitals.

Mr. White, after a car accident, is admitted to the Emergency Department in a local hospital. This hospital is not equipped with a Neurological ward so the ER physician, Dr. Young, decides to ask for a consult by a specialist. Using a Consult Requester system, Dr. Young publishes a Consult Request, looking for an available Consultant. This is done by publishing a Subscription for Consult Request document with a subscription expiration time that covers the whole work shift of the clinician and that has a "Consult Request" documentType.

When Dr. Young’s Consult Request is published, the Notification Broker identifies a match with a patient-independent subscription and sends a notification to Dr. Green.

26.4.2.8.2 Tele-Consultant patient-independent notification Process Flow

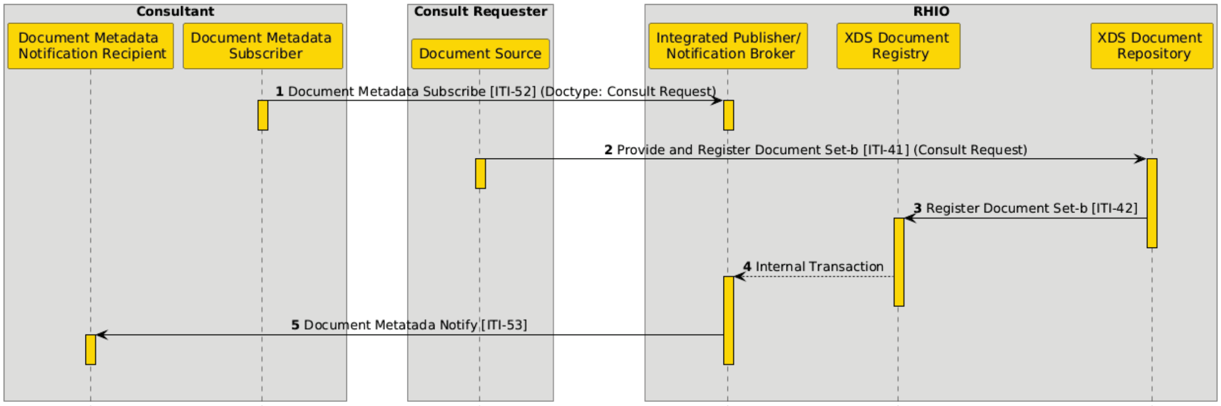

Consultant
Document Metadata Notification Recipient
Document Metadata Subscriber
Consult Requester
Document Source
RHIO
Integrated Publisher/ Notification Broker
XDS Document Registry
XDS Document Repository
1 Document Metadata Subscribe [ITI-52] (Doctype: Consult Request)
2 Provide and Register Document Set-b [ITI-41] (Consult Request)
3 Register Document Set-b [ITI-42]
4 Internal Transaction
5 Document Metatada Notify [ITI-53]

Figure 26.4.2.8.2-1: Interaction Diagram for patient-independent subscription

26.4.2.9 Use Case #9: Document Metadata Update Notification

This use case takes into consideration the fact that it is possible to update metadata of documents when mistakes happen or, in general, when there is the need to change only the metadata and not the clinical document itself. If the metadata match the subscription parameters after the update, a notification will be sent.

26.4.2.9.1 Document Metadata Update notification scenario

Mr. Nick undergoes a Radiographic exam in the local hospital, with a new RIS, required by Dr. Sam after his hospitalization. After the exam, the radiological doctor produces the diagnostic report.

The IT specialist of the new RIS, after the production of the document, immediately realizes that some errors are present in the metadata and updates the metadata of the document.

After that, Dr Sam receives the notification that a Radiographic report has been produced for Mr. Nick, and he is able to retrieve the document, and see the report.

26.4.2.9.2 Document Metadata Update notification Process Flow

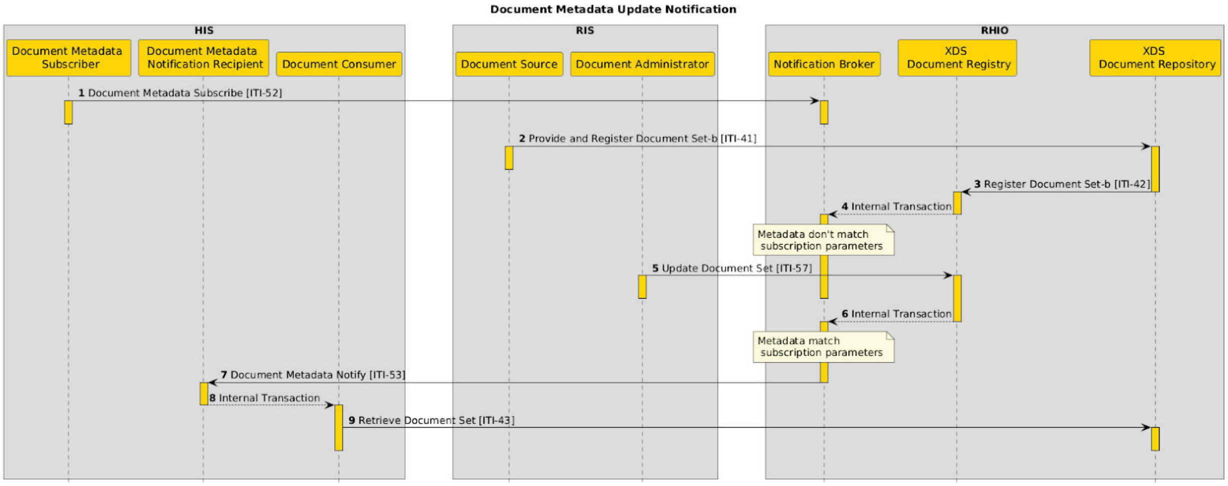

Document Metadata Update Notification
HIS
RIS
RHIO
Document Metadata Subscriber
Document Metadata Notification Recipient
Document Consumer
Document Source
Document Administrator
Notification Broker
XDS Document Registry
XDS Document Repository
1 Document Metadata Subscribe [ITI-52]
2 Provide and Register Document Set-b [ITI-41]
3 Register Document Set-b [ITI-42]
4 Internal Transaction
Metadata don't match subscription parameters
5 Update Document Set [ITI-57]
6 Internal Transaction
Metadata match subscription parameters
7 Document Metadata Notify [ITI-53]
8 Internal Transaction
9 Retrieve Document Set [ITI-43]

Figure 26.4.2.9.2-1: Interaction Diagram for Document Metadata Update Notification scenario

The Document Metadata Subscriber Actor of the HIS creates a subscription for documents, including update events, for a specific patient with the Document Metadata Subscribe [ITI-52] transaction identifying the Document Metadata Notification Recipient as target for the notifications created.

A document is published by the Document Source of the RIS in the XDS environment (using the transactions Provide and Register Document Set-b [ITI-41] and Register Document Set-b [ITI-42]) for that patient. The event is sent by internal transaction to the Document Metadata Notification Broker for the evaluation against the existing subscription, but it does not trigger any notification because there are no matches.

After the mistake was detected, the Document Administrator of the RIS performs an update of the metadata of the document produced, using the Update Document Set [ITI-57] transaction.

The event is sent through an internal transaction to the Document Metadata Notification Broker and because the metadata now match the parameters of the subscription, it creates and sends a notification to the Document Metadata Notification Recipient using the Document Metadata Notify [ITI-53] transaction.

The notification payload is used by the Document Consumer of the HIS, grouped with the Document Metadata Notification Recipient, to retrieve documents using the XDS transaction Retrieve Document Set-b [ITI-43].

26.4.2.10 Use Case #10: Subscription search and deactivation notification

In this use case, a Subscription Administrator, which implements the Document Metadata Subscriber, manages the subscriptions made by other systems in order to unsubscribe and deactivate the subscription.

In this use case it is specified that the notification in case of deactivation is sent when another system deactivates the subscription, but this notification can also be triggered when the subscription is deactivated from the same system that created it or at the termination time.

26.4.2.10.1 Subscription management by another system scenario

In this scenario, Dr Sam, a clinician of an HIS system, wants to know when a subscription he created for a certain patient is deactivated.

A Subscription Administrator searches for the subscriptions created for that patient and manages the deactivation of the subscription created by the HIS system. After the deactivation, Dr Sam receives the notification that the subscription deactivation has occurred.

26.4.2.10.2 Subscription management by another system Process Flow

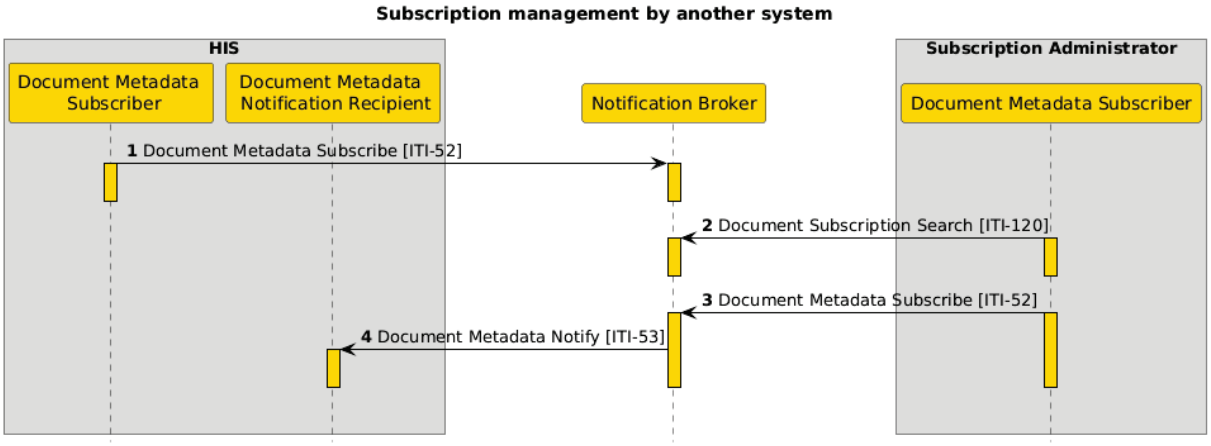

Subscription management by another system
HIS
Document Metadata Subscriber
Document Metadata Notification Recipient
Notification Broker
Subscription Administrator
Document Metadata Subscriber
1 Document Metadata Subscribe [ITI-52]
2 Document Subscription Search [ITI-120]
3 Document Metadata Subscribe [ITI-52]
4 Document Metadata Notify [ITI-53]

Figure 26.4.2.10.2-1: Interaction Diagram for Subscription management by other system

The Document Metadata Subscriber Actor of the HIS creates a subscription for documents, considering the deactivation event, for a specific patient, using the Document Metadata Subscribe [ITI-52] transaction and identifying the Document Metadata Notification Recipient as target for notifications created.

Another Document Metadata Subscriber, which is part of the Subscription Administrator, searches for the subscriptions created for the patient using the Document Subscription Search [ITI-120].

Then the Document Metadata Subscriber of the Subscription Administrator system sends a Document Metadata Subscription [ITI-52] to the Notification Broker to deactivate the subscription created by the Notification Metadata Subscriber of the HIS system.

