

**Integrating the Healthcare Enterprise**



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**IHE IT Infrastructure  
Technical Framework Supplement**

10

**Document Metadata Subscription  
(DSUB)**

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**Trial Implementation**

20

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25 **Foreword**

This is a supplement to the IHE IT Infrastructure Technical Framework V9.0. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

30 This supplement is published for Trial Implementation on August 31, 2012 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 ITI Infrastructure Technical Framework. Comments are invited and may be submitted at <http://www.ihe.net/iti/iticomments.cfm>.

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

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

40

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

General information about IHE can be found at: [www.ihe.net](http://www.ihe.net)

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

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

The current version of the IHE Technical Framework can be found at: [http://www.ihe.net/Technical\\_Framework/index.cfm](http://www.ihe.net/Technical_Framework/index.cfm)

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## Introduction

105 This supplement contains two related parts. The first part is the Document Metadata Subscription (DSUB) Integration Profile, which describes the use of subscriptions within an XDS Affinity Domain or across communities. A Document Metadata Subscriber may subscribe on behalf of the Document Metadata Notification Recipient to receive notifications about the availability of documents based on specific criteria. A Document Metadata Notification Broker keeps track of the subscriptions and sends the appropriate notifications based on the registration of objects in an XDS Document Registry. Subscriptions exist for a certain period of time and can be cancelled.

110 The second part is a new section for Chapter 4 of Volume 2 of the ITI Technical Framework, which describes a general framework for defining web-services based publish/subscribe interactions. The purpose of this new section is to help other profiles and domains to specify publish/subscribe interactions when needed. The DSUB profile in this supplement is the first use of the general pattern.

## 115 Profile Abstract

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

## 120 Open Issues and Questions

None

## Closed Issues

1. Specify the IHE Publish/subscribe pattern in Volume 2, Chapter 4
- 125 2. This profile uses WS-Notification. Is this choice appropriate? Yes, for both the profile, and the framework
3. Should the Publish/Subscribe Framework (Chapter 4 section) describe XPath as a universal filter language for XML transactions?
4. Notification/Subscription domains and NB cascading
5. Should we extend the topics to include MPQ? Not at this time
- 130 6. Should notifications include document content? Exposure of document content poses challenges. Decision: no document content.
7. Should the DSUB profile support XDR? Out of scope at this time.
8. The XCA environment is supported by this profile.

# **Volume 1 – Integration Profiles**

135 **Glossary**

*Add the following terms to the Glossary:*

140 **Notification Broker** – a system or a module in a publish/subscribe framework, the purpose of which is to process subscription/un-subscription requests, to keep track of existing subscriptions, to receive publish information, and based on the set of filters for each subscription to send a notification about the published information to the appropriate notification recipients.

**Publisher** – a system or a module in a publish/subscribe framework, the purpose of which is to publish information to the notification broker about events for which there may be existing subscriptions.

145 **Subscriber** – a system or a module in a publish/subscribe framework, the purpose of which is to send subscribe and unsubscribe requests to the notification broker on the behalf of a notification recipient. The subscribe request contains a set of filters to determine the information for which the subscription applies.

**Notification Recipient** – a system or a module in a publish/subscribe framework, the purpose of which is to receive and process notifications from the notification broker.

150 **1.7 History of Annual Changes**

*Add the following bullet to the end of the bullet list in Section 1.7*

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

155 **2.1 Dependencies among Integration Profiles**

*Add the following to Table 2-1*

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

*Add the following section to Section 2.2*

160 **2.2.26 Document Metadata Subscription Integration Profile**

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

165

*Add Section 26*

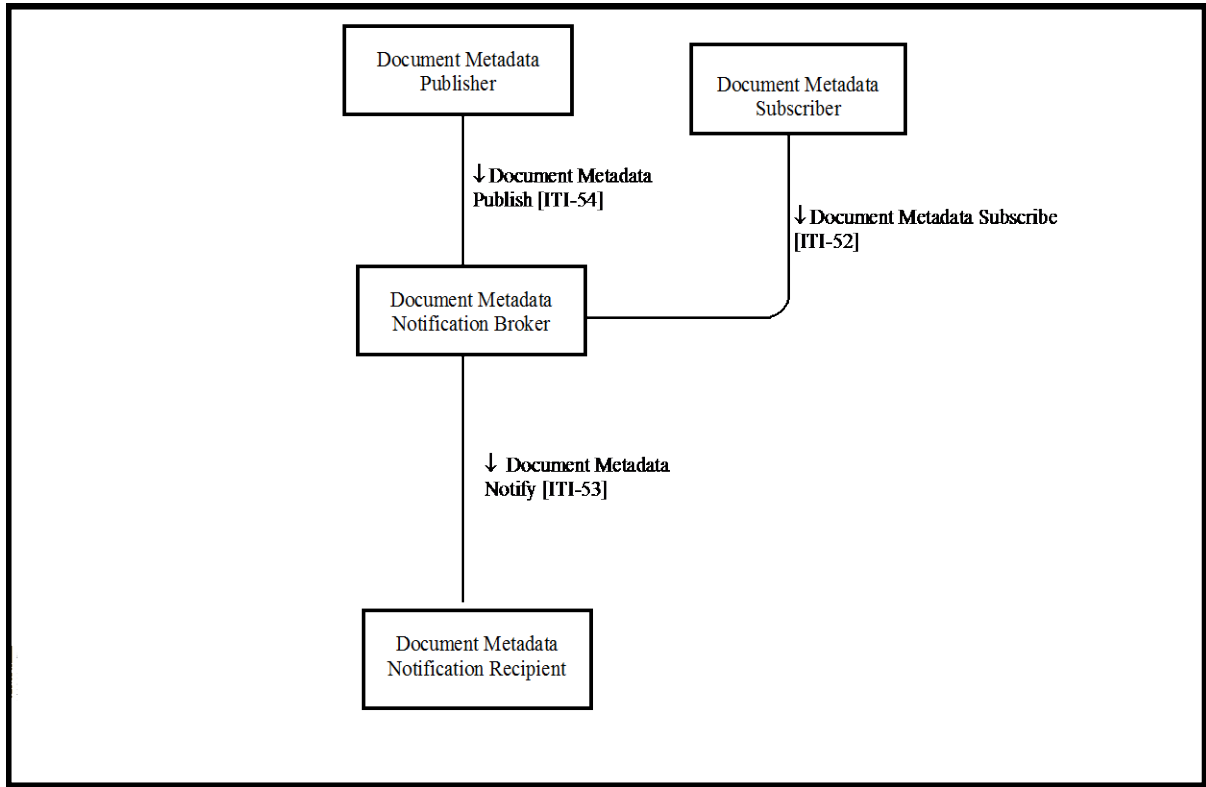
**26 Document Metadata Subscription Integration Profile**

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

**26.1 Actors/ Transactions**

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





**Figure 26.1-1: Document Metadata Subscription Actor Diagram**

180 Table 26.1-1 lists the transactions for each actor directly involved in the Document Metadata Subscription Profile. In order to claim support of this Integration Profile, an implementation must perform the required transactions (labeled “R”). Transactions labeled “O” are optional. A complete list of options defined by this Integration Profile and that implementations may choose to support is listed in Section 26.2.

185

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

Actors	Transactions	Optionality	Section
Document Metadata Notification Broker	Document Metadata Subscribe	R	ITI TF-2b:3.52
	Document Metadata Notify	R	ITI TF-2b:3.53
	Document Metadata Publish	O	ITI TF-2b:3.54
Document Metadata Subscriber	Document Metadata Subscribe	R	ITI TF-2b:3.52
Document Metadata Publisher	Document Metadata Publish	R	ITI TF-2b:3.54

Actors	Transactions	Optionality	Section
Document Metadata Notification Recipient	Document Metadata Notify	R	ITI TF-2b:3.53

## 26.1.1 Actors

### 26.1.1.1 Document Metadata Notification Broker

190 The Document Metadata Notification Broker is the receiver of the Document Metadata  
Subscribe transaction containing a subscription request, or a subscription cancellation. It keeps  
track of all subscriptions in the Metadata Notification domain, including the time limits of  
subscriptions. Based on the metadata associated with document registrations, this actor sends  
195 notifications to interested subscribers. This actor may optionally receive Document Metadata  
Publish Transactions representing the stream of events against which the existing subscriptions  
are matched. Within an XDS Affinity Domain the Document Metadata Notification Broker will  
most likely be grouped with a Document Registry actor. In a cross-community environment, this  
actor will most likely be grouped with Initiating and Responding Gateway Actors.

### 26.1.1.2 Document Metadata Subscriber

200 The Document Metadata Subscriber actor initiates and terminates subscriptions on behalf of a  
Document Metadata Notification Recipient. Within an XDS Affinity Domain the subscriber will  
most likely be grouped with a Document Consumer actor. In a cross-community environment,  
the subscriber will most likely be grouped with an Initiating Gateway Actor.

### 26.1.1.3 Document Metadata Publisher

205 The Document Metadata Publisher actor shall send a Document Metadata Publish transaction to  
the Document Metadata Notification Broker for any event for which a subscription may exist.  
This profile does not specify how the Document Metadata Publisher becomes aware of events  
about new documents becoming available. Within an XDS Affinity Domain the Document  
Metadata Publisher actor will most likely be grouped with a Document Registry actor.

### 210 26.1.1.4 Document Metadata Notification Recipient

This actor receives the notification about an event, when the subscription filters specified for this  
Document Metadata Notification Recipient are satisfied. Within an XDS Affinity Domain this  
actor will very likely be grouped with a Document Consumer. In a cross-community  
environment the Document Metadata Notification Recipient will most likely be grouped with a  
215 Responding Gateway actor.

## 26.1.2 Transactions

### 26.1.2.1 Document Metadata Subscribe

220 This transaction is sent by the Document Metadata Subscriber to the Document Metadata Notification Broker in order to start a subscription for a particular set of topics, indicating possible start and end time for the subscription. Subscriptions cannot be modified. Any subscriber actor can cancel a subscription, as long as they have the subscription id. The subscription request shall specify whether a full notification or a minimal notification will be sent when there is a match to the subscription's filter.

### 26.1.2.2 Document Metadata Notify

225 This is a transaction from the Document Metadata Notification Broker to the Document Metadata Notification Recipients, sending a notification about the availability of a document or documents of interest, based on the subscribers' filters on selected topics.

### 26.1.2.3 Document Metadata Publish

230 This transaction is sent from the Document Metadata Publisher to the Document Metadata Notification Broker when an event occurs for which there may be a subscription.

## 26.2 Document Metadata Subscription Integration Profile Options

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

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

Actor	Options	Vol & Section
Document Metadata Notification Broker	Document Metadata Publish Recipient	ITI TF-1: 26.2.1
Document Metadata Subscriber	<i>No options defined</i>	--
Document Metadata Publisher	<i>No options defined</i>	--
Document Metadata Notification Recipient	<i>No options defined</i>	--

### 26.2.1 Document Metadata Publish Recipient Option

If the Document Metadata Notification Broker supports this option, it shall accept and process Document Metadata Publish transactions, representing applicable events for which there may be valid subscriptions.

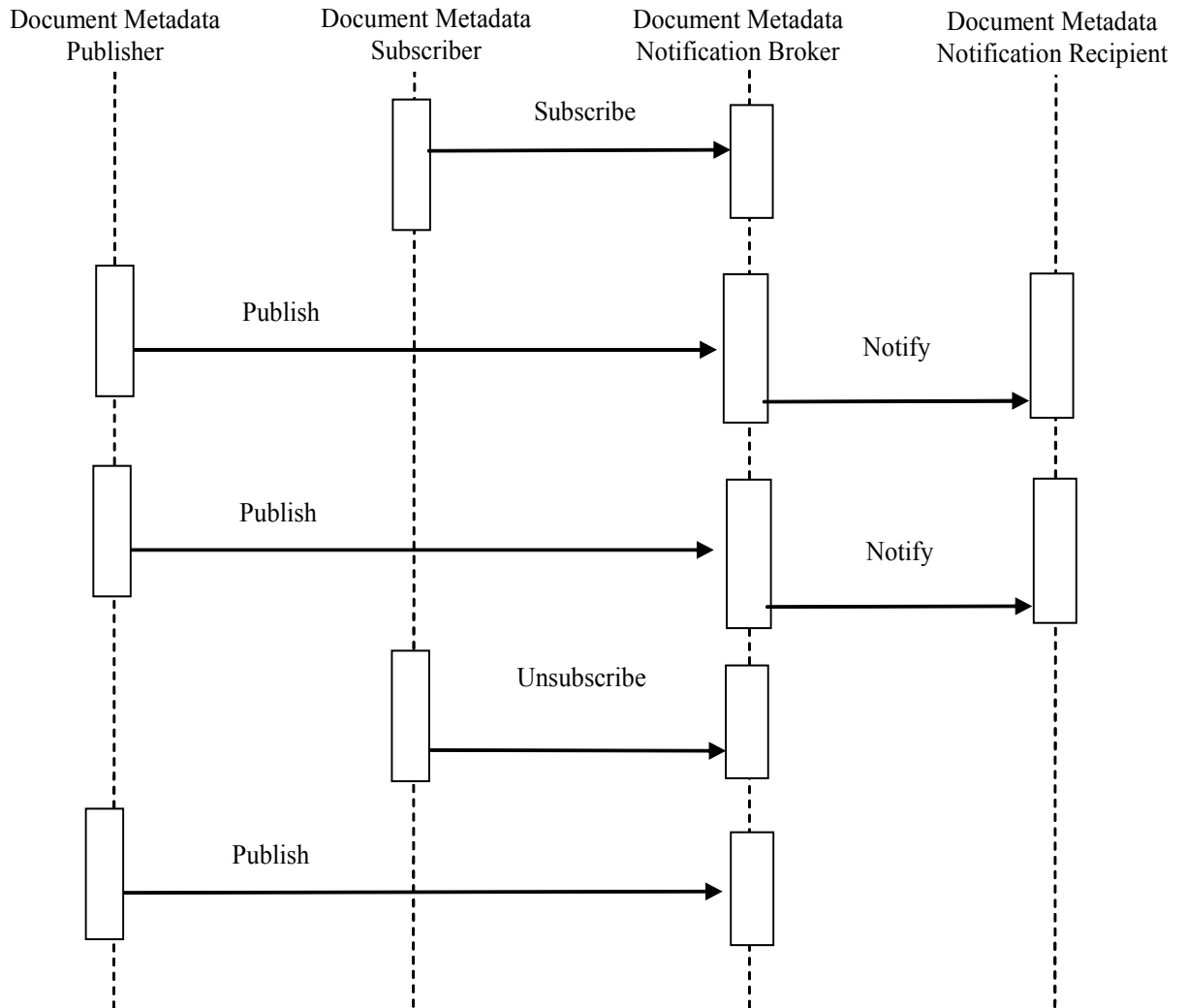
240 **26.3 Grouping**

Each DSUB Actor shall be grouped with Secure Node or Secure Application Actor in order to manage audit trail of exported PHI, node authentication and transport security. As a consequence of this requirement, each DSUB Actor shall be grouped with the Time Client Actor as well.

**26.4 Document Metadata Subscription Process Flow**

245 **26.4.1 Unexpected Notification Use Case**

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



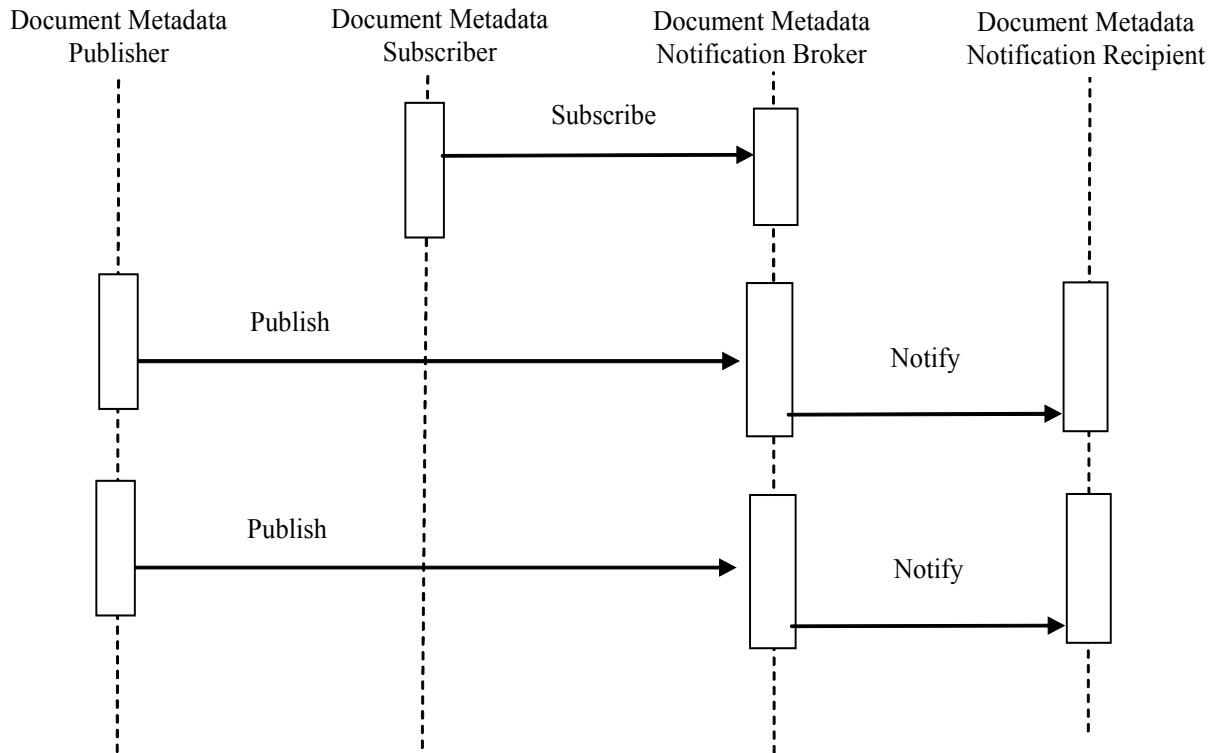
255

Figure 26.4.1-1: Interaction Diagram for Use Case 26.4.1

### 26.4.2 Long-term Subscription Use Case

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

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



270

**Figure 26.4.2-1: Interaction Diagram for Use Case 26.4.2**

### 26.4.3 Antepartum Record Availability Use Case

From the Ante-partum Record profile under development in the PCC Technical Committee:

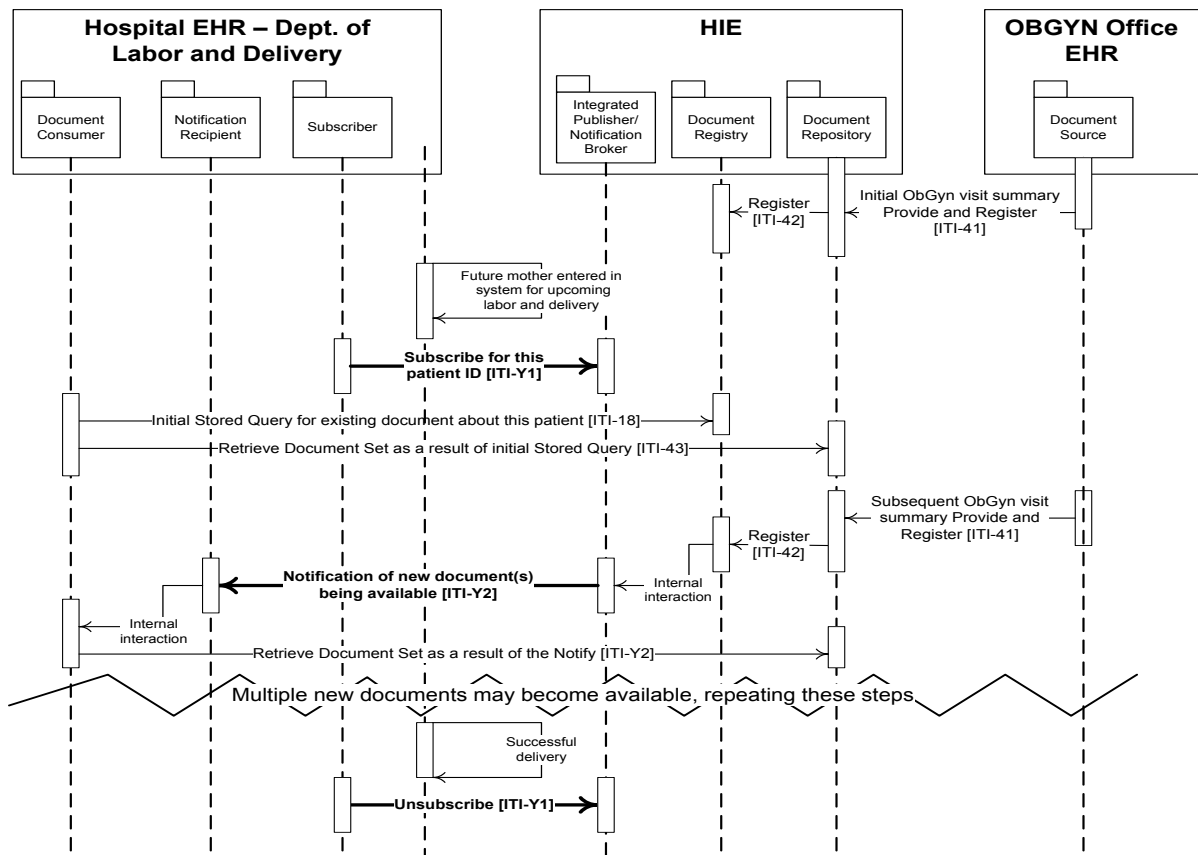
During the 40 weeks of a typical pregnancy duration, the patient will have an initial History and Physical Examination, followed by repetitive office visits with multiple laboratory studies, imaging (usually ultrasound) studies, and serial physical examinations with recordings of vital signs, fundal height, and the fetal heart rate. As the patient is seen over a finite period in the office, aggregation of specific relevant data important to the evaluation of the obstetric patient upon presentation to Labor and Delivery is captured on paper forms. The Antepartum record contains the most critical information needed including the ongoing Medical Diagnoses, the Estimated Due Date, outcomes of any prior pregnancies, serial visit data on the appropriate

growth of the uterus and assessments of fetal well-being, authorizations, laboratory and imaging studies. This data must all be presented and evaluated upon entry to the Labor and Delivery Suite to ensure optimal care for the patient and the fetus.