The Document Metadata Notification Broker creates and sends a notification to the Document Metadata Notification Recipient using the Document Metadata Notify [ITI-53] transaction to notify that the subscription has been deactivated.

Editor: apply the following changes to Section 26.5

26.5 DSUB Security Considerations

The risk analysis for this profile enumerates assets, threats, and mitigations.

The notification provides sufficient data to retrieve documents, the retrieval of the document itself is handled through regular XDS retrieve document.

The risk assessment for DSUB is presented in the table below:

Table 26.5-1: DSUB risk assessment

Scenario	Asset	Type of impact	Level of impact	Probability	Mitigation
Eavesdropping of notification	metadata (as sent in notification)	Loss of confidentiality for patients	High (from an organizational point of view)	High	Recommend use of TLS unless the transmission is otherwise protected through specific implementation
A user replaying subscription to overload the recipient	notification recipient	Availability of notification recipient	Medium	Medium	DSUB design: Node authentication through ATNA, audit trails through ATNA and recommendation to use XUA to convey personal authentication
					Implementation: Access control
Replay of subscription generates multiplication of actions automatically taken on notification (e.g., database updates) that have to be flushed out later	notification recipient and associated systems	Availability of notification recipient and associated systems	Medium	Low	DSUB design: Node authentication through ATNA, audit trails through ATNA and recommendation to use XUA to convey personal authentication
					Implementation: Access control

Scenario	Asset	Type of impact	Level of impact	Probability	Mitigation
A user get unauthorized access to metadata through a subscription sent to an authentified node (as there is no link to end user in the subscription)	metadata (as sent in notification)	Loss of confidentiality for patients	High (from an organizational point of view)	High	DSUB design: Node authentication through ATNA and association of SAML assertion to notification to define who the notification can be disclosed to Implementation: Access control on the notification recipient
A notification is done without any record of that notification.	metadata (as sent in notification)	Loss of confidentiality for patients that cannot be traced to a user	High (from an organizational point of view)	High	DSUB design: audit trails through ATNA on the notification recipient actor
Malicious subscriptions to overload an innocent recipient are done without any information about the user requesting the information	notification recipient	Availability of notification recipient	High (from an organizational point of view)	High	DSUB design: Node authentication through ATNA and recommendation to use XUA to convey personal authentication Implementation: Access control
Intrusion in the Notification recipient (either through the application or through the taking over of the system on which the notification recipient is implemented)	metadata (as sent in notification)	Loss of confidentiality for patients	High (from an organizational point of view)	High	Implementation: notification recipient should be secured against intrusion
Overload of a notification recipient because notification ids have been lost and the subscriptions cannot be cancelled	notification recipient	Availability of notification recipient	Medium	High	Implementation: administrative service allowing cancellation of subscription
A subscription gets maliciously canceled	notification recipient	Availability of notification	Medium	Medium	DSUB design: Node authentication through ATNA, audit trails through ATNA and recommendation to use XUA to convey personal authentication Implementation: administrative mechanism to inform the intended recipient of the cancellation of the subscription

Scenario	Asset	Type of impact	Level of impact	Probability	Mitigation
Back-up recovery or reboot of the system restarts old subscriptions and/or erase newly submitted subscription	notification broker	integrity of subscription	Medium	Medium	Implementation: back-up recovery design should take the consistency of subscription handling into account
Updates to access control policies is not conveyed to the publisher and/or the notification broker leading to unauthorized disclosure of metadata	metadata (as sent in publication or in notification)	Loss of confidentiality for patients	Medium	High	None identified
Eavesdropping of publication	metadata (as sent in publication)	Loss of confidentiality for patients	High (from an organizational point of view)	High	DSUB design: Recommend use of TLS unless the transmission is otherwise protected through specific implementation
A system masquerading for an authorized system is maliciously publishing wrong metadata to the notification broker	metadata (as sent in publication)	Integrity of metadata being published	Medium	Medium	DSUB design: Node authentication through ATNA
A user get unauthorized access to metadata through a subscription search sent from an authentified node (as there is no link to end user in the subscription)	**subscription informations**	**Loss of confidentiality for patients**	**Medium**	**High**	**DSUB design: Node authentication through ATNA** **Implementation: Access control on Notification Broker**

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: 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 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 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 Document Metadata Notification Broker sends the references, then 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 transaction in Volume 2.

Volume 2 – Transactions

Editor: Add Section 3.52.4.1.3.1, 3.52.4.1.3.2, 3.52.4.1.3.3, 3.52.4.1.3.4

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.

A Document Metadata Subscriber supporting the Folder Subscription Option shall be able to create subscriptions for a folder.

The events for which a subscription is created are the registration of a Folder and the registration or replacement of DocumentEntry objects linked to the Folder.

3.52.4.1.3.2 Extended Events Document Metadata Subscription Option

A Document Metadata Notification Broker supporting the Extended Events Document Metadata Subscription Option shall accept and manage a subscription created for the registration, update and delete events on DocumentEntry objects.

3.52.4.1.3.3 Update Events Folder Subscription Option

A Document Metadata Notification Broker supporting the Update Events Document Metadata Subscription Option shall accept and manage a subscription created for the registration and update events on Folder objects, including also the registration, the replacement and the removal of DocumentEntry objects linked to a Folder and the update of the status or the metadata of the Folder.

3.52.4.1.3.4 Extended Events Folder Subscription Option

A Document Metadata Notification Broker supporting the Extended Events Document Metadata Subscription Option shall accept and process a subscription created for the registration, update and delete events on Folder objects.

Editor: Add Section 3.52.5.1.4, 3.52.5.1.5, 3.52.5.1.6, 3.52.5.1.7, and 3.52.5.1.8

3.52.5.1.4 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 Section 3.53.4.1.2.

Note that the event of updating a Folder means the insertion or the replacement of a document linked to the Folder.

3.52.5.1.5 ihe:ExtendedFullDocumentEntry

This topic indicates that the events for which the subscription is made shall be DocumentEntry registrations, updates, and deletes, and that the notification shall contain the full metadata describing each matching DocumentEntry as described in the Notification transaction in Section 3.53.4.1.2.

3.52.5.1.6 ihe:ExtendedMinimalDocumentEntry

This topic indicates that the events for which the subscription is made shall be DocumentEntry registrations, updates, and deletes, and that the notification shall contain the minimal set of data describing each matching DocumentEntry as described in the Document Metadata Notify transaction in Section 3.53.4.1.2.

3.52.5.1.7 ihe:UpdateFolder

This topic indicates that the events for which the subscription is made shall be registrations and updates on Folder objects (including the registration, replace and removal of a DocumentEntry object linked to a Folder and the update of the status or the metadata of a Folder), as described in the Notification transaction in Section 3.53.4.1.2.

3.52.5.1.8 ihe:ExtendedFolder

This topic indicates that the events for which the subscription is made shall be registrations and updates on Folder objects (including the registration, replacement and removal of a DocumentEntry object linked to a Folder and the update of the status or the metadata of a Folder) and the delete of a Folder, as described in the Notification transaction in Section 3.53.4.1.2.

Editor: Apply the following changes in Section 3.52.5.2

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 [ITI-18] transaction 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-2: 3.18.4.1.2.3.7. The 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 FindDocumentsByReferenceId, ~~or~~ FindSubmissionSets, **GetFolders or 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 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 in the subscription, were sent to a XDS Document Registry containing the Document Entry Objects, ~~or~~ 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.

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

Editor: Add Sections 3.52.5.2.3, 3.52.5.2.4, and 3.52.5.2.5

3.52.5.2.3 Subscriptions for folders metadata

A Document Metadata Subscriber that supports the Folder Subscription Option shall be able to create subscriptions in accordance with the filter semantics defined in this section.
This type of filter shall be accepted by a Document Metadata Notification Broker that supports the Folder Subscription Option, the Update Events Folder Subscription Option, and the Extended Events 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 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. **$XDSFolderPatientId**: this is a required parameter that matches with the metadata XDSFolder.patientId;
2. **$XDSFolderUniqueId:** this parameter matches with the metadata XDSFolder.uniqueId. This is an optional parameter that contains the identifier defined for the Folder Object subscribed. This parameter may be multi-valued.
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 XDS Documents in an XDSFolder. This parameter may be multi-valued.

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:

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

3.52.5.2.4 Patient-Independent Subscriptions for Document metadata

A Document Metadata Subscriber that supports the Patient-Independent Subscription Option shall be able to create subscriptions in accordance with the filter semantics defined in this section.

A Document Metadata Notification Broker that supports Patient-Independent Subscription Option shall accept subscription filters defined in this section.

This section defines a filter semantics that allow the subscription for patient-independent DocumentEntry metadata. Each filter parameter described below is optional; however, at least one of $XDSDocumentEntryClassCode, $XDSDocumentEntryTypeCode, $XDSDocumentEntryPracticeSettingCode or $XDSDocumentEntryHealthcareFacilityTypeCode shall be specified. All parameters may be multi-valued.

1. **$XDSDocumentEntryClassCode**: this parameter is optional and matches against the XDSDocumentEntry.classCode metadata elements in a given registry submission
2. **$XDSDocumentEntryTypeCode:** this parameter is optional and matches against the XDSDocumentEntry.typeCode metadata elements in a given registry submission
3. **$XDSDocumentEntryPracticeSettingCode:** this parameter is optional and matches against the XDSDocumentEntry.practiceSettingCode metadata elements in a given registry submission
4. **$XDSDocumentEntryHealthcareFacilityTypeCode:** this parameter is optional and matches against the XDSDocumentEntry.healthcareFacilityTypeCode metadata elements in a given registry submission
5. **$XDSDocumentEntryEventCodeList:** this parameter is optional and matches against the XDSDocumentEntry.eventCodeList metadata elements in a given registry submission
6. **$XDSDocumentEntryConfidentialityCode:** this parameter is optional and matches against the XDSDocumentEntry.confidentialityCode metadata elements in a given registry submission
7. **$XDSDocumentEntryFormatCode:** this parameter is optional and matches against the XDSDocumentEntry.formatCode metadata elements in a given registry submission
8. **$XDSDocumentEntryAuthorPerson:** this parameter is optional and matches against the XDSDocumentEntry.author metadata elements in a given registry submission. All

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

The AdHocQuery/@id attribute SHALL be “urn:uuid:742790e0-aba6-43d6-9f1f-e43ed9790b79”.

An example of patient-independent subscription for documents is presented below:

```
<?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://notificationBroker/ad45m6o5493a</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:742790e0-aba6-43d6-9f1f-e43ed9790b79">
                    <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>
```

3.52.5.2.5 Patient-Independent Subscriptions for SubmissionSet metadata

A Document Metadata Subscriber that supports Patient-Independent Subscription Option shall be able to create subscriptions in accordance with the filter semantics defined in this section.

A Document Metadata Notification Broker that supports Patient-Independent Subscription Option shall accept subscription filters defined in this section.

This section defines a filter semantic that allows the subscription for patient-independent SubmissionSet metadata. Each filter parameter described below is optional; however, at least one of $XDSSubmissionSetSourceId, $XDSSubmissionSetAuthor or $XDSSubmissionSetIntendedRecipient shall be specified.