275 Once the electronic means of communicating the Antepartum Record are established via this new profile, the ability of the PCC Content Consumer to establish a subscription for the Antepartum Record updates for a given expectant mother will enhance the ability to automate the delivery of the information in a timely manner.

The following diagram illustrates the process flow within an XDS Affinity Domain reflecting the use case presented in Section 26.4.3:

280



**Figure 26.4.3-1: Interaction diagram**

285 The above interaction diagram is showing a grouping of a Document Consumer, a Document Metadata Notification Recipient, and a Document Metadata Subscriber actor on one side, and a grouping of a Document Registry, a Document Repository and an Integrated Document Metadata Publisher/Notification Broker actor on the other side. The emphasized transactions are

described in this profile, while the interactions with the grouped XDS actors are also shown. Note that the grouping presented here is not required.

## 290 **26.5 Document Metadata Subscription Security Considerations**

The risk analysis for this profile enumerates assets, threats, and mitigations. The risk assessment spreadsheet is stored and available from IHE at [http://wiki.ihe.net/images/4/46/DSUB\\_risk\\_assesment.xls](http://wiki.ihe.net/images/4/46/DSUB_risk_assesment.xls).

295 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.

300 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.)

305 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).

Specific security considerations are presented in the security section of each transaction in Volume 2b.



310 **Appendix A Actor Summary Definitions**

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

**Document Metadata Subscriber** – The Document Metadata Subscriber actor initiates and terminates subscriptions on behalf of a Document Metadata Notification Recipient.

320 **Document Metadata Publisher** – The Document Metadata Publisher actor shall send a Document Metadata Publish transaction to the Document Metadata Notification Broker for any event for which a subscription may exist.

**Document Metadata Notification Recipient** – This actor receives the notification about an event, when the subscription filters specified for this Document Metadata Notification Recipient  
325 are satisfied.

## Appendix B Transaction Summary Definitions

330 **52. Document Metadata Subscribe:** This transaction is sent by the Document Metadata Subscriber to the Document Metadata Notification Broker in order to start a subscription for a particular set of topics, indicating possible start and end time for the subscription. Subscriptions cannot be modified. Any subscriber actor can cancel a subscription, as long as they have the subscription id. The subscription request shall specify whether a full notification or a minimal notification will be sent when there is a match to the subscription's filter.

335 **53. Document Metadata Notify:** This is a transaction from the Document Metadata Notification Broker to the Document Metadata Notification Recipients, sending a notification about the availability of a document or documents of interest, based on the subscribers' filters on selected topics.

340 **54. Document Metadata Publish:** This transaction is sent from the Document Metadata Publisher to the Document Metadata Notification Broker when an event occurs for which there may be a subscription.

## Volume 2 - Transactions

*Add Section 3.52*

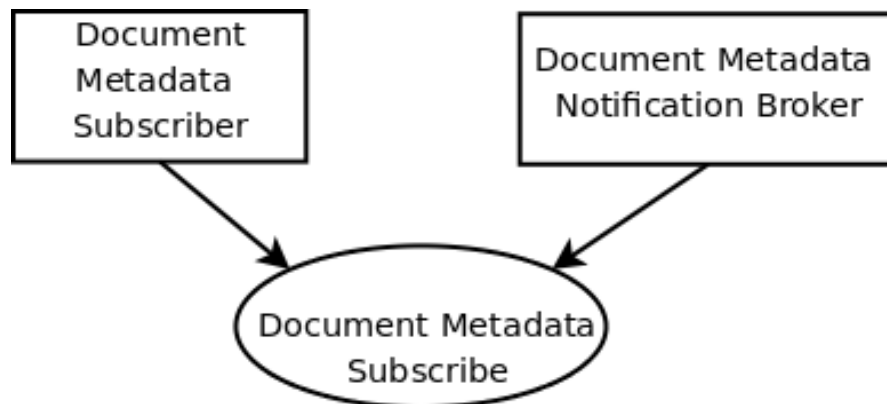
### 3.52 Document Metadata Subscribe

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

#### 3.52.1 Scope

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

#### 3.52.2 Use Case Roles



**Actor:** Document Metadata Subscriber

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

**Actor:** Document Metadata Notification Broker

**Role:** Manages subscriptions of Document Metadata Notification Recipients

#### 3.52.3 Referenced Standards

360 [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](#)

[IHE ITI TF-2a: 3.18 - Registry Stored Query Transaction](#)

365

[IHE ITI TF-2x: Appendix V](#)

### 3.52.4 Interaction Diagram

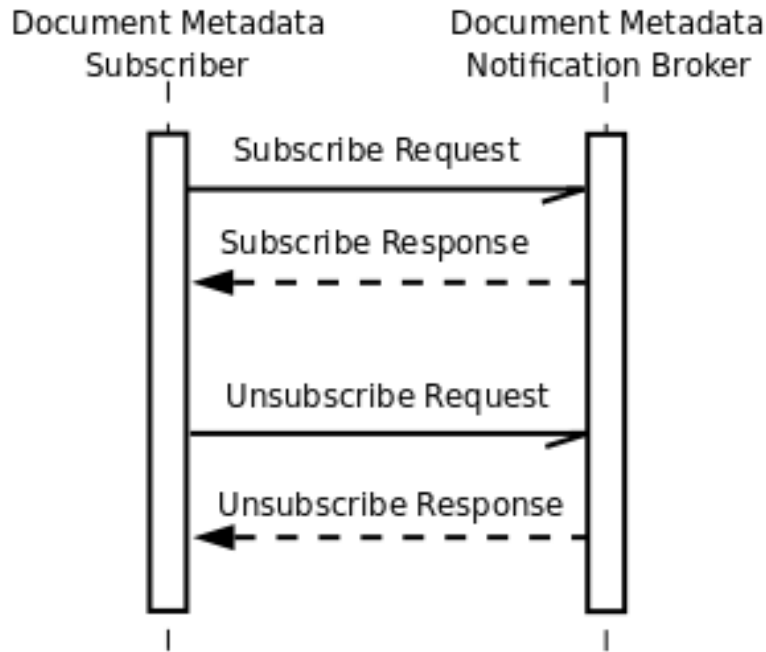


Figure 3.52.4-1: Document Metadata Subscribe Sequence

#### 3.52.4.1 Subscribe Request Message

##### 370 3.52.4.1.1 Trigger

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

##### 3.52.4.1.2 Message Semantics

375 The Subscribe Request message shall comply with the requirements in the WS-BaseNotification standard as described in ITI TF-3: 4.4.2.1.4.1.2.

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

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

### 380 3.52.4.1.3 Expected Actions

The expected actions are described in ITI TF-3: 4.4.2.1.4.1.3.

### 3.52.4.1.4 Example

```
385 <?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-
390 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-
395 2/NotificationProducer/SubscribeRequest</a:Action>
    <a:MessageID>382dcdc7-8e84-9fdc-8443-48fd83bca938</a:MessageID>
  </s:Header>
  <s:Body>
    <wsnt:Subscribe>
400 <!-- 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>
405 </wsnt:ConsumerReference>
    <wsnt:Filter>
      <wsnt:TopicExpression Dialect="http://docs.oasis-open.org/wsn/t-
1/TopicExpression/Simple">ihe:MinimalDocumentEntry</wsnt:TopicExpression>
      <rim:AdhocQuery id="urn:uuid:aa2332d0-f8fe-11e0-be50-0800200c9a6">
410 <rim:Slot name="$XDSDocumentEntryPatientId">
        <rim:ValueList>
<rim:Value>'st3498702^^^&1.3.6.1.4.1.21367.2005.3.7&ISO'</rim:Value>
          </rim:ValueList>
        </rim:Slot>
415 <rim:Slot name="$XDSDocumentEntryHealthcareFacilityTypeCode">
          <rim:ValueList>
            <rim:Value>('Emergency Department')</rim:Value>
          </rim:ValueList>
        </rim:Slot>
420 </rim:AdhocQuery>
      </wsnt:Filter>
      <wsnt:InitialTerminationTime>2010-05-31T00:00:00.00000Z</wsnt:InitialTerminationTime>
    </wsnt:Subscribe>
425 </s:Body>
</s:Envelope>
```

### 3.52.4.2 Subscribe Response Message

#### 3.52.4.2.1 Trigger

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

### 3.52.4.2.2 Message Semantics

The message semantics are described in ITI TF-3: 4.4.2.1.4.2.2.

### 3.52.4.2.3 Expected Actions

The expected actions are described in ITI TF-3: 4.4.2.1.4.2.3.

### 435 3.52.4.2.4 Example

```
440 <?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:dsub:2009"
      xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
445 envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
      http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
      <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
450 2/NotificationProducer/SubscribeResponse</a:Action>
      </s:Header>
      <s:Body>
        <wsnt:SubscribeResponse>
          <!-- A WS-Addressing endpoint, where modification and cancelation requests for this
455 subscription must be sent -->
          <wsnt:SubscriptionReference>
            <a:Address>https://NotificationBrokerServer/Subscription/</a:Address>
            <a:ReferenceParameters>
              <ihe:SubscriptionId>382dc7-8e84-9fdc-8443-48fd83bca938</ihe:SubscriptionId>
              </a:ReferenceParameters>
            </wsnt:SubscriptionReference>
            <wsnt:TerminationTime>2008-05-31T00:00:00Z</wsnt:TerminationTime>
460 </wsnt:SubscribeResponse>
          </s:Body>
        </s:Envelope>
```

### 3.52.4.3 Unsubscribe Request Message

#### 3.52.4.3.1 Trigger

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

#### 3.52.4.3.2 Message Semantics

The message semantics are described in ITI TF-3: 4.4.2.1.4.3.2.