1. **$XDSSubmissionSetSourceId**: this optional parameter identifies the source of the content published by the submission and represent the value of the XDSSubmissionSets.sourceId metadata. This parameter may be multi-valued.
2. **$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.
3. **$XDSSubmissionSetIntendedRecipient**: this is an optional parameter for the subscription. A Document Metadata Subscriber shall be able to subscribe to this parameter in addition to other parameters that have direct correspondence with query parameters in the Registry Stored Query [ITI-18] transaction. This parameter represents the value of the XDSSubmissionSet.intendedRecipient metadata. This 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.

The AdHocQuery/@id attribute SHALL contain

“urn:uuid:868cad3d-ec09-4565-b66c-1be10d034399”.

An example of patient-independent subscription for SubmissionSet metadata is presented below:

```
<?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://notificationBroker/qiwmen34dekE</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:SubmissionSetMetadata</wsnt:TopicExpression>
                <rim:AdhocQuery id="urn:uuid:868cad3d-ec09-4565-b66c-1be10d034399">
                      <rim:Slot name="$XDSSubmissionSetIntendedRecipient">
                        <rim:ValueList>
                            <rim:Value>('Some Hospital%')</rim:Value>
                            <rim:Value>('|Welby%')</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>
```

Editor: Apply the following changes 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
	ihe:ExtendedFullDocumentEntry
	ihe:ExtendedMinimalDocumentEntry
subscription for Folders	**ihe:FolderMetadata**
	ihe:UpdateFolder
	ihe:ExtendedFolder
subscription for SubmissionSets	ihe:SubmissionSetMetadata
subscription for DocumentEntry (Patient-Independent)	**ihe:FullDocumentEntry**
	ihe:MinimalDocumentEntry
	ihe:ExtendedFullDocumentEntry
	ihe:ExtendedMinimalDocumentEntry
subscription for SubmissionSet (Patient-Independent)	**ihe:SubmissionSetMetadata**

Editor: Apply the following changes in Section 3.52.6

3.52.6 Security Considerations

The risk assessment for the Document Metadata Subscribe transaction is described in Table 1:26.5-1: DSUB risk assessment (see Section 1:26.5 DSUB Security Considerations). The derived mitigations are as follows:

- Document Metadata Subscriber and 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)

As it is possible through the document metadata subscribe transaction to maliciously overload 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:

- 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
- 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

The Document Metadata Subscriber that supports the Patient-Independent Subscription Option can create a subscription without specifying the patientId subscription parameter. This functionality increases risks connected with policy changes between subscription time and notification event. It is recommended to take organizational/technical measures to reduce this risk. This profile provides the ihe:MinimalDocumentEntry topic expression to avoid disclosing sensitive information. Using this type of topic expression allows delegation of the access control decisions to the Document Sharing infrastructure.

Editor: Apply the following changes in Section 3.53.4

3.53.4 Messages

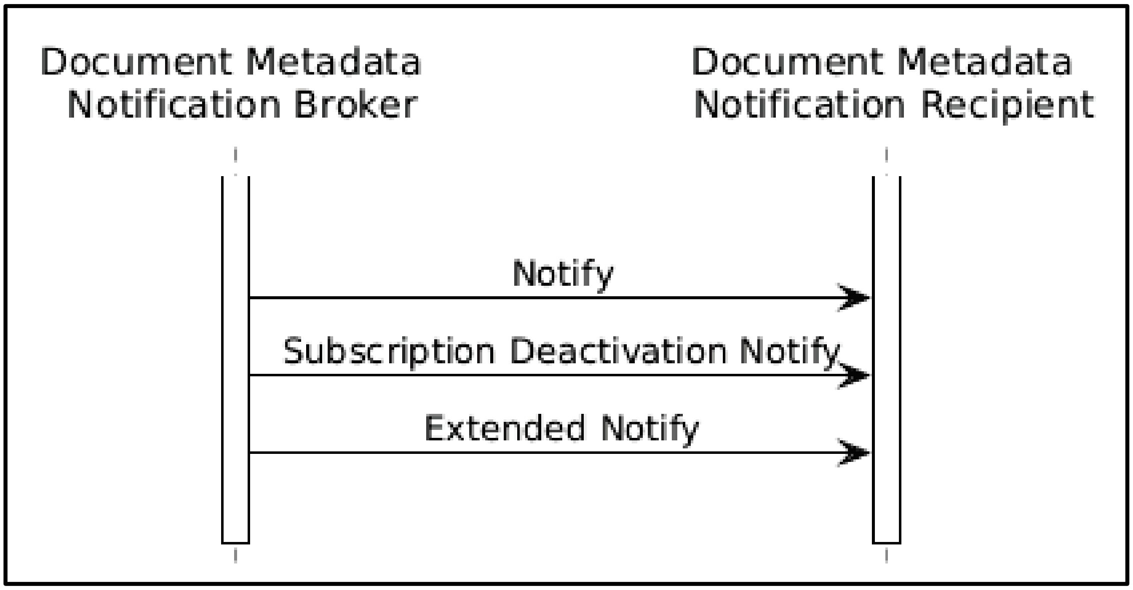

Document Metadata Notification Broker
Document Metadata Notification Recipient
Notify
Subscription Deactivation Notify
Extended Notify

Figure 3.53.4-1: Document Metadata Notify Sequence

Editor: Apply the following changes in Section 3.53.4.1.2. Note: ***highlighted*** *text shall be added* ***bold*** *in the final text.*

3.53.4.1.2 Message Semantics

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-2: 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, 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-2: 3.52.5.1). In this case, the notification shall consist of parts of the payload of a Register Document Set-b Transaction as defined in ITI TF-2: 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 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-2: 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> element.

A Folder Notification, which shall be sent if the subscription request included the topic ihe:FolderMetadata. A Document Metadata Notification Broker that supports Folder Subscription Option shall be able to create this type of notification. In this case, the notification shall consist of parts of the payload of a Register Document Set-b Transaction as defined in ITI TF-2: 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 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 topic ihe:SubmissionSetMetadata. In this case the **notification shall** consist of parts of the payload of a Register Document Set-b Transaction as defined in ITI TF-2: 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 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).

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.

Editor: Update Vol 2 Section 3.53.4.1.3 as follows

3.53.4.1.3 Expected Actions

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 (either a logical identifier or a service address url) of the Notification Broker that produces the notification. 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 is grouped with a Notification Pull Point, the notification received SHALL be stored in the related Pull Point resource.

Editor: Add Section 3.53.4.1.4.4

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"
    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:FolderMetadata</wsnt:Topic>
                <wsnt:ProducerReference>
                    <a:Address>https://ProducerReference</a:Address>
                </wsnt:ProducerReference>
                <wsnt:Message>
                    <lcm:SubmitObjectsRequest
                        xsi:schemaLocation="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0
../../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">
                        <rim:RegistryObjectList>
                            <rim:RegistryPackage id="Folder01">

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

                            </rim:RegistryPackage>
                            <rim:Classification id="Fol" classifiedObject="Folder01"
                                classificationNode="urn:uuid:d9d542f3-6cc4-48b6-8870-
ea235fbc94c2"/>
                        </rim:RegistryObjectList>
                    </lcm:SubmitObjectsRequest>
                </wsnt:Message>
            </wsnt:NotificationMessage>
        </wsnt:Notify>
    </s:Body>
</s:Envelope>
```

Editor: add Section 3.53.4.2

3.53.4.2 Subscription Deactivation Notify Message

The Subscription Deactivation Notify Message is sent from the Document Metadata Notification Broker to the Document Metadata Notification Recipient.

A Document Metadata Notification Broker that supports Subscription Deactivation Notify Option shall be able to create this type of message.

3.53.4.2.1 Trigger

When a subscription deactivation occurs, a Document Metadata Notification Broker supporting the Subscription Deactivation Notify Option shall trigger a Notification message to the corresponding Document Metadata Notification Recipient to notify that the subscription is no longer active.

The subscription deactivation can be triggered by:

- the Document Metadata Notification Broker at the termination time.
- a Document Metadata Subscriber by using an [ITI-52] transaction. The subscription can be deactivated by the Document Metadata Subscriber that created it or by another one.

3.53.4.2.2 Message Semantics

The Subscription Deactivation 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-2: Appendix V.

The Subscription Deactivation Notify message contains in the *wsnt:Notify/wsnt:NotificationMessage* the elements:

- <*wsnt:SubscriptionReference*> that contains two elements, the <*wsnt:Address*>, containing the identifier of the subscription, and the <*wsnt:TerminationTime*>, containing the termination time of the subscription;
- <*wsnt:Message*> that contains the <*wsnt:Unsubscribe*> element only, to convey the information that the subscription has been deactivated.

3.53.4.2.3 Expected Actions

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.

Note that historical Document Metadata Notification Recipient actors may not support the Subscription Deactivation Notify Option, and the notification sent to them may not be processed.

The Document Metadata Notification Broker may send the filter conditions of the subscription, and/or the address (either a logical identifier or a service address url) of the Notification Broker that produces the notification. Both alternatives increase certain security risks; their use should be determined by local policy for security and confidentiality.

3.53.4.2.4 Subscription Deactivation Notify Message 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:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0">
    <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:TerminationTime>2008-05-31T00:00:00Z</wsnt:TerminationTime>
                </wsnt:SubscriptionReference>
                <wsnt:Message>
                    <wsnt:Unsubscribe/>
                </wsnt:Message>
            </wsnt:NotificationMessage>
        </wsnt:Notify>
    </s:Body>
</s:Envelope>
```

Editor: add Section 3.53.4.3

3.53.4.3 Extended Notify Message

The Extended Notify Message is sent from the Document Metadata Notification Broker to the Document Metadata Notification Recipient.

A Document Metadata Notification Broker that supports at least one of the following the Options:

- Extended Events Document Metadata Subscription Option, in case of notifications about DocumentEntry objects (see Section 3.52.4.1.3.2).
- Update Events Folder Subscription Option, in case of notifications about Folder objects (see Section 3.52.4.1.3.3).
- Extended Events Folder Subscription Option, in case of notifications about Folder objects (see Section 3.52.4.1.3.4).

Shall be able to create this type of message.

3.53.4.3.1 Trigger

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 an Extended Notify message to the corresponding Document Metadata Notification Recipient.

The Document Metadata Notification Broker shall support the Extended Events Document Metadata Subscription, in case of events matching a subscription created for DocumentEntry objects, and the Update Events Folder Subscription or the Extended Events Folder Subscription, in case of events matching a subscription created for Folder objects. The description of matching subscriptions to events can be found in Section 3.52.5.2.

3.53.4.3.2 Message Semantics

The Extended 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-2: Appendix V.

The Extended Notify Message conveys in the *wsnt:Notify/wsnt:NotificationMessage/wst:Message* the event that matched with a subscription.

The element *wsnt:Notify/wsnt:NotificationMessage/ws*nt:Topic has a different value, which depends on the event that triggered the notification. The value of this element is composed by the topic of the subscription (contained in the *TopicExpression* element of the ITI-52) and the type of event for which the notification is created, as described in the tables below (Table 3.53.4.3.2-1 and Table 3.53.4.3.2-2):

Table 3.53.4.3.2-1: Topics Combinations for Document Entry Metadata

Event/Topic ITI-52	ihe:FullDocumentEntry	ihe:MinimalDocumentEntry	ihe:ExtendedFullDocumentEntry	ihe:ExtendedMinimalDocumentEntry
New document available (i.e., registration of a Document Entry object)	ihe:FullDocumentEntry	ihe:MinimalDocumentEntry	ihe:ExtendedFullDocumentEntry	ihe:ExtendedMinimalDocumentExtry
Update of the metadata status of a document (i.e., update of the Document Entry status)	-	-	ihe:ExtendedFullDocumentEntry/Deprecate	ihe:ExtendedMinimalDocumentEntry/Deprecate
Delete of a document (i.e., delete of a Document Entry object)	-	-	ihe:ExtendedFullDocumentEntry/Delete	ihe:ExtendedMinimalDocumentEntry/Delete
Update of all the metadata of a document (i.e., of the confidentialityCode of a Documen	-	-	ihe:ExtendedFullDocumentEntry/UpdateMetadata	ihe:ExtendedMinimalDocumentEntry/UpdateMetadata

Event/Topic ITI-52	ihe:FullDocumentEntry	ihe:MinimalDocumentEntry	ihe:ExtendedFullDocumentEntry	ihe:ExtendedMinimalDocumentEntry
t Entry object)				

1320 **Table 3.53.4.3.2-2: Topics Combinations for Folder Metadata**

Event/Topic ITI-52	ihe:FolderMetadata	ihe:UpdateFolder	ihe:ExtendedFolder
Creation of a new Folder (i.e., the creation of a Folder object)	ihe:FolderMetadata	ihe:UpdateFolder	ihe:UpdateFolder
Insert of a new document in a Folder (i.e., update a Folder object with a new link to a Document Entry object)	ihe:FolderMetadata	ihe:UpdateFolder/UpdateContent	ihe:ExtendedFolder/UpdateContent
Replace of a document in a Folder (i.e., update a Folder object with a new link to a Document Entry object and with the link to the Document Entry object replaced)	ihe:FolderMetadata	ihe:UpdateFolder/UpdateContent	ihe:ExtendedFolder/UpdateContent
Removal of a document from a Folder (i.e., update a Folder object erasing a Document Entry link)	-	ihe:UpdateFolder/RemoveDocument	ihe:ExtendedFolder/RemoveDocument
Update of the metadata a Folder (i.e., the update of a Folder object)	-	ihe:UpdateFolder/UpdateMetadata	ihe:ExtendedFolder/UpdateMetadata
Update of the metadata status of a Folder (i.e.,	-	ihe:UpdateFolder/Deprecate	ihe:ExtendedFolder/Deprecate

Event/Topic ITI-52	ihe:FolderMetadata	ihe:UpdateFolder	ihe:ExtendedFolder
update of the Folder status)			
Deletion of a Folder (i.e., the delete of a Folder type List object)	-	-	ihe:ExtendedFolder/Delete

Depending on the event that triggered the notification, there may be one or more Document Entry Objects, Folder Objects, or SubmissionSet Objects whose metadata match the filter conditions of any particular subscription.

For notifications related to DocumentEntry Objects, this transaction defines the following structures for conveying an Extended Notify message:

- A **Full Notification**, which shall be sent if the subscription request included the topic ihe:ExtendedFullDocumentEntry (see ITI TF-2: 3.52.5.1). 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 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:ExtendedMinimalDocumentEntry. 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*> element.

For notifications related to SubmissionSet Objects, this transaction defines the following structures for conveying an Extended Notify message:

A **submissionSet Notification**, which shall be sent if the subscription request included the topic ihe:SubmissionSetMetadata. In this case the response consists of parts of the payload of a Register Document Set-b Transaction as defined in Section 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 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).

For notifications related to Folder Objects, this transaction defines the following structures for conveying an Extended Notify message:

A **Folder Notification**, which shall be sent if the subscription request includes the topic ihe:ExtendedFolderMetadata. A Document Metadata Notification Broker that supports Update Events Folder Subscription Option or the Extended Events Folder Subscription Option shall be able to create this type of notification. 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 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).

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.

3.53.4.3.3 Expected Actions

The Document Metadata Notification Recipient that supports the Extended Events Document Metadata Subscription Option, the Update Events Folder Subscription Option, or the Extended Events Folder Subscription Option shall accept the Extended Notify message. The Extended 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 (either a logical identifier or a service address url) of the Notification Broker that produces the notification. Both alternatives increase certain security risks; their use should be determined by local policy for security and confidentiality.

3.53.4.3.4 Extended Notify Message Examples

3.53.4.3.4.1 Full Notification Message (ihe:ExtendedEventsFullDocumentEntry)

```
<?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">
    <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 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:a="http://www.w3.org/2005/08/addressing" xmlns:s="http://www.w3.org/2003/05/soap-
envelope"
    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">
    <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:ExtendedFullDocumentEntry/UpdateMetadata</wsnt:Topic>
        <wsnt:ProducerReference>
            <a:Address>https://ProducerReference</a:Address>
        </wsnt:ProducerReference>
        <wsnt:Message>
            <lcm:SubmitObjectsRequest>
                <rim:RegistryObjectList>
                    …
                    </rim:ExtrinsicObject>
                </rim:RegistryObjectList>
            </lcm:UpdateObjectsRequest>
        </wsnt:Message>
    </wsnt:NotificationMessage>
</wsnt:Notify>
    </s:Body>
</s:Envelope>
```

3.53.4.3.4.2 Notification Message (ihe:ExtendedFolder)

```
<?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">
    <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:UpdateFolder/Deprecate</wsnt:Topic>
                <wsnt:ProducerReference>
                    <a:Address>https://ProducerReference</a:Address>
                </wsnt:ProducerReference>
                <wsnt:Message>
                    <lcm:SubmitObjectsRequest
                        xsi:schemaLocation="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0
../../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">
                        <rim:RegistryObjectList>
                            <rim:RegistryPackage id="Folder01">

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

                            </rim:RegistryPackage>
                            <rim:Classification id="Fol" classifiedObject="Folder01"
                                classificationNode="urn:uuid:d9d542f3-6cc4-48b6-8870-
ea235fbc94c2"/>
                        </rim:RegistryObjectList>
                    </lcm:SubmitObjectsRequest>
                </wsnt:Message>
            </wsnt:NotificationMessage>
        </wsnt:Notify>
    </s:Body>
</s:Envelope>
```

Editor: make the following changes in Section 3.53.5.1.1

	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)			
DocumentEntry/**Folder**/SubmissionSet(1..n)			

…

DocumentEntry **Folder** **SubmissionSet** **(AuditMessage/ ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“2” (system object)
	ParticipantObjectTypeCodeRole	M	“3” (report)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	The Document Metadata Notification Recipient shall include one of the following values, depending on the specific object in the message: EV("urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1”, “IHE XDS Metadata”, “document entry object type”) EV(“urn:uuid:34268e47-fdf5-41a6-ba33-82133c465248”, “IHE XDS Metadata”, “on-demand document entry object type”) **EV("urn:uuid:d9d542f3-6cc4-48b6-8870-ea235fbc94c2”, “IHE XDS Metadata”, “folder classification node”)** EV(urn:uuid:a54d6aa5-d40d-43f9-88c5-b4633d873bdd”, “IHE XDS Metadata”, ”submission set classification node”)
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The value of the object's EntryUUID attribute.
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	C	This element is required, if known: Type: “urn:ihe:iti:xca:2010:homeCommunityId” (literal string) Value: value of the homeCommunityId

Editor: make the following changes in Section 3.53.5.1.2

	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)			
DocumentEntry/**Folder**/SubmissionSet (1..n)			

…

DocumentEntry **Folder** **SubmissionSet** **(AuditMessage/ ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“2” (system object)
	ParticipantObjectTypeCodeRole	M	“3” (report)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	The Document Metadata Notification Broker shall include one of the following values, depending on the specific object in the message: EV("urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1”, “IHE XDS Metadata”, “document entry object type”) EV(“urn:uuid:34268e47-fdf5-41a6-ba33-82133c465248”, “IHE XDS Metadata”, “on-demand document entry object type”) **EV("urn:uuid:d9d542f3-6cc4-48b6-8870-ea235fbc94c2”, “IHE XDS Metadata”, “folder classification node”)** EV(urn:uuid:a54d6aa5-d40d-43f9-88c5-b4633d873bdd”, “IHE XDS Metadata”, ”submission set classification node”)
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The value of the object's EntryUUID attribute.
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	C	This element is required, if known: Type: “urn:ihe:iti:xca:2010:homeCommunityId” (literal string) Value: value of the homeCommunityId

Editor: Apply the following changes in Section 3.54.4

3.54.4 Messages

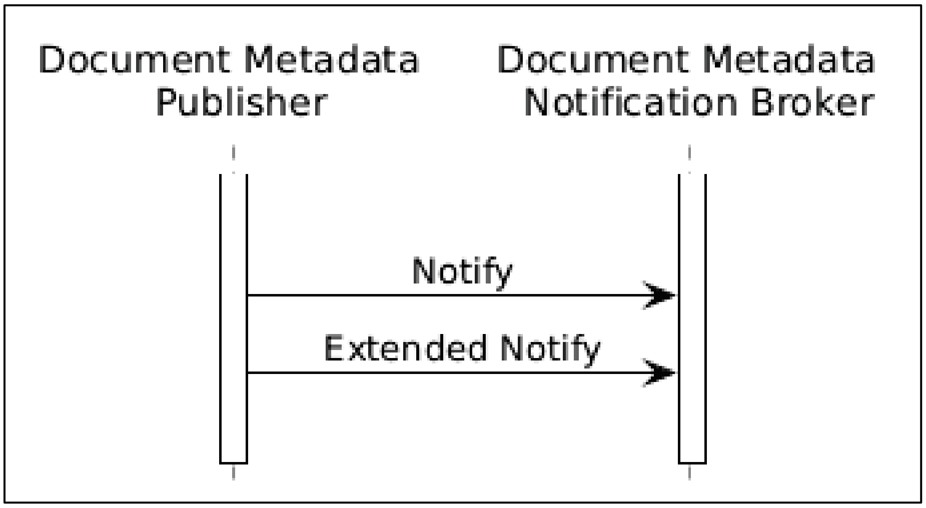

Document Metadata Publisher
Document Metadata Notification Broker
Notify
Extended Notify

Figure 3.54.4-1: Document Metadata Publish Sequence

Editor: make the following changes in Section 3.54.4.1.1

3.54.4.1.1 Trigger

When an event occurs for which a subscription may exist, the Document Metadata Publisher will trigger a Notification message to the Document Metadata Notification Broker. Events that could trigger a notification are publication of or update to a DocumentEntry, **Folder** or SubmissionSet and the deletion of a DocumentEntry or Folder.

Editor: make the following changes in Section 3.54.4.1.2

3.54.4.1.2 Message Semantics

The Document Metadata Publisher shall use a Notify message to communicate published objects to the Document Metadata Notification Broker.

This message shall have one <*NotificationMessage*> *element*.