#### 3.52.4.3.3 Expected Actions

470 The expected actions are described in ITI TF-3: 4.4.2.1.4.3.3.

#### 3.52.4.3.4 Example

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
475 <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:dsub:2009"
      xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
480 envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
      http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
    <s:Header>
      <a:Action>http://docs.oasis-open.org/wsn/bw-
485 2/SubscriptionManager/UnsubscribeRequest</a:Action>
      <a:MessageID>382dc9-8e86-9fde-8445-48fd83bca93a</a:MessageID>
      <a:To>https://NotificationBrokerServer/Subscription</a:To>
      <ihe:SubscriptionId a:IsReferenceParameter="true">382dc7-8e84-9fdc-8443-
490 48fd83bca938</ihe:SubscriptionId>
    </s:Header>
    <s:Body>
      <wsnt:Unsubscribe/>
    </s:Body>
  </s:Envelope>
```

### 3.52.4.4 Unsubscribe Response Message

#### 3.52.4.4.1 Trigger

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

#### 3.52.4.4.2 Message Semantics

The message semantics are described in ITI TF-3: 4.4.2.1.4.4.2.

#### 3.52.4.4.3 Expected Actions

500 The actions are described in ITI TF-3: 4.4.2.1.4.4.3.

The Document Metadata Notification Broker shall cancel the corresponding subscription.

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

#### 3.52.4.4.4 Example

```
505 <?xml version="1.0" encoding="UTF-8"?>
  <s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
    xmlns:a="http://www.w3.org/2005/08/addressing"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
    xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
510 envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
    http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
    <s:Header>
      <a:Action>http://docs.oasis-open.org/wsn/bw-
515 2/SubscriptionManager/UnsubscribeRequest</a:Action>
    </s:Header>
    <s:Body>
      <wsnt:UnsubscribeResponse/>
    </s:Body>
  </s:Envelope>
```

520

```
</s:Body>  
</s:Envelope>
```

### 3.52.5 Subscription Topics and Filter Expressions

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

525

#### 3.52.5.1 Topics

This transaction defines simple topics as described in the WS-Topics specification. The Document Metadata Notification Broker shall support the following topics in a Document Metadata Subscribe Request, and the Document Metadata Subscriber may support a subset of these:

530

##### 3.52.5.1.1 ihe:FullDocumentEntry

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

##### 3.52.5.1.2 ihe:MinimalDocumentEntry

535

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

### 3.52.5.2 Building Filter Expressions

540

The XDS metadata, specified in ITI TF-3: 4.1, describes the objects which are used in a document registration. The Registry Stored Query transaction [ITI-18] uses a subset of the metadata to build a list of queries available to a XDS Document Consumer to search for documents with specific characteristics. The list of queries is in ITI TF-2a: 3.18.4.1.2.3.7. This transaction limits the filtering expression to only a subset of the parameters of the FindDocuments query defined within the Registry Stored Query transaction and uses the syntax of the FindDocuments query to express the filter.

545

550

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 Document Entry 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 in an event.



555 A match means that if a FindDocuments 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 from the event, the result of this Stored Query contains one or more of the Document Entry Objects.

560 In an XDS Affinity Domain context, the applicable events are likely to be Register Document Set transactions containing one or more Document Entry objects. In a cross-community context, the applicable events are defined by the XCA gateway and out of scope for this profile. In the latter 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, in an XDS Affinity Domain context, the stored query

```
565 <rim:AdhocQuery id="urn:uuid:aa2332d0-f8fe-11e0-be50-0800200c9a6"
xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0">
  <rim:Slot name="$XDSDocumentEntryPatientId">
    <rim:ValueList>
      <rim:Value>'st3498702^^^&1.3.6.1.4.1.21367.2005.3.7&ISO'</rim:Value>
    </rim:ValueList>
  </rim:Slot>
  <rim:Slot name="$XDSDocumentEntryEventCodeList">
    <rim:ValueList>
      <rim:Value>('44950' '44955' '44960' '44970' '44979')</rim:Value>
    </rim:ValueList>
  </rim:Slot>
575 </rim:AdhocQuery>
```

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

```
585 <lcm:SubmitObjectsRequest>
  <rim:RegistryObjectList>
    <rim:ExtrinsicObject id="Document01" mimeType="text/xml" objectType="urn:uuid:7edca82f-
054d-47f2-a032-9b2a5b5186c1">
    ...
    <rim:Classification classificationScheme="urn:uuid:2c6b8cb7-8b2a-4051-b291-
590 b1ae6a575ef4" classifiedObject="Document01" nodeRepresentation="44950">
      <rim:Name>
        <rim:LocalizedString value="Appendectomy"/>
      </rim:Name>
      <rim:Slot name="codingScheme">
        <rim:ValueList>
          <rim:Value>CPT codes</rim:Value>
        </rim:ValueList>
      </rim:Slot>
      </rim:Classification>
595 ...
600 <rim:ExternalIdentifier id="ei01" registryObject="Document01"
identificationScheme="urn:uuid:58a6f841-87b3-4a3e-92fd-a8ffeff98427"
value="'st3498702^^^&1.3.6.1.4.1.21367.2005.3.7&ISO'">
  <rim:Name>
```

605

```
        <rim:LocalizedString value="XSDDocumentEntry.patientId"/>
        </rim:Name>
        </rim:ExternalIdentifier>
```

...

610

```
        <rim:ExtrinsicObject>
        </rim:RegistryObjectList>
</lcm:SubmitObjectsRequest>
```

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

615

```
<?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>
  </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:FullDocumentEntry</wsnt:TopicExpression>
        <rim:AdhocQuery id="urn:uuid:aa2332d0-f8fe-11e0-be50-0800200c9a6">
          <rim:Slot name="$XSDDocumentEntryPatientId">
            <rim:ValueList>
              <rim:Value>'st3498702^^^&1.3.6.1.4.1.21367.2005.3.7&ISO'</rim:Value>
            </rim:ValueList>
          </rim:Slot>
          <rim:Slot name="$XSDDocumentEntryEventCodeList">
            <rim:ValueList>
              <rim:Value>('44950' '44955' '44960' '44970' '44979')</rim:Value>
            </rim:ValueList>
          </rim:Slot>
        </rim:AdhocQuery>
      </wsnt:Filter>
      <wsnt:InitialTerminationTime>2008-07-31T00:00:00.00000Z</wsnt:InitialTerminationTime>
    </wsnt:Subscribe>
  </s:Body>
</s:Envelope>
```

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The actual implementation of how the Document Metadata Notification Broker evaluates the filter expression, and how it performs the matching against the existing subscriptions, is out of scope of this profile. It is expected that such implementation details will allow vendors to differentiate themselves in the marketplace.

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

#### 3.52.5.2.1 Subscriptions based on FindDocuments query

665 Document Metadata Notification Brokers that accept a Subscribe Request containing filter expressions based on the FindDocuments stored query shall yield a match as described earlier in this section. Note that the parameters to the Find Documents stored query which are not listed below do not have clear applicability as a filter expression.

- 670 1. **\$XDSDocumentEntryPatientId**: this required parameter contains the patient ID for which a document entry is being registered in the XDS Document Registry
2. **\$XDSDocumentEntryClassCode**: this parameter matches against the **XDSDocumentEntry.classCode** metadata elements in a given registry submission
3. **\$XDSDocumentEntryPracticeSettingCode**: this parameter matches against the **XDSDocumentEntry.practiceSettingCode** metadata elements in a given registry submission
- 675 4. **\$XDSDocumentEntryHealthcareFacilityTypeCode**: this parameter matches against the **XDSDocumentEntry.healthcareFacilityTypeCode** metadata elements in a given registry submission
5. **\$XDSDocumentEntryEventCodeList**: this parameter matches against the **XDSDocumentEntry.eventCodeList** metadata elements in a given registry submission
- 680 6. **\$XDSDocumentEntryConfidentialityCode**: this parameter matches against the **XDSDocumentEntry.confidentialityCode** metadata elements in a given registry submission
7. **\$XDSDocumentEntryFormatCode**: this parameter matches against the **XDSDocumentEntry.formatCode** metadata elements in a given registry submission
- 685 8. **\$XDSDocumentEntryAuthorPerson**: this parameter matches against the **XDSDocumentEntry.author** metadata elements in a given registry submission. All properties of this parameter specified in ITI TF-2a: 3.18.4.1.2.3.7.1 are applicable in this transaction.

690

#### 3.52.5.3 Combining topics and filter expressions

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

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

- the values for all specified query parameters must match (AND all different parameters)
  - at least one of the values of multi-valued parameters must match (OR the values in a multi-valued query parameter)
- 700

### 3.52.6 Security Considerations

705 The risk assessment for the Document Metadata Subscribe transaction is described in the risk assessment spreadsheet for the Document Metadata Subscription profile, which is available from IHE at [http://wiki.ihe.net/images/4/46/DSUB\\_risk\\_assesment.xls](http://wiki.ihe.net/images/4/46/DSUB_risk_assesment.xls). The derived mitigations are as follows:

- Document Metadata Subscriber and Document Metadata Notification Broker shall be grouped with an ATNA Secure Node or Secure Application actor for Node Authentication and Audit Trails
  - The use of encrypted TLS is recommended when the transmission is not otherwise secured (e.g. transmission over a secure network)
- 710

715 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
- 720

#### 3.52.6.1 Audit Record Considerations

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

**3.52.6.1.1 Document Metadata Subscriber audit message:**

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

Where:

<b>Source</b> AuditMessage/ ActiveParticipant	UserID	C	When WS-Addressing is used: <ReplyTo/>
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	U	not specialized
	UserIsRequestor	M	"true"
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.
<b>Human Requestor (if known)</b> AuditMessage/ ActiveParticipant	UserID	M	Identity of the human that initiated the transaction.
	AlternativeUserID	U	not specialized
	UserName	U	not specialized
	UserIsRequestor	M	"true"
	RoleIDCode	U	Access Control role(s) the user holds that allows this transaction.
	NetworkAccessPointTypeCode	NA	
	NetworkAccessPointID	NA	

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

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<b>Audit Source</b> <i>AuditMessage/</i> <i>AuditSourceIdentification</i>	<i>AuditSourceID</i>	<i>U</i>	<i>Not specialized.</i>
	<i>AuditEnterpriseSiteID</i>	<i>U</i>	<i>not specialized</i>
	<i>AuditSourceTypeCode</i>	<i>U</i>	<i>not specialized</i>

<b>Patient (if known)</b> <i>(AuditMessage/</i> <i>ParticipantObjectIdentification)</i>	<i>ParticipantObjectTypeCode</i>	<i>M</i>	<i>“1” (Person)</i>
	<i>ParticipantObjectTypeCodeRole</i>	<i>M</i>	<i>“1” (Patient)</i>
	<i>ParticipantObjectDataLifeCycle</i>	<i>U</i>	<i>not specialized</i>
	<i>ParticipantObjectIDTypeCode</i>	<i>M</i>	<i>EV(2, RFC-3881, “Patient Number”)</i>
	<i>ParticipantObjectSensitivity</i>	<i>U</i>	<i>not specialized</i>
	<b>PARTICIPANTOBJECTID</b>	<i>M</i>	<i>The patient ID in HL7 CX format.</i>
	<i>ParticipantObjectName</i>	<i>U</i>	<i>not specialized</i>
	<b>PARTICIPANTOBJECTQUERY</b>	<i>U</i>	<i>not specialized</i>
	<i>ParticipantObjectDetail</i>	<i>U</i>	<i>not specialized</i>
<b>Query Parameters</b> <i>(AuditMessage/</i> <i>ParticipantObjectIdentification)</i>	<i>ParticipantObjectTypeCode</i>	<i>M</i>	<i>“2” (system object)</i>
	<i>ParticipantObjectTypeCodeRole</i>	<i>M</i>	<i>“24” (query)</i>
	<i>ParticipantObjectDataLifeCycle</i>	<i>U</i>	<i>not specialized</i>
	<b>PARTICIPANTOBJECTIDTYPECODE</b>	<i>M</i>	<i>EV(“ITI-52”, “IHE Transactions”, “Document Metadata Subscribe”)</i>
	<i>ParticipantObjectSensitivity</i>	<i>U</i>	<i>not specialized</i>
	<b>PARTICIPANTOBJECTID</b>	<i>U</i>	<i>not specialized</i>
	<i>ParticipantObjectName</i>	<i>C</i>	<i>If known the value of &lt;ihe:HomeCommunityId/&gt;</i>
	<b>PARTICIPANTOBJECTQUERY</b>	<i>M</i>	<i>the value of &lt;wsnt:Filter&gt; element, base64 encoded.</i>
	<i>ParticipantObjectDetail</i>	<i>U</i>	<i>not specialized</i>

### 3.52.6.1.2 Document Metadata Notification Broker audit message:

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

Where:

IHE IT Infrastructure Technical Framework Supplement – Document Metadata Subscription (DSUB)

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

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

735

<b>Audit Source</b> <i>AuditMessage/AuditSourceIdentification</i>	<i>AuditSourceID</i>	U	<i>Not specialized.</i>
	<i>AuditEnterpriseSiteID</i>	U	<i>not specialized</i>
	<i>AuditSourceTypeCode</i>	U	<i>not specialized</i>

<b>Patient (If known)</b> <i>(AuditMessage/ParticipantObjectIdentification)</i>	ParticipantObjectTypeCode	M	“1” (Person)
	ParticipantObjectTypeCodeRole	M	“1” (Patient)
	<i>ParticipantObjectDataLifeCycle</i>	U	<i>not specialized</i>
	ParticipantObjectIDTypeCode	M	EV(2, RFC-3881, “Patient Number”)
	<i>ParticipantObjectSensitivity</i>	U	<i>not specialized</i>
	<b>PARTICIPANTOBJECTID</b>	M	The patient ID in HL7 CX format.
	<i>ParticipantObjectName</i>	U	<i>not specialized</i>
	<b>PARTICIPANTOBJECTQUERY</b>	U	<i>not specialized</i>
	<i>ParticipantObjectDetail</i>	U	<i>not specialized</i>
<b>Query Parameters</b> <i>(AuditMessage/ParticipantObjectIdentification)</i>	ParticipantObjectTypeCode	M	“2” (system object)
	ParticipantObjectTypeCodeRole	M	“24” (query)
	<i>ParticipantObjectDataLifeCycle</i>	U	<i>not specialized</i>
	ParticipantObjectIDTypeCode	M	EV(“ITI-52”, “IHE Transactions”, “Document Metadata Subscribe”)
	<i>ParticipantObjectSensitivity</i>	U	<i>not specialized</i>
	<b>PARTICIPANTOBJECTID</b>	U	<i>not specialized</i>
	<b>PARTICIPANTOBJECTQUERY</b>	M	the value of <wsnt:Filter> element, base64 encoded.

	<i>ParticipantObjectDetail</i>	<i>U</i>	<i>not specialized</i>
--	--------------------------------	----------	------------------------

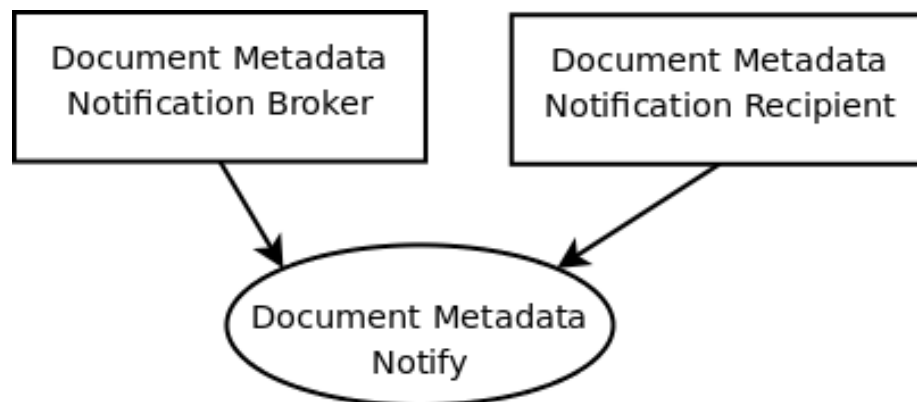
### 3.53 Document Metadata Notify

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

#### 3.53.1 Scope

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

#### 3.53.2 Use Case Roles



**Actor:** Document Metadata Notification Broker

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

**Actor:** Document Metadata Notification Recipient

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

#### 3.53.3 Referenced Standards

755 [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](#)

IHE ITI TF-2b: 3.43.4.2.2

760

IHE ITI TF-2x: Appendix V

### 3.53.4 Interaction Diagram

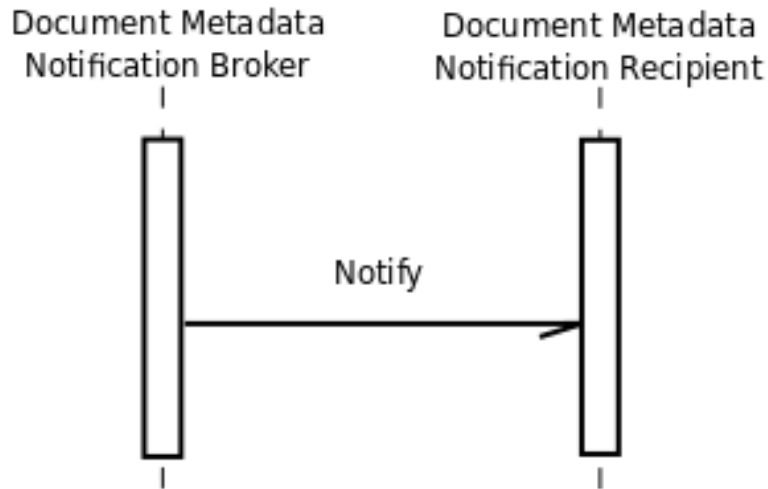


Figure 3.53.4-1: Document Metadata Notify Sequence

#### 3.53.4.1 Notify Message

765

##### 3.53.4.1.1 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 a Notification message to the corresponding Document Metadata Notification Recipient. The description of matching subscriptions to events can be found in ITI TF-2b: 3.52.5.2.

770

##### 3.53.4.1.2 Message Semantics

Depending on the event which triggered the notification, there may be one or more Document Entry Objects whose metadata matches the filter conditions of any particular subscription. This transaction defines the following structures for conveying a Notify message:

775

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

- 780 <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 response consists of the
- 785 <ihe:RetrieveDocumentSetRequest> element, as defined in the XDS Retrieve Document Set transaction (ITI TF-2b: 3.43.4.1). The element is sent as the only child of the wsnt:Notify/wsnt:NotificationMessage/wsnt:Message element.

790 There shall be a single wsnt:Notify/wsnt:NotificationMessage/wsnt:Message element in this transaction. If multiple DocumentEntries need to be represented in a single notification, the underlying structure allows this to be done.

### 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.

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

### 3.53.4.1.4 Examples

#### 800 3.53.4.1.4.1 Full Notification Example

```
805 <?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:lcm:3.0"
  xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
  xmlns:ihe="urn:ihe:iti:dsub:2009"
  xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
810 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</a:Address>
          <a:ReferenceParameters>
```

```

825         <ihe:SubscriptionId>382dcdc7-8e84-9fdc-8443-
48fd83bca938</ihe:SubscriptionId>
           </a:ReferenceParameters>
           </wsnt:SubscriptionReference>
830     <wsnt:Topic Dialect="http://docs.oasis-open.org/wsn/t-
1/TopicExpression/Simple">ihe:FullDocumentEntry</wsnt:Topic>
           <wsnt:ProducerReference>
           <a:Address>https://ProducerReference</a:Address>
           </wsnt:ProducerReference>
835     <wsnt:Message>
           <lcm:SubmitObjectsRequest>
           <rim:RegistryObjectList>
           <rim:ExtrinsicObject id="Document01" mimeType="text/xml"
objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1">
840     ...
           <rim:Classification classificationScheme="urn:uuid:2c6b8cb7-8b2a-
4051-b291-b1ae6a575ef4" classifiedObject="Document01" nodeRepresentation="44950">
           <rim:Name>
           <rim:LocalizedString value="Appendectomy"/>
845     </rim:Name>
           <rim:Slot name="codingScheme">
           <rim:ValueList>
           <rim:Value>CPT codes</rim:Value>
           </rim:ValueList>
           </rim:Slot>
850     </rim:Classification>
           ...
           <rim:ExternalIdentifier id="ei01" registryObject="Document01"
identificationScheme="urn:uuid:58a6f841-87b3-4a3e-92fd-a8ffeff98427"
855     value="'st3498702^^^&1.3.6.1.4.1.21367.2005.3.7&ISO'">
           <rim:Name>
           <rim:LocalizedString value="XDSDocumentEntry.patientId"/>
           </rim:Name>
           </rim:ExternalIdentifier>
860     ...
           <rim:ExtrinsicObject>
           </rim:RegistryObjectList>
           </lcm:SubmitObjectsRequest>
           </wsnt:Message>
           </wsnt:NotificationMessage>
865     </wsnt:Notify>
           </s:Body>
           </s:Envelope>

```

### 3.53.4.1.4.2 Minimal Notification Example