This element SHALL have two child elements:

- *<ProducerReference>* that identifies the source of the data published.
- *<Message>* that identifies published objects. This element shall have a single child element *<lcm:SubmitObjectsRequest>* that has only one child element *<rim:RegistryObjectList>*. This element conveys a list of SubmissionSet, **Folder,** and DocumentEntry objects.

Note: SubmissionSet **and Folder** objects are constructed from *<rim:RegistryObject>* elements and must include the *<rim:Classification>* **that distinguishes SubmissionSet from Folder objects**.

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

Editor: Add Section 3.54.4.2

3.54.4.2 Extended Notify Message

The Extended Notify Message is sent from the Document Metadata Publisher to the Document Metadata Notification Broker.

The Document Metadata Notification Broker that supports at least one of the following the Options:

- Extended Events Document Metadata Subscription Option, in case of notifications about DocumentEntry objects (see Section 3.52.4.1.3.2);
- Update Events Folder Subscription Option, in case of notifications about Folder objects (see Section 3.52.4.1.3.3).
- Extended Events Folder Subscription Option, in case of notifications about Folder objects (see Section 3.52.4.1.3.4).

Shall be able to create this type of message.

3.54.4.2.1 Trigger

When an event occurs where the topics of the event match the filter requirements of one or more existing subscriptions, the Document Metadata Publisher will trigger an Extended Notify Message to the Document Metadata Notification Broker.

The Document Metadata Publisher shall support the Extended Events Document Metadata Subscription, in case of events matching a subscription created for DocumentEntry objects, and the Update Events Folder Subscription or the Extended Events Folder Subscription, in case of events matching a subscription created for Folder objects. The description of matching subscriptions to events can be found in Section 3.52.5.2.

3.54.4.2.2 Message Semantics

The Extended 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-2: Appendix V.

The Document Metadata Publisher shall use an Extended Notify message to communicate published objects to the Document Metadata Notification Broker Actor.

This message shall have one *wsnt:Notify/wsnt:NotificationMessage* element, which shall have three child elements:

- The element *wsnt:Notify/wsnt:NotificationMessage/wsnt:Topic* has a different value, which depends on the event that triggered the publication. The value of this element is composed by the topic of the subscription (contained in the *TopicExpression* element of the ITI-52) and an ending part that specifies the type of event, as described in the table below:

Table 3.53.4.3.2-1: Topics Combinations for Document Entry Metadata

Event/Topic ITI-52	ihe:FullDocumentEntry	ihe:MinimalDocumentEntry	ihe:ExtendedFullDocumentEntry	ihe:ExtendedMinimalDocumentEntry
New document available (i.e., registration of a Document Entry object)	ihe:FullDocumentEntry	ihe:MinimalDocumentEntry	ihe:ExtendedFullDocumentEntry	ihe:ExtendedMinimalDocumentExtry
Update of the metadata status of a document (i.e., update of the Document Entry status)	-	-	ihe:ExtendedFullDocumentEntry/Deprecate	ihe:ExtendedMinimalDocumentEntry/Deprecate
Delete of a document (i.e., delete of a Documen	-	-	ihe:ExtendedFullDocumentEntry/Delete	ihe:ExtendedMinimalDocumentEntry/Delete

Event/Topic ITI-52	ihe:FullDocumentEntry	ihe:MinimalDocumentEntry	ihe:ExtendedFullDocumentEntry	ihe:ExtendedMinimalDocumentEntry
t Entry object)				
Update of all the metadata of a document (i.e., of the confidentialityCode of a Document Entry object)	-	-	ihe:ExtendedFullDocumentEntry/UpdateMetadata	ihe:ExtendedMinimalDocumentEntry/UpdateMetadata

Table 3.53.4.3.2-2: Topics Combinations for Folder Metadata

Event/Topic ITI-52	ihe:FolderMetadata	ihe:UpdateFolder	ihe:ExtendedFolder
Creation of a new Folder (i.e., the creation of a Folder object)	ihe:FolderMetadata	ihe:UpdateFolder	ihe:UpdateFolder
Insert of a new document in a Folder (i.e., update a Folder object with a new link to a Document Entry object)	ihe:FolderMetadata	ihe:UpdateFolder/UpdateContent	ihe:ExtendedFolder/UpdateContent
Replace of a document in a Folder (i.e., update a Folder object with a new link to a Document Entry object and with the link to the Document Entry object replaced)	ihe:FolderMetadata	ihe:UpdateFolder/UpdateContent	ihe:ExtendedFolder/UpdateContent
Removal of a document from a Folder (i.e., update a Folder object erasing a	-	ihe:UpdateFolder/RemoveDocument	ihe:ExtendedFolder/RemoveDocument

Event/Topic ITI-52	ihe:FolderMetadata	ihe:UpdateFolder	ihe:ExtendedFolder
Document Entry link)			
Update of the metadata a Folder (i.e., the update of a Folder object)	-	ihe:UpdateFolder/UpdateMetadata	ihe:ExtendedFolder/UpdateMetadata
Update of the metadata status of a Folder (i.e., update of the Folder status)	-	ihe:UpdateFolder/Deprecate	ihe:ExtendedFolder/Deprecate
Deletion of a Folder (i.e., the delete of a Folder type List object)	-	-	ihe:ExtendedFolder/Delete

- The element <*ProducerReference*> that identifies the source of the data published. This element conveys the value of the SubmissionSet.sourceId attribute. This attribute shall contain a URI, for example “urn:oid:1.2.3.4.5”.
- The element <*Message*> that identifies published objects. This element shall have a single child element <*lcm:SubmitObjectsRequest*> that has only one child element <*rim:RegistryObjectList*>. This element conveys a list of SubmissionSet, Folder, and DocumentEntry objects.

3.54.4.2.3 Expected Actions

The Document Metadata Notification Broker that supports the Extended Events Document Metadata Subscription Option, the Update Events Folder Subscription Option, or the Extended Events Folder Subscription Option shall evaluate the Publish transaction.

If there are matching subscriptions, the Document Metadata Notification Broker shall send the corresponding Notification transaction to the appropriate Document Metadata Notification Recipients.