```

870 <?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"
875  xmlns:xds="urn:ihe:iti:xds-b:2007"
  xmlns:ihe="urn:ihe:iti:dsub:2009"
  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
880 http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd urn:ihe:iti:xds-b:2007
.../schema/IHE/XDS.b_DocumentRepository.xsd urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0
.../schema/ebRS/rim.xsd">
  <s:Header>
    <a:Action>http://docs.oasis-open.org/wsn/bw-2/NotificationConsumer/Notify</a:Action>
    <a:MessageID>382dcdca-8e87-9fdf-8446-48fd83bca93b</a:MessageID>
885    <a:To>https://NotificationRecipientServer/xdsBnotification</a:To>
  </s:Header>

```

```
890     <s:Body>
      <wsnt:Notify>
        <wsnt:NotificationMessage>
          <wsnt:SubscriptionReference>
            <a:Address>https://NotificationBrokerServer/Subscription/</a:Address>
            <ihe:SubscriptionId>382dcdc7-8e84-9fdc-8443-48fd83bca938</ihe:SubscriptionId>
          </wsnt:SubscriptionReference>
          <wsnt:Topic Dialect="http://docs.oasis-open.org/wsn/t-
895 1/TopicExpression/Simple">ihe:MinimalDocumentEntry</wsnt:Topic>
          <wsnt:ProducerReference>
            <a:Address>https://ProducerReference</a:Address>
          </wsnt:ProducerReference>
          <wsnt:Message>
900     <xds:RetrieveDocumentSetRequest>
          <xds:DocumentRequest>
            <xds:HomeCommunityId>urn:oid:1.3.2458.2423.458.3.2</xds:HomeCommunityId>
            <xds:RepositoryUniqueId>1.3.6.4...1000</xds:RepositoryUniqueId>
            <xds:DocumentUniqueId>1.3.2458.2423.456.5.3.5</xds:DocumentUniqueId>
905     </xds:DocumentRequest>
          </xds:RetrieveDocumentSetRequest>
          </wsnt:Message>
        </wsnt:NotificationMessage>
910     </wsnt:Notify>
    </s:Body>
  </s:Envelope>
```

### 3.53.5 Security Considerations

The risk assessment for the Document Metadata Notify transaction is described in the risk assessment spreadsheet for the Document Metadata Subscription profile, which is available from IHE at [http://wiki.ihe.net/images/4/46/DSUB\\_risk\\_assesment.xls](http://wiki.ihe.net/images/4/46/DSUB_risk_assesment.xls). The derived mitigations are as follows:

- Document Metadata Notification Broker and Document Metadata Notification Recipient actors shall be grouped with an ATNA Secure Node or Secure Application for Node Authentication and Audit Trails
- The use of encrypted TLS is recommended when the transmission is not otherwise secured (e.g. transmission over a secure network)

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

#### 3.53.5.1 Audit Record Considerations

The Document Metadata Notify Transaction is an Export event, as defined in ITI TF-2b Table 3.20.6-1. The Actors involved in the transaction shall create audit data in conformance with DICOM (Supp 95) “Data Export”/“Data Import”, with the following exceptions.

### 3.53.5.1.1 Document Metadata Notification Recipient audit message:

	Field Name	Opt	Value Constraints
<b>Event</b> 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")
<b>Source (Document Metadata Notification Broker) (1)</b>			
<b>Destination (Document Metadata Notification Recipient) (1)</b>			
<b>Human Requestor (0..n)</b>			
<b>Audit Source (Document Metadata Notification Recipient) (1)</b>			
<b>Patient (0..1)</b>			
<b>Document (1..n)</b>			

Where:

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

935

<b>Destination</b> AuditMessage/ ActiveParticipant	UserID	C	When WS-Addressing is used: <ReplyTo/>
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	U	not specialized
	UserIsRequestor	M	"true"
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address, as specified in RFC 3881.
<b>Human Requestor (if known)</b> AuditMessage/ ActiveParticipant	UserID	M	Identity of the human that initiated the transaction.
	AlternativeUserID	U	not specialized
	UserName	U	not specialized
	UserIsRequestor	M	"true"
	RoleIDCode	U	Access Control role(s) the user holds that allows this transaction.
	NetworkAccessPointTypeCode	NA	
	NetworkAccessPointID	NA	

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<b>Audit Source</b> <small>AuditMessage/ AuditSourceIdentification</small>	<i>AuditSourceID</i>	<i>U</i>	<i>Not specialized.</i>
	<i>AuditEnterpriseSiteID</i>	<i>U</i>	<i>not specialized</i>
	<i>AuditSourceTypeCode</i>	<i>U</i>	<i>not specialized</i>

<b>Patient (if-known)</b> <small>(AuditMessage/ ParticipantObjectIdentification)</small>	ParticipantObjectTypeCode	M	“1” (Person)
	ParticipantObjectTypeCodeRole	M	“1” (Patient)
	<i>ParticipantObjectDataLifeCycle</i>	<i>U</i>	<i>not specialized</i>
	ParticipantObjectIDTypeCode	M	EV(2, RFC-3881, “Patient Number”)
	<i>ParticipantObjectSensitivity</i>	<i>U</i>	<i>not specialized</i>
	<b>PARTICIPANTOBJECTID</b>	M	The patient ID in HL7 CX format.
	<i>ParticipantObjectName</i>	<i>U</i>	<i>not specialized</i>
	<b>PARTICIPANTOBJECTQUERY</b>	<i>U</i>	<i>not specialized</i>
	<i>ParticipantObjectDetail</i>	<i>U</i>	<i>not specialized</i>
<b>Document</b> <small>(AuditMessage/ ParticipantObjectIdentification)</small>	ParticipantObjectTypeCode	M	“2” (System)
	ParticipantObjectTypeCodeRole	M	“3” (report)
	<i>ParticipantObjectDataLifeCycle</i>	<i>U</i>	<i>not specialized</i>
	ParticipantObjectIDTypeCode	M	EV(9, RFC-3881, “Report Number”)
	<i>ParticipantObjectSensitivity</i>	<i>U</i>	<i>not specialized</i>
	<b>PARTICIPANTOBJECTID</b>	M	The value of <ihe:DocumentUniqueId/>
	<i>ParticipantObjectName</i>	C	If known the value of <ihe:HomeCommunityId/>
	<b>PARTICIPANTOBJECTQUERY</b>	<i>U</i>	<i>not specialized</i>
	<i>ParticipantObjectDetail</i>	<i>U</i>	<i>not specialized</i>

### 3.53.5.1.2 Document Metadata Notification Broker audit message:

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

Where:

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

940

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

<b>Audit Source</b> <i>AuditMessage/AuditSourceIdentification</i>	<i>AuditSourceID</i>	<i>U</i>	<i>Not specialized.</i>
	<i>AuditEnterpriseSiteID</i>	<i>U</i>	<i>not specialized</i>
	<i>AuditSourceTypeCode</i>	<i>U</i>	<i>not specialized</i>

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

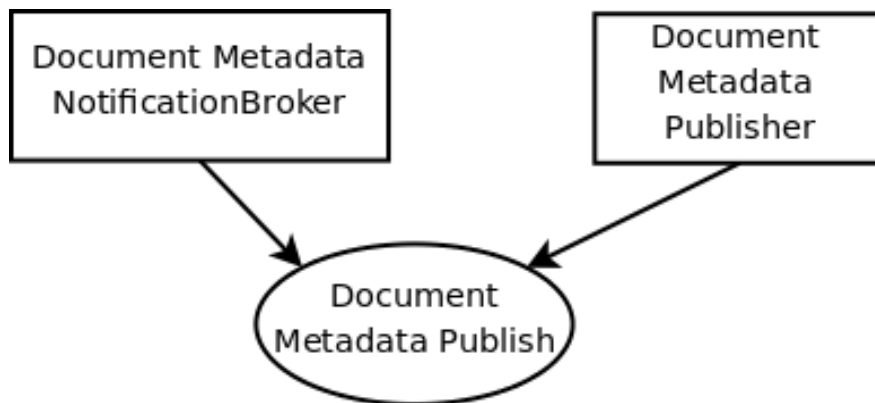
### 3.54 Document Metadata Publish

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

### 3.54.1 Scope

950 This transaction delivers information from the Document Metadata Publisher to the Document Metadata Notification Broker about an event which may have a subscription.

### 3.54.2 Use Case Roles



**Actor:** Document Metadata Notification Broker

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

955 **Actor:** Document Metadata Publisher

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

### 3.54.3 Referenced Standards

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

[WS-BaseNotification 1.3 OASIS Standard](#)

[WS-BrokeredNotification 1.3 OASIS Standard](#)

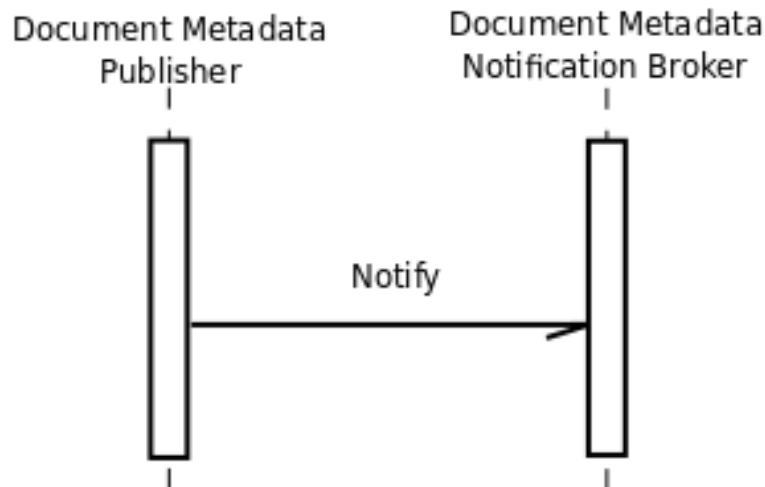
[WS-Topics 1.3 OASIS Standard](#)

[IHE ITI TF-2b: 3.43.4.2.2](#)

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965 **3.54.4 Interaction Diagram**



**Figure 3.54.4-1 Document Metadata Publish Sequence**

**3.54.4.1 Notify Message**

**3.54.4.1.1 Trigger**

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

**3.54.4.1.2 Message Semantics**

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

**3.54.4.1.3 Expected Actions**

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

**3.54.4.1.4 Example**

```
985 <?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:rjm="urn:oasis:names:tc:ebxml-regrep:xsd:rjm:3.0">
```

```

990     xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd urn:ihe:iti:pub-
sub:2008 ../schema/IHE/XDS.b_PublishSubscribe.xsd urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0
../schema/ebRS/rim.xsd">
995     <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>
1000    </s:Header>
<s:Body>
<wsnt:Notify>
<wsnt:NotificationMessage>
<wsnt:ProducerReference>
<a:Address>https://DocumentSource</a:Address>
1005    </wsnt:ProducerReference>
<wsnt:Message>
<lcm:SubmitObjectsRequest>
<rim:RegistryObjectList>
<!-- The list of extrinsic objects -->
<rim:ExtrinsicObject id="Document01" mimeType="text/xml"
1010    objectType="urn:uuid:7edca82f-054d-47f2-a032-9b2a5b5186c1">
...
</rim:ExtrinsicObject>
</rim:RegistryObjectList>
</lcm:SubmitObjectsRequest>
1015    </wsnt:Message>
</wsnt:NotificationMessage>
</wsnt:Notify>
</s:Body>
</s:Envelope>

```

1020 **3.54.5 Security Considerations**

The risk assessment for the Document Metadata Publish transaction is described in the risk assessment spreadsheet for the Document Metadata Subscription profile, which is available from IHE at [http://wiki.ihe.net/images/4/46/DSUB\\_risk\\_assesment.xls](http://wiki.ihe.net/images/4/46/DSUB_risk_assesment.xls). The derived mitigations are as follows:

- 1025 • The Document Metadata Publisher and the Document Metadata Notification Broker shall be grouped with an ATNA Secure Node or Secure Application for Node Authentication and Audit Trails
- The use of encrypted TLS is recommended when the transmission is not otherwise secured (e.g. transmission over a secure network)

1030 **3.54.5.1 Audit Record Considerations**

The Document Metadata Publish Transaction is an Export event, as defined in ITI TF-2a: Table 3.20.6-1. The Actors involved in the transaction shall create audit data in conformance with DICOM (Supp 95) “Data Export”/“Data Import”, with the following exceptions.

**3.54.5.1.1 Document Metadata Publisher Audit Message:**

	Field Name	Opt	Value Constraints
<b>Event</b>	EventID	M	EV(110107, DCM, “Import”)

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	EventActionCode	M	“C” (Create)
	EventDateTime	M	not specialized
	EventOutcomeIndicator	M	not specialized
	EventTypeCode	M	EV(“ITI-54”, “IHE Transactions”, “Document Metadata Publish”)
<b>Source (Document Metadata Publisher) (1)</b>			
<b>Destination (Document Metadata Notification Broker) (1)</b>			
<b>Human Requestor (0..n)</b>			
<b>Audit Source (Document Metadata Publisher) (1)</b>			
<b>Patient (0..1)</b>			
<b>Document (1..n)</b>			

1035 Where:

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

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

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

<b>Audit Source</b> AuditMessage/ AuditSourceIdentification	AuditSourceID	U	Not specialized.
	AuditEnterpriseSiteID	U	not specialized
	AuditSourceTypeCode	U	not specialized

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<b>Patient (if-known)</b> (AuditMessage/ ParticipantObjectIdentification)	ParticipantObjectTypeCode	M	“1” (Person)
	ParticipantObjectTypeCodeRole	M	“1” (Patient)
	<i>ParticipantObjectDataLifeCycle</i>	<i>U</i>	<i>not specialized</i>
	ParticipantObjectIDTypeCode	M	EV(2, RFC-3881, “Patient Number”)
	<i>ParticipantObjectSensitivity</i>	<i>U</i>	<i>not specialized</i>
	<b>PARTICIPANTOBJECTID</b>	M	The patient ID in HL7 CX format.
	<i>ParticipantObjectName</i>	<i>U</i>	<i>not specialized</i>
	<b>PARTICIPANTOBJECTQUERY</b>	<i>U</i>	<i>not specialized</i>
	<i>ParticipantObjectDetail</i>	<i>U</i>	<i>not specialized</i>
<b>Document</b> (AuditMessage/ ParticipantObjectIdentification)	ParticipantObjectTypeCode	M	“2” (System)
	ParticipantObjectTypeCodeRole	M	“3” (report)
	<i>ParticipantObjectDataLifeCycle</i>	<i>U</i>	<i>not specialized</i>
	ParticipantObjectIDTypeCode	M	EV(9, RFC-3881, “Report Number”)
	<i>ParticipantObjectSensitivity</i>	<i>U</i>	<i>not specialized</i>
	<b>PARTICIPANTOBJECTID</b>	M	The value of <ihe:DocumentUniqueId/>
	<i>ParticipantObjectName</i>	<i>C</i>	If known the value of <ihe:HomeCommunityId/>
	<b>PARTICIPANTOBJECTQUERY</b>	<i>U</i>	<i>not specialized</i>
	<i>ParticipantObjectDetail</i>	<i>U</i>	<i>not specialized</i>

1040

**3.54.5.1.2 Document Metadata Notification Broker audit message:**

	Field Name	Opt	Value Constraints
<b>Event</b> (AuditMessage/ EventIdentification)	EventID	M	EV(110106, DCM, “Export”)
	EventActionCode	M	“R” (Read)
	<i>EventDateTime</i>	<i>M</i>	<i>not specialized</i>
	<i>EventOutcomeIndicator</i>	<i>M</i>	<i>not specialized</i>
	EventTypeCode	M	EV(“ITI-54”, “IHE Transactions”, “Document Metadata Publish”)
<b>Source (Document Metadata Publisher) (1)</b>			
<b>Destination (Document Metadata Notification Broker) (1)</b>			
<b>Audit Source (Document Metadata Notification Broker) (1)</b>			
<b>Document (1..n)</b>			

Where:

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

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

<b>Audit Source</b>  <b>AuditMessage/ AuditSourceIdentification</b>	<i>AuditSourceID</i>	U	<i>Not specialized.</i>
	<i>AuditEnterpriseSiteID</i>	U	<i>not specialized</i>
	<i>AuditSourceTypeCode</i>	U	<i>not specialized</i>

<b>Document URI</b>  <b>(AuditMessage/ ParticipantObjectIdentifi- cation)</b>	ParticipantObjectTypeCode	M	“2” (System)
	ParticipantObjectTypeCodeRole	M	“3” (report)
	<i>ParticipantObjectDataLifeCycle</i>	U	<i>not specialized</i>
	ParticipantObjectIDTypeCode	M	EV(9, RFC-3881, “Report Number”)
	<i>ParticipantObjectSensitivity</i>	U	<i>not specialized</i>
	<b>PARTICIPANTOBJECTID</b>	M	The value of <ihe:DocumentUniqueId/>
	<i>ParticipantObjectName</i>	C	If known the value of <ihe:HomeCommunityId/>
	<b>PARTICIPANTOBJECTQUERY</b>	U	<i>not specialized</i>
	<i>ParticipantObjectDetail</i>	U	<i>not specialized</i>