3.54.4.2.4 Extended Notify Message 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"
    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0">
    <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://NotificationBroker/xdsBpublish</a:To>
    </s:Header>
    <s:Body>
        <wsnt:Notify
    xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0">
    <wsnt:NotificationMessage>
        <wsnt:Topic Dialect="http://docs.oasis-open.org/wsn/t-1/TopicExpression/Simple"
            >ihe:ExtendedMinimalDocumentEntry/Deprecate</wsnt:Topic>
        <wsnt:ProducerReference>
            <a:Address>urn:oid:1.2.3.4.5</a:Address>
        </wsnt:ProducerReference>
        <wsnt:Message>
            <lcm:SubmitObjectsRequest>
                <rim:RegistryObjectList>
                    <!-- The list of extrinsic objects -->
                    <rim:ExtrinsicObject id="Document01" mimeType="text/xml"
                        objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1">...
</rim:ExtrinsicObject>
                    <!-- The list of RegistryPackage objects -->
                    <rim:RegistryPackage                        objectType="urn:oasis:names:tc:eb
xml-regrep:ObjectType:RegistryObject:RegistryPackage"
                        id="Submission01">
                        <rim:Classification
                            classificationNode="urn:uuid:a54d6aa5-d40d-43f9-88c5-b4633d873bdd"
                            classifiedObject="Submission01"                      objectType="urn:
oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:Classification"
                            id="classification01"/>
                    </rim:RegistryPackage>
                    <rim:RegistryPackage                       objectType="urn:oasis:names:tc:ebx
ml-regrep:ObjectType:RegistryObject:RegistryPackage"
                        id="Folder01">
                        <rim:Classification
                            classificationNode="urn:uuid:d9d542f3-6cc4-48b6-8870-ea235fbc94c2"
                            classifiedObject="Folder01"                          objectType="urn:
oasis:names:tc:ebxml-regrep:ObjectType:RegistryObject:Classification"
                            id="classification02"/>
                    </rim:RegistryPackage>
                </rim:RegistryObjectList>
            </lcm:SubmitObjectsRequest>
        </wsnt:Message>
    </wsnt:NotificationMessage>
</wsnt:Notify>
    </s:Body>
</s:Envelope>
```

Update Vol 2 Sec 3.54.5.1.1 as follows

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)			
DocumentEntry/**Folder**/SubmissionSet(1..n)			

…

DocumentEntry **Folder** **SubmissionSet** **(AuditMessage/ ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“2” (system object)
	ParticipantObjectTypeCodeRole	M	“3” (report)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	The Document Metadata Publisher shall include one of the following values, depending on the specific object in the message: EV("urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1”, “IHE XDS Metadata”, “document entry object type”) EV(“urn:uuid:34268e47-fdf5-41a6-ba33-82133c465248”, “IHE XDS Metadata”, “on-demand document entry object type”) **EV("urn:uuid:d9d542f3-6cc4-48b6-8870-ea235fbc94c2”, “IHE XDS Metadata”, “folder classification node”)** EV(urn:uuid:a54d6aa5-d40d-43f9-88c5-b4633d873bdd”, “IHE XDS Metadata”, ”submission set classification node”)
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The value of the object's EntryUUID attribute.
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	C	This element is required, if known:

			Type: “urn:ihe:iti:xca:2010:homeCommunityId” (literal string) Value: value of the homeCommunityId

Update Vol 2 Sec 3.54.5.1.2 as follows

3.54.5.1.2 Document Metadata Notification Broker 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-54”, “IHE Transactions”, “Document Metadata Publish”)
Source (Document Metadata Publisher) (1)			
Destination (Document Metadata Notification Broker) (1)			
Audit Source (Document Metadata Notification Broker) (1)			
DocumentEntry**/Folder**/SubmissionSet(1..n)			

…

DocumentEntry **Folder** **SubmissionSet** **(AuditMessage/ ParticipantObjectIdentification**	ParticipantObjectTypeCode	M	“2” (System)
	ParticipantObjectTypeCodeRole	M	“3” (report)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	The Document Metadata Publisher shall include one of the following values, depending on the specific object in the message: EV("urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1”, “IHE XDS Metadata”, “document entry object type”) EV(“urn:uuid:34268e47-fdf5-41a6-ba33-82133c465248”, “IHE XDS Metadata”, “on-demand document entry object type”) **EV("urn:uuid:d9d542f3-6cc4-48b6-8870-ea235fbc94c2”, “IHE XDS Metadata”, “folder classification node”)** EV(urn:uuid:a54d6aa5-d40d-43f9-88c5-b4633d873bdd”, “IHE XDS Metadata”, ”submission set classification node”)
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The value of the object's EntryUUID attribute.
	ParticipantObjectName	*U*	*not specialized*

	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	C	This element is required, if known: Type: “urn:ihe:iti:xca:2010:homeCommunityId” (literal string) Value: value of the homeCommunityId

Add Section 3.69

3.69 Create Destroy Pull Point [ITI-69]

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

3.69.1 Scope

This transaction involves a Request by the Notification Puller to the Notification Pull Point 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 also uses this transaction to destroy a Pull Point resource which is no longer needed.

3.69.2 Use Case 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.

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
- WS-BaseFaults
- ITI TF-2: Appendix V

- WS-Addressing OASIS Standard

3.69.4 Messages

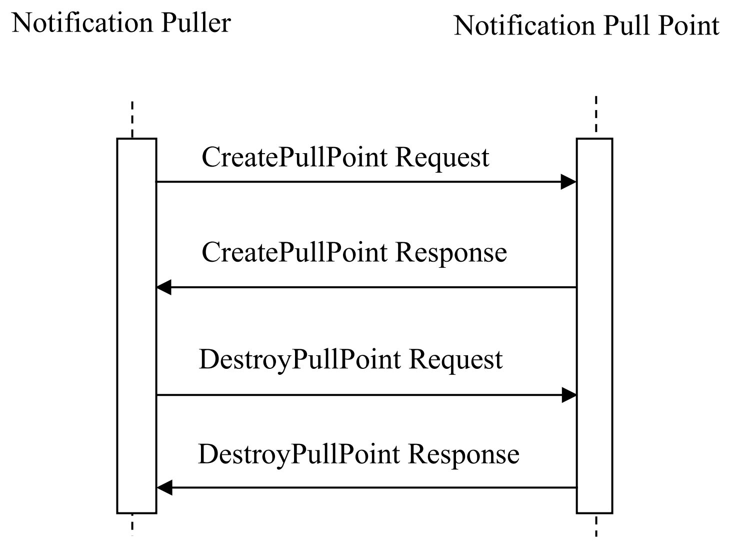


Figure 3.69.4-1: Interaction Diagram

3.69.4.1 CreatePullPoint Request message

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

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

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

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

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

If many Notification Puller Actors are involved in the notification system, the Notification Pull Point is grouped with many Document Metadata Notification Recipient Actors (see Figure 3.69.4.1-1). When a Notification Puller sends a CreatePullPoint Request message, the Notification Pull Point returns an endpoint in the CreatePullPoint Response message. This endpoint is associated with a Document Metadata Notification Recipient. 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.

The Notification Puller 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.

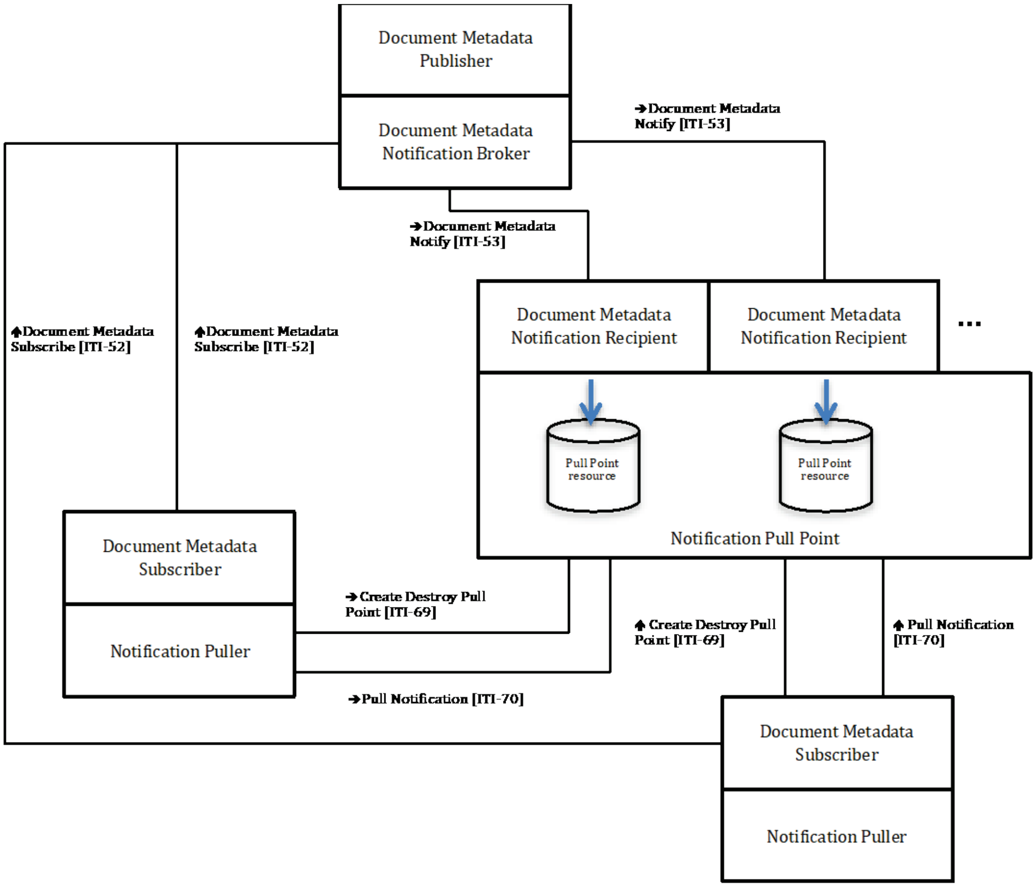

Document Metadata Publisher
Document Metadata Notification Broker
➔Document Metadata Notify [ITI-53]
➔Document Metadata Notify [ITI-53]
🡅Document Metadata Subscribe [ITI-52]
🡅Document Metadata Subscribe [ITI-52]
Document Metadata Notification Recipient
Document Metadata Notification Recipient
...
Pull Point resource
Pull Point resource
Notification Pull Point
Document Metadata Subscriber
Notification Puller
➔Create Destroy Pull Point [ITI-69]
🡅Create Destroy Pull Point [ITI-69]
🡅Pull Notification [ITI-70]
➔Pull Notification [ITI-70]
Document Metadata Subscriber
Notification Puller

Figure 3.69.4.1-1: Pull-style Notification Framework

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.

3.69.4.1.2 Message Semantics

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

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

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

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 SHALL create a new Pull Point resource. The Document Metadata Notification Recipient/Notification Pull Point can act in one of two ways:

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 when it is no longer capable of accumulating notifications is out of scope for this transaction.
2. If the Notification Pull Point 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:
    - 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>
```

3.69.4.2 CreatePullPoint Response message

If the Notification Pull Point can create a Pull Point resource dedicated to the specific Notification Puller, the Notification Pull Point 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 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 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 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 [ITI-53] transaction on the Document Metadata Notification Recipient that is grouped with the Notification Pull Point.

3.69.4.2.3 Expected Actions

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

If the Notification Puller 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.

3.69.4.3.1 Trigger Events

This message is created when the Notification Puller 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 grouped with the Notification Puller starts the process for unsubscribe filters created using the Pull Point resource endpoint as target for notifications created before to start the destruction.

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

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

If the Notification Pull Point does not respond to the DestroyPullPoint Request message 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:

1. If the Pull Point resource identified in the DestroyPullPoint Request message is not known to the Notification Pull Point, it SHALL send a fault specified by the WS-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.

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

The Notification Pull Point responds to the Notification Puller 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 SHALL respond with the DestoryPullPoint Response message.

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

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

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

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 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, because the Broker recognizes as a reputable actor the Document Metadata Notification Recipient.

- Mitigation:
  - 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 Pull Point and Notification Puller SHALL create an Audit Record in accordance to the structure defined below. These events are of type “Application Activity” as defined in ITI TF-2: Table 3.20.4.1.1.1-1. The actors involved in the transaction SHALL create audit data in conformance with DICOM Part 15 “Application Activity”.

3.69.5.1.1 Notification Pull Point audit message

	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)			
Destination (Notification Pull Point) (1)			
Human Requestor (0..1)			
Audit Source (Notification Pull Point) (1)			
Pull Point (1)			

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Where:

Source **(AuditMessage/ ActiveParticipant)**	*UserID*	*U*	*not specialized*
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV (110153, DCM, "Source RoleID")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address

Destination **(AuditMessage/ ActiveParticipant)**	UserID	M	Metadata Notification Pull Point SOAP URI
	AlternativeUserID	M	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 RoleID")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address

Human Requestor **(AuditMessage/ActiveParticipant)**	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	*U*	*not specialized*
	NetworkAccessPointTypeCode	*U*	*not specialized*
	NetworkAccessPointID	*U*	*not specialized*

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

Pull Point **(AuditMessge/ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“2” (system object)
	ParticipantObjectTypeCodeRole	M	“20” (job)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	*U*	*not specialized*
	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

	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)			
Destination (Notification Pull Point) (1)			

Human Requestor (0..1)
Audit Source (Notification Puller) (1)
Pull Point (1)

Where:

Source (AuditMessage/ ActiveParticipant)	*UserID*	*U*	*not specialized*
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV (110153, DCM, “Source RoleID”)
	NetworkAccessPointTypeCode	M	“1” for machine (DNS) name “2” for IP address
	NetworkAccessPointID	M	The machine name or IP address

Destination (AuditMessage/ ActiveParticipant)	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 RoleID”)
	NetworkAccessPointTypeCode	M	“1” for machine (DNS) name “2” for IP address
	NetworkAccessPointID	M	The machine name or IP address

Human Requestor (AuditMessage/ActiveParticipant)	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	*U*	*not specialized*
	NetworkAccessPointTypeCode	*U*	*not specialized*
	NetworkAccessPointID	*U*	*not specialized*

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

Pull Point (AuditMessge/ParticipantObject Identification)	ParticipantObjectTypeCode	M	“2” (system object)
	ParticipantObjectTypeCodeRole	M	“20” (job)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	*U*	*not specialized*
	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*

3.69.5.1.3 Notification Pull Point Actor Specific Security Considerations

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

Add Section 3.70

3.70 Pull Notification [ITI-70]

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.

3.70.1 Scope

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

3.70.2 Use Case Roles

Actor:	Notification Puller
Role:	Sends a request to the Notification Pull Point 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.

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
- WS-Topics 1.3 OASIS Standard
- ITI TF-2: Appendix V
- WS-Addressing OASIS Standard

3.70.4 Messages

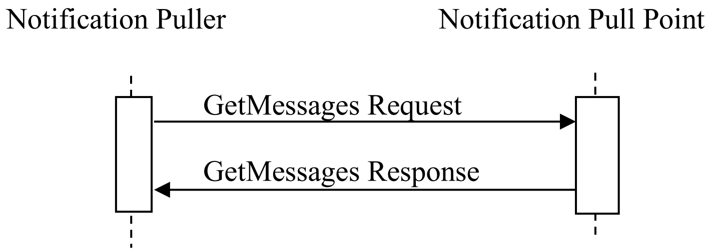

Figure 3.70.4-1: Interaction Diagram

3.70.4.1 GetMessages Request message

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

3.70.4.1.1 Trigger Events

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

3.70.4.1.2 Message Semantics

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

This is a request message to the Notification Pull Point 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:

- **/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 the request message is processed. The Pull Point shall respond to the Notification Puller immediately when the request is processed, returning content stored at that time without waiting for other notifications to 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 patient.

3.70.4.1.3 Expected Actions

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

1. ***The Notification Pull Point resource has no notifications messages stored***. The Notification Pull Point SHALL respond with a GetMessages Response message containing zero Notification Response Messages
2. ***The Notification Pull Point resource has one notification message stored***. The Notification Pull Point SHALL respond with a GetMessage Response containing only one Notification Message into a GetMessages Response message.
3. ***The Notification Pull Point resource stores more than one message***. The Response message convey only one notification message but the Notification Puller is required to start another Notification Pull transaction in order to retrieve all notifications.
4. ***The Pull Point resource is unable to respond to the request***. The Notification Pull Point SHALL send one of these faults:
   - 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 cannot return notifications messages for some unspecified reasons

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

If the Notification Pull Point 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.

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:

- **/wsnt:GetMessagesResponse**: This component contains one Notification Message. The number of messages appearing is limited by the wsnt:MaximumNumber component of 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.
- **/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 [ITI-53] transaction. The GetMessagesResponse message does not define additional constraints on the Notification Message component. The content of the Notification Message is exactly the 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.

3.70.4.2.3 Expected Actions

The Notification Puller 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.

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 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)

Additionally, it is recommended that the Notification Pull transaction be associated with a SAML assertion so that the Notification Puller can outline authorizations to access the notification content (for example, see the XUA Profile ITI TF-1: 13). Only the Notification 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-2: Table 3.20.4.1.1.1-1. 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 to query for instances stored in the Pull Point resource.

3.70.5.1.1 Notification Puller audit message

The Notification Puller MUST send an audit message for each DocumentEntry/Folder/SubmissionSet conveyed in the NotificationMessage element of the GetMessageResponse 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)			
Audit Source (Notification Puller)			
Patient (0..1)			
DocumentEntry/Folder/SubmissionSet (0..n)			

Where:

Source AuditMessage/ ActiveParticipant	*UserID*	*U*	*not specialized*
	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 RoleID”)
	NetworkAccessPointTypeCode	M	“1” for machine (DNS) name, “2” for IP address
	NetworkAccessPointID	M	The machine name or IP address

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*

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 RoleID”)
	NetworkAccessPointTypeCode	M	“1” for machine (DNS) name, “2” for IP address
	NetworkAccessPointID	M	The machine name or IP address

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

Patient (if known) **(AuditMessage/ ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“1” (Person)
	ParticipantObjectTypeCodeRole	M	“1” (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	*U*	*not specialized*
	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*

DocumentEntry Folder SubmissionSet **(AuditMessage/ ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“2” (system object)
	ParticipantObjectTypeCodeRole	M	“3” (report)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	The Notification Puller shall include one of the following values, depending on the specific object being received: EV("urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1”, “IHE XDS Metadata”, “document entry object type”) EV(“urn:uuid:34268e47-fdf5-41a6-ba33-82133c465248”, “IHE XDS Metadata”, “on-demand document entry object type”) EV("urn:uuid:d9d542f3-6cc4-48b6-8870-ea235fbc94c2”, “IHE XDS Metadata”, “folder classification node”) EV(urn:uuid:a54d6aa5-d40d-43f9-88c5-b4633d873bdd”, “IHE XDS Metadata”, ”submission set classification node”)
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The value of the object's EntryUUID attribute.

	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	C	This element is required, if known: Type: “urn:ihe:iti:xca:2010:homeCommunityId” (literal string) Value: value of the homeCommunityId

3.70.5.1.2 Notification Pull Point audit 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)			
Audit Source (notification Pull Point)			
Patient (0..1)			
DocumentEntry/Folder/SubmissionSet (0..n)			

Where:

Source **AuditMessage/** **ActiveParticipant**	*UserID*	*U*	*not specialized*
	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 RoleID”)
	NetworkAccessPointTypeCode	M	“1” for machine (DNS) name, “2” for IP address
	NetworkAccessPointID	M	The machine name or IP address

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 RoleID”)
	NetworkAccessPointTypeCode	M	“1” for machine (DNS) name, “2” for IP address
	NetworkAccessPointID	M	The machine name or IP address

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

Patient **(if known)** **(AuditMessage/ ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“1” (Person)
	ParticipantObjectTypeCodeRole	M	“1” (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	*U*	*not specialized*
	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*

DocumentEntry **Folder** **SubmissionSet** **(AuditMessage/ ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“2” (system object)
	ParticipantObjectTypeCodeRole	M	“3” (report)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	The Notification Pull Point shall include one of the following values, depending on the specific object being returned in the GetMessages Response message: EV("urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1”, “IHE XDS Metadata”, “document entry object type”) EV(“urn:uuid:34268e47-fdf5-41a6-ba33-82133c465248”, “IHE XDS Metadata”, “on-demand document entry object type”)

			EV("urn:uuid:d9d542f3-6cc4-48b6-8870-ea235fbc94c2”, “IHE XDS Metadata”, “folder classification node”) EV(urn:uuid:a54d6aa5-d40d-43f9-88c5-b4633d873bdd”, “IHE XDS Metadata”, ”submission set classification node”)
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The value of the object's EntryUUID attribute.
	ParticipantObjectName	*C*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	C	This element is required, if known: Type: “urn:ihe:iti:xca:2010:homeCommunityId” (literal string) Value: value of the homeCommunityId

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 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.

Add Section 3.120

3.120 Document Subscription Search [ITI-120]

This section corresponds to the transaction [ITI-120] Document Subscription Search of the IHE IT Infrastructure Technical Framework. Transaction [ITI-120] Document Subscription Search is used by the Document Metadata Subscriber and by the Document Metadata Notification Broker Actors.

3.120.1 Scope

The Document Subscription Search transaction provides a message exchange to allow a Document Metadata Subscriber to search for Subscriptions and get back the results from the Document Metadata Notification Broker. This transaction requires a Request created by the Document Metadata Subscriber to discover Subscriptions and to be aware of Subscriptions status.

3.120.2 Use Case Roles

Actor:	Document Metadata Subscriber
Role:	Sends a request to the Document Metadata Notification Broker to search for Subscriptions.
Actor:	Document Metadata Notification Broker
Role:	Receives the request and responds to the Document Metadata Subscriber

3.120.3 Referenced Standards

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

- OASIS/ebXML Registry Information Model v3.0
- OASIS/ebXML Registry Services Specifications v3.0

3.120.4 Messages

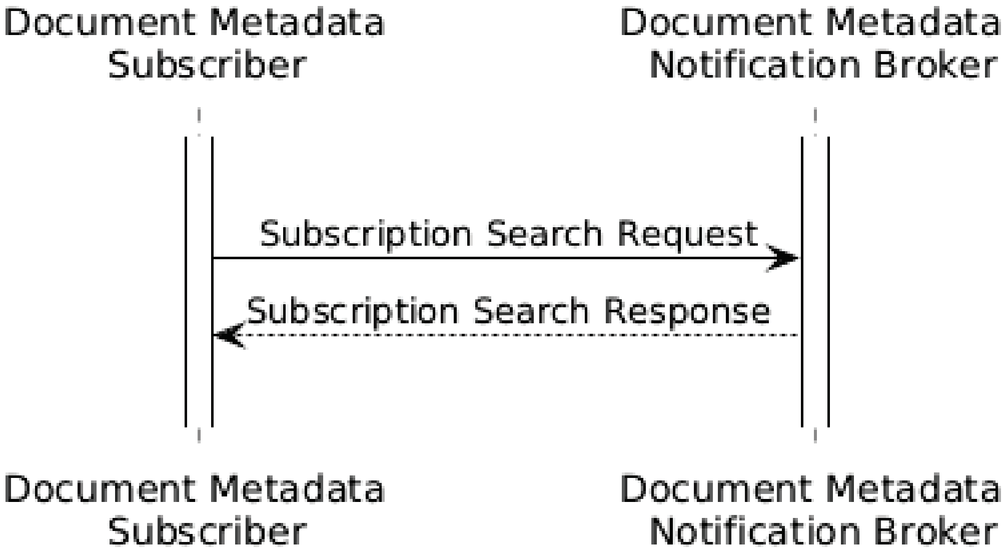
Document Metadata Subscriber
Document Metadata Notification Broker
Subscription Search Request
Subscription Search Response
Document Metadata Subscriber
Document Metadata Notification Broker

Figure 3.120.4-1: Document Subscription Search Sequence

3.120.4.1 Subscription Search Request message

The Document Metadata Subscriber queries the Document Metadata Notification Broker to search for information about Subscriptions.

3.120.4.1.1 Trigger Events

The Document Metadata Subscriber wants to search for information about one or more Subscriptions.

3.120.4.1.2 Message Semantics

The semantics of Stored Query are defined in Section 6.3 *Stored Query Support* of ebRS version 3.0.

This message corresponds to Section 6.3.2 *Invoking a Stored Query*.

The Document Metadata Subscriber sends this request message to the Document Metadata Notification Broker to search for one or more Subscriptions.

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

urn:ihe:iti:dsub:2024:SubscriptionSearchRequest.

3.120.4.1.2.1 Version 3.0 ebXML Registry Standard

This transaction uses ebXML Registry version 3.0.

3.120.4.1.2.2 Query Request Parameters – Coding Style

Document Subscription Search supports the following parameters:

- returnType – 'LeafClass' or 'ObjectRef'
- Query ID – a UUID from Section 3.120.4.1.2.2.2
- Query Parameters – as defined in the subsections under Section 3.120.4.1.2.4 that correspond to the Query ID

3.120.4.1.2.2.1 Parameter returnType

Document Subscription Search supports the following values for the parameter returnType:

- ObjectRef – a list of object UUIDs (references)
- LeafClass – list of XML elements representing the leaf class of the object returned

The 'LeafClass' returnType is meant for returning all the information about the Subscriptions that match the query parameters. This type of query result is self-contained; everything known about the object(s) is returned. The specific query documented in this section describes which object types will be included. ObjectRef elements are also returned. These represent objects not included in the returned object list that are referenced by objects in the returned object list. These ObjectRefs are optional by the registry standard version 3.0.

The 'ObjectRef' returnType returns references to the Subscriptions that match the query. This type of query is recommended when the returned object list could be large. An initial query returning ObjectRefs for all objects of interest followed by secondary queries requesting full metadata (query type LeafClass) is an efficient way to query for large bodies of metadata.

An ObjectRef looks like:

<ObjectRef id="urn:uuid:58a6f841-87b3-4a3e-92fd-a8ffeff98427"/>

3.120.4.1.2.2.2 Subscription Search Query IDs

The standard DSUB queries are assigned the following Query IDs. These IDs are used in the AdhocQueryRequest to reference queries stored on the Document Metadata Notification Broker. Query IDs are in UUID format (RFC4122). An error shall be returned when an unsupported stored query ID is received.

Table 3.120.4.1.2.2.2-1: Subscription Search Query IDs

Query Name	Query ID
GetSubscriptions	urn:uuid:b68a424d-625d-420f-bde7-c5538f22e99f
FindSubscriptions	urn:uuid:d9882216-d44d-43dc-a89f-fda5de7e52ae

3.120.4.1.2.3 Parameter for Subscription Search

The sections below document the queries defined in the Document Subscription Search [ITI-120] transaction. These sections document a collection of Stored Queries. Document Metadata Notification Broker Actors implementing this transaction shall support all queries in this collection and all parameters defined for each query. Document Metadata Subscriber Actors implementing this transaction shall implement one or more of these queries as needed to support the use cases it implements.

Note that dollar sign ($) prefix on query parameters is required by ebRS 3.0.

In the query parameter tables below, each row represents a query parameter. Optional parameters which are not included in the query invocation have no effect on the query. Queries return registry objects that match all the supplied parameters. See Section 3.18.4.1.2.3.5 for information on specifying multiple values for a parameter.

3.120.4.1.2.3.1 GetSubscriptions

Search for a Subscription by using the Subscription Id. Returns the Subscriptions identified by the Subscription id.

Table 3.120.4.1.2.3.1-1: Query Parameters for GetSubscriptions

Parameter Name	Description	Attribute	Opt	Mult
$SubscriptionId	The id of the Subscription	None	R	M

3.120.4.1.2.3.2 FindSubscriptions

Search for a Subscription by using at least one parameter contained in Table 3.120.4.1.2.4.2-1: Parameters for FindSubscriptions, or parameters used in transaction [ITI-52] Document Metadata Subscribe by the Document Metadata Subscriber to create filters for a Subscription (see Section 3.52.5.2 Building Filter Expressions).

Returns the Subscriptions that match the query parameters.

Table 3.120.4.1.2.3.2-1: Query Parameters for FindSubscriptions

Parameter Name	Description	Attribute	Opt	Mult
$SubscriptionStatus	The current status of the Subscription	None	R	M
$SubscriptionUrl	The URI that will receive the notifications	None	O	M
$SubscriptionTopic	The topic of the Subscription	None	O	M
$SubscriptionStartTime	The starting time of the Subscription	None	O	—
$SubscriptionEndTime	The termination time of the Subscription	None	O	—

3.120.4.1.3 Expected Actions

The Document Metadata Notification Broker that received the message SHALL process the request as appropriate and respond to the Document Metadata Subscriber with a Subscription Search Response Message.

After receiving a Subscription Search Request Message, the Document Metadata Notification Broker shall:

- Verify the required parameters are included in the request.
- Errors shall be returned for the following conditions:
  - Unknown query ID (error code XDSUnknownStoredQuery)
  - Required parameter missing (error code XDSStoredQueryMissingParam)

See ITI TF-3: 4.2.4 Error Reporting for additional error codes and general information on formatting error responses.

- Process the query as appropriate and return a Notify message with the Subscriptions that match the query parameters in the request message.

3.120.4.1.4 Example SOAP Encoding of the Subscription Search Request message

```
<s:Envelope ... >
  <s:Header>
    <wsa:Action>
      urn:ihe:iti:2024:BrokerStoredQuery
    </wsa:Action>
    ...
  </s:Header>
  <s:Body>
<query:AdhocQueryRequest xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance"
    xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0">
    <query:ResponseOption returnComposedObjects="true"
returnType="LeafClass"/>
    <rim:AdhocQuery xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0
ebRS/rim.xsd"
        xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
        id="urn:uuid:d9882216-d44d-43dc-a89f-fda5de7e52ae">
        <rim:Slot name="SubscriptionStatus">
            <rim:ValueList>
                <rim:Value>('urn:oasis:names:tc:ebxml-
regrep:ResponseStatusType:Approved')</rim:Value>
            </rim:ValueList>
        </rim:Slot>
        <rim:Slot name="SubscriptionUrl">
            <rim:ValueList>
                <rim:Value>('https://NotificationRecipientServer/xdsBnotifi
cation')</rim:Value>
            </rim:ValueList>
        </rim:Slot>
        <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:AdhocQuery>
</query:AdhocQueryRequest>
  </s:Body>
</s:Envelope>
```

3.120.4.2 Subscription Search Response message

The Document Metadata Notification Broker SHALL respond to the request received from the Document Metadata Subscriber with a Subscription Search Response.

3.120.4.2.1 Trigger Events

This message is created by the Document Metadata Notification Broker after processing the request message received from the Document Metadata Subscriber.

3.120.4.2.2 Message Semantics

The semantics of Stored Query are defined in Section 6.3 *Stored Query Support* of ebRS version 3.0.

This message corresponds to Section 6.3.3 *Response to a Stored Query Invocation*.

The WS-Addressing [action] element of the response of the Subscription Search Response message MUST contain the URI:

urn:ihe:iti:dsub:2024:SubscriptionSearchResponse

Inside the SOAP Body, the contents of the Subscription Search response message are further described as follows:

- The SOAP Body contains one element **/query:AdhocQueryResponse**, that contains one **/rim:RegistryObjectList**.
- When the “returnType” attribute in the request is set to:
  - “ObjectRef”, the **/rim:RegistryObjectList** contains a list of references to the Subscriptions that match the query parameters, in the elements **/rim:ObjectRef** (see Section 3.120.4.1.2.2.1 Parameter returnType).
  - “LeafClass”, the **/rim:RegistryObjectList** contains one element **/rim:Subscription**, which is structured as defined in Section 3.120.4.2.2.1 Required Elements.

3.120.4.2.2.1 Required Elements

The element **/rim:Subscription** contains the following elements:

- a required attribute Subscription/@selector, which represents the id of the Subscription;
- a required attribute Subscription/@status, which represents the current status of the Subscription;
- a required attribute Subscription/@id, which represents the endpoint for the unsubscription;
- a required attribute Subscription/@startTime, that represents the starting time of the Subscription;

- an attribute Subscription/@endTime, that represents the termination time of the Subscription;
- a required element Subscription/NotifyAction/@endPoint, which represents the URI that will receive the notifications;
- a required element Subscription/NotifyAction/@notificationOption, that represents the topic of the Subscription.
- a required list of elements Subscription/Slot, which represents the parameters of the Subscriptions that match the query parameters.

The Document Metadata Notification Broker retrieves the values of the elements of the Subscription Search response message from the information contained in [ITI-52] Document Metadata Subscribe.

3.120.4.2.3 Expected Actions

The Document Metadata Subscriber SHALL be able to process the results contained in the response message.

3.120.4.2.4 Example SOAP Encoding of the Subscription Search Response Message

```
<s:Envelope ... >
  <s:Header>
    <wsa:Action>
      urn:ihe:iti:2024:BrokerStoredQueryResponse
    </wsa:Action>
    ...
  </s:Header>
  <s:Body>
 <query:AdhocQueryResponse status="urn:oasis:names:tc:ebxml-
regrep:ResponseStatusType:Success" xmlns:query="urn:oasis:names:tc:ebxml-
regrep:xsd:query:3.0">
<rim:RegistryObjectList xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance"
    xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0">
    <rim:Subscription selector="urn:uuid:aa2332d0-f8fe-11e0-be50-
0800200c9a66"
        id="https://NotificationRecipientServer/xdsBnotification"
        startTime="2010-05-30T00:00:00.00000Z" endTime="2010-05-
31T00:00:00.00000Z" status="active">
        <rim:Slot name="codingScheme">
            <rim:ValueList>
                <rim:Value>CPT codes</rim:Value>
            </rim:ValueList>
        </rim:Slot>
        <rim:Name>
```

```
            <rim:LocalizedString value="Appendectomy"/>
        </rim:Name>
        <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:NotifyAction
            endPoint="https://NotificationBrokerServer/Subscription/382dcdc
7-8e84-9fdc-8443"
            notificationOption="http://docs.oasis-open.org/wsn/t-
1/TopicExpression/Simple"/>
    </rim:Subscription>
</rim:RegistryObjectList>
</query:AdhocQueryResponse>
  </s:Body>
</s:Envelope>
```

3.120.5 Security Considerations

The risk assessment for the [ITI-120] Document Subscription Search transaction is described in Table 1:26.5-1: DSUB risk assessment (see Section 1:26.5 DSUB Security Considerations).

Document Metadata Notification Broker and Document Metadata Subscribers shall be grouped with a Secure Node or Secure Application in the Audit Trail and Node Authentication (ATNA) Profile.

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 [ITI-120] transaction be associated with a SAML assertion outlining authorizations to the notification content so that the Document Metadata Subscriber will be able to enforce these authorizations (for example, see the Cross-Enterprise User Assertion (XUA) Profile ITI TF-1:13). This recommendation is highly dependent on an XDS Affinity Domain managing roles for its users correctly as most of the authorizations will be based on roles.

3.120.5.1 Audit Record Considerations

The Document Subscription Search [ITI-120] transaction is a Query Information event as defined in Table 3.20.4.1.1.1-1. If a status of PartialSuccess is returned, the Actors involved shall record both a success and a failure audit event. The Actors involved shall record audit events according to the following:

3.120.5.1.1 Document Metadata Subscriber audit 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-120", "IHE Transactions", "Subscription Search")
Source (Document Metadata Subscriber) (1)			
Human Requestor (0..n)			
Destination (Document Metadata Notification Broker) (1)			
Audit Source (Document Metadata Subscriber) (1)			
Patient (0..1)			

Where:

Source **AuditMessage/ ActiveParticipant**	*UserID*	*M*	*not specialized*
	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 Role ID")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address

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*

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 Role ID”)
	NetworkAccessPointTypeCode	M	“1” for machine (DNS) name, “2” for IP address
	NetworkAccessPointID	M	The machine name or IP address

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

Patient **(if known)** **(AuditMessage/ ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“1” (Person)
	ParticipantObjectTypeCodeRole	M	“1” (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	*M*	*not specialized*
	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/ ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“2” (system object)
	ParticipantObjectTypeCodeRole	M	“24” (query)
	ParticipantObjectDataLifeCycle	*U*	not specialized
	ParticipantObjectIDTypeCode	M	EV(“ITI-120”, “IHE Transactions”, “Subscription Search”)
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	Stored Query ID (UUID)
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	U	the AdhocQueryRequest, base64 encoded.
	ParticipantObjectDetail	C	The ParticipantObjectDetail element may occur more than once. In one element, set “QueryEncoding”as the value of the attribute type , Set the attribute value to the character encoding, such as “UTF-8”, used to

			encode the ParticipantObjectQuery before base64 encoding.

3.120.5.1.2 Document Metadata Notification Broker audit 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-120", "IHE Transactions", "Subscribe Search")
Source (Document Metadata Subscriber) (1)			
Destination (Document Metadata Notification Broker) (1)			
Audit Source (Document Metadata Notification Broker) (1)			
Patient (0..1)			
Query Parameters (1)			

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Where:

Source **AuditMessage/ ActiveParticipant**	*UserID*	*M*	*not specialized*
	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 Role ID")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address

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 Role ID")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address

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

Patient **(if known)** **(AuditMessage/ ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“1” (Person)
	ParticipantObjectTypeCodeRole	M	“1” (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	*M*	*not specialized*
	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/ ParticipantObjectIdentification)**	ParticipantObjectTypeCode	M	“2” (system object)
	ParticipantObjectTypeCodeRole	M	“24” (query)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV(“ITI-120”, “IHE Transactions”, “Subscription Search”)
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	Stored Query ID (UUID)
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	M	the AdhocQueryRequest, base64 encoded.
	ParticipantObjectDetail	C	The ParticipantObjectDetail element may occur more than once. In one element, set “QueryEncoding”as the value of the attribute type , Set the attribute value to the character encoding, such as “UTF-8”, used to encode the ParticipantObjectQuery before base64 encoding.