1045

Add the following Section to Chapter 4 in Volume 3 of the ITI Technical Framework

#### **4.4 Publish/Subscribe Infrastructure**

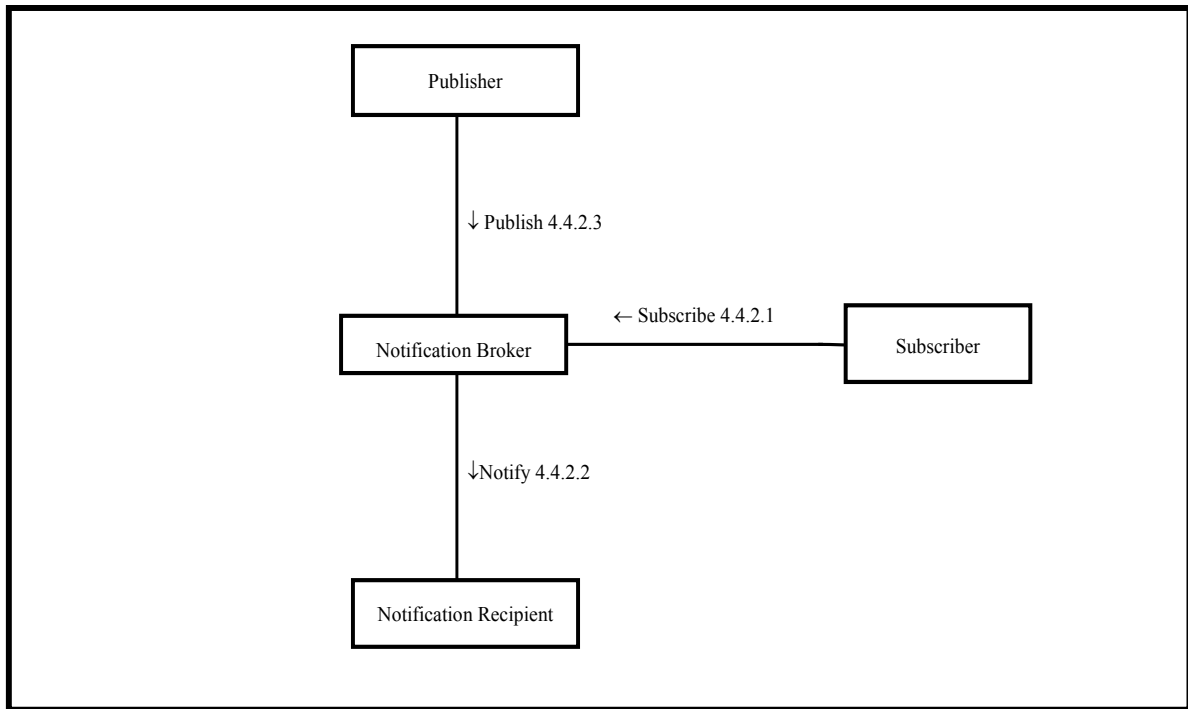
1050 Event driven information exchange patterns dominate the data interchange in most healthcare settings. For example, most HL7 version 2.x interfaces send messages based on events within the sender's system. Most current IHE profiles assume either static, out-of-band determination of the senders and receivers of event driven information exchange, or describe query-response patterns. There is a need for a profiled dynamic infrastructure for event-driven information exchange patterns within IHE. This section describes such a framework based on the publish/subscribe data exchange model.

1060 Publish/subscribe patterns of data exchange are conceptually simple, and involve a limited number of actors and transactions. The transactions allow for automating the determination of information consumers based on events or content "topics". For example, if an IHE profile describes information content where a diagnosis is present and coded using a particular coding system, a subscriber can request to receive notifications when a diagnosis code from a particular set of codes is present. If the subscription is accepted, the system which keeps track of information recipients will start sending notifications when new data matches the described criteria.

1065 The above example demonstrates an important issue which needs to be addressed by profilers and implementers of publish/subscribe interactions. Based on the information exchange environment, topics can be described in various ways. This section presents a specific approach for delivering abstract publish/subscribe content within a SOAP-based web services environment.

1070 The implementation of publish/subscribe in healthcare environments also needs to take into account the need for security and privacy of the exchanged information. It is expected that specific bindings of IHE profiles to this framework will include details about security, access controls and auditing controls within the bound profile.

#### 4.4.1 Publish/Subscribe Actors and Patterns



1075

**Figure 4.4.1-1: Publish/Subscribe Actor Diagram**

Figure 4.4.1-1 shows a general publish/subscribe pattern, expressed in the usual IHE Actor/Transaction diagram. The actors and transactions described in this section are “abstract”, in the sense that the purpose of these descriptions is to provide the common underlying transport infrastructure for publish/subscribe. A profile using the publish/subscribe pattern will provide the content and actual implementable details for the above actors and transactions within the context of that profile. Such a profile may choose to omit certain actors or transactions, or to require specific grouping with other IHE actors.

1080

The following subsections discuss the various patterns applicable to a publish/subscribe implementation, which are intended to help systems designers and profile authors to appropriately apply publish/subscribe to different types of data interchanges.

1085

##### 4.4.1.1 General Publish/Subscribe Pattern

The general publish/subscribe pattern contains four separate actors, which communicate via three transactions. The actors are Notification Broker, Publisher, Subscriber, and Notification Recipient. While in many practical cases some of these actors may be grouped, the most general discussion of publish/subscribe can occur when these actors are considered individually.

1090

#### 4.4.1.1.1 Notification Broker

1095 The Notification Broker keeps track of all subscriptions, and based on the information received in a Publish transaction it sends notifications to the appropriate Notification Recipients. This actor is the receiver of the Subscribe transaction, which represents subscription requests, subscription modifications, and subscription cancellations. It also keeps track of the time limits of subscriptions.

#### 4.4.1.1.2 Publisher

1100 Within the publish/subscribe pattern, the Publisher actor is the source of the information to which there may be a subscription. The Publisher is the sender of the Publish transaction and when the publish/subscribe pattern is applied to an existing IHE profile, in most cases it will be grouped with an existing IHE actor.

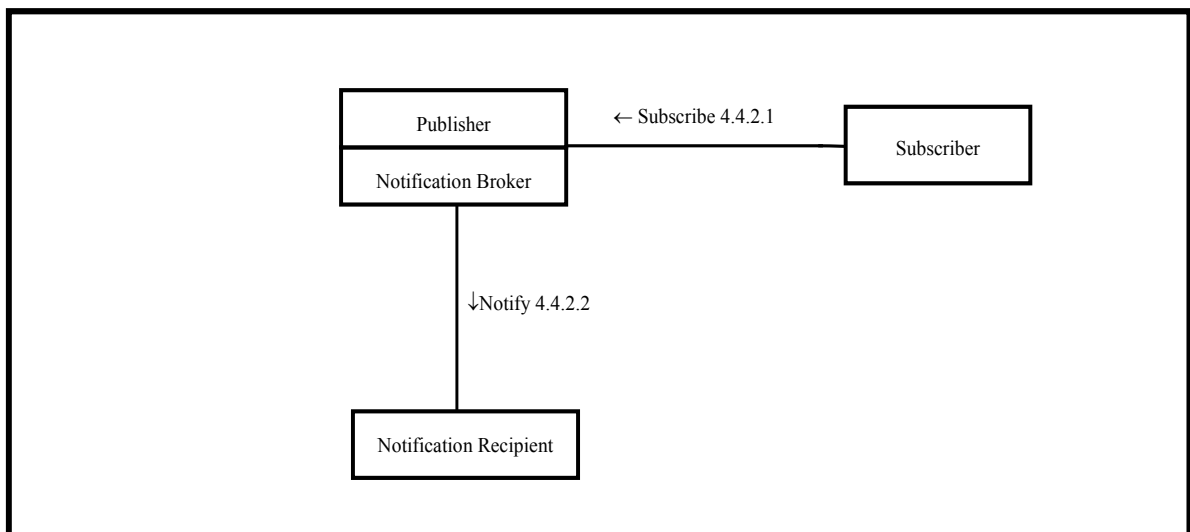
#### 4.4.1.1.3 Subscriber

1105 The Subscriber actor initiates, modifies, and terminates subscriptions on behalf of a Notification Recipient. It is the sender of the Subscribe transaction, and it may be servicing any number of Notification Recipients.

#### 4.4.1.1.4 Notification Recipient

The Notification Recipient actor receives the notification about a published event, when the subscription filters specified for this Notification Recipient are satisfied.

#### 1110 4.4.1.2 Combined Publisher/Notification Broker



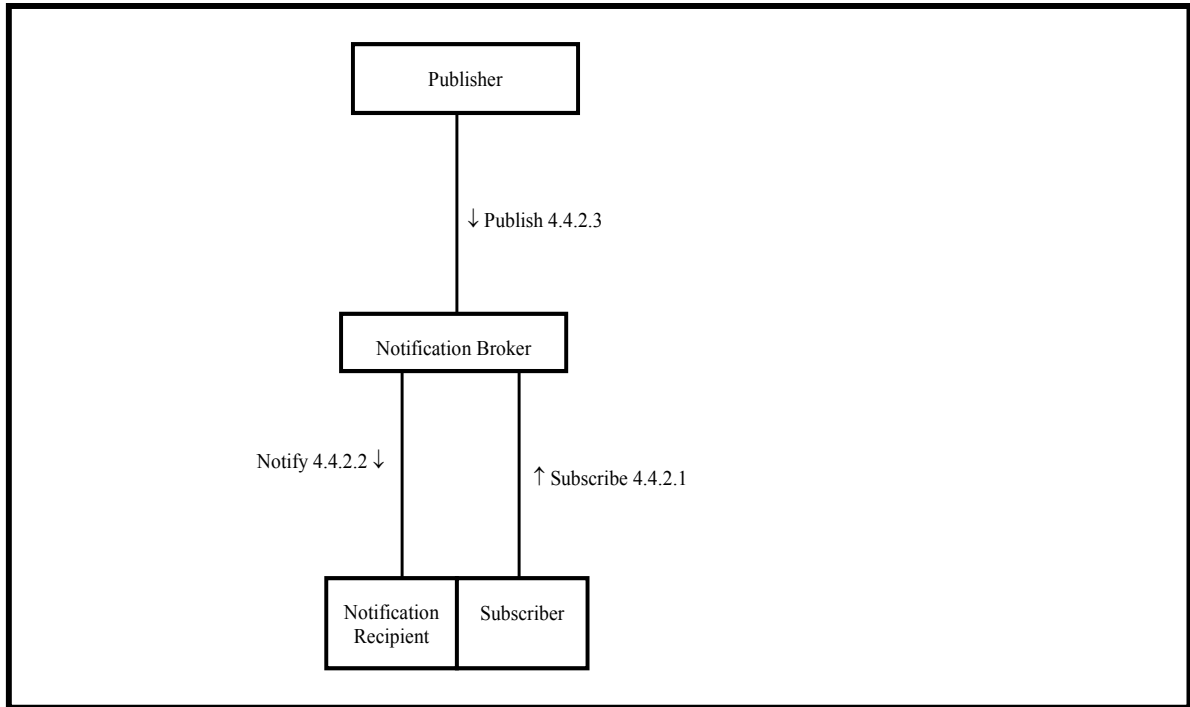
**Figure 4.4.1.2-1: Combined Publisher/Notification Broker Actor Diagram**



1115

The Publisher and Notification Broker may be grouped together in cases where the source of information to which there may be subscriptions can be enhanced with Notification Broker capabilities, or when the Notification Broker is able to access the information for which there may be subscriptions via some alternate mechanism. In such cases the Publish transaction will not be present in the publish/subscribe implementation.

#### 4.4.1.3 Combined Subscriber/Notification Recipient

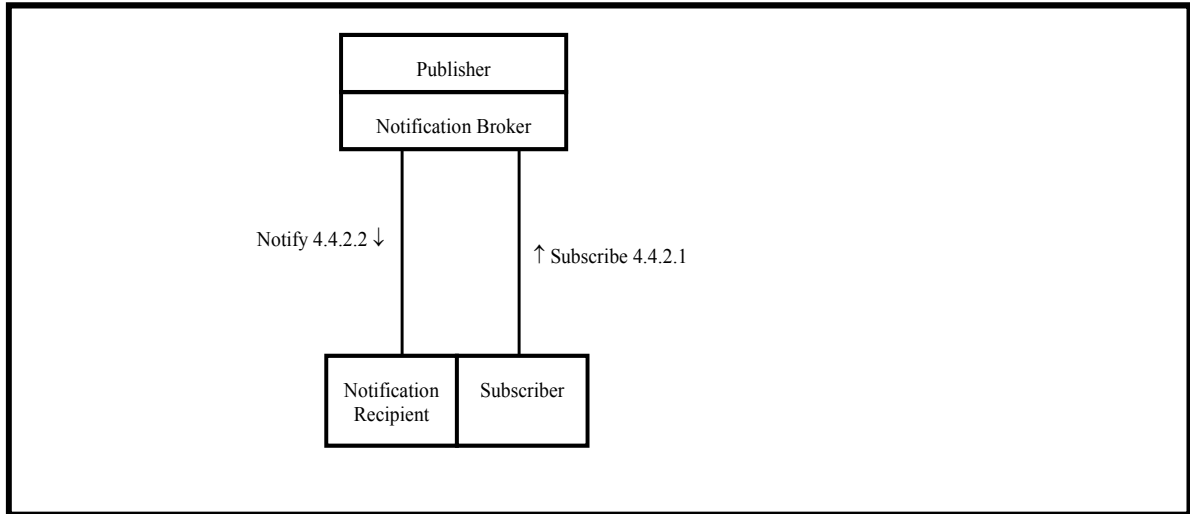


1120

**Figure 4.4.1.3-1: Combined Subscriber/Notification Recipient Actor Diagram**

In many cases, the Notification Recipient will have the capability to manage its own subscriptions, thus making the grouping of Subscriber and Notification Recipient a common occurrence.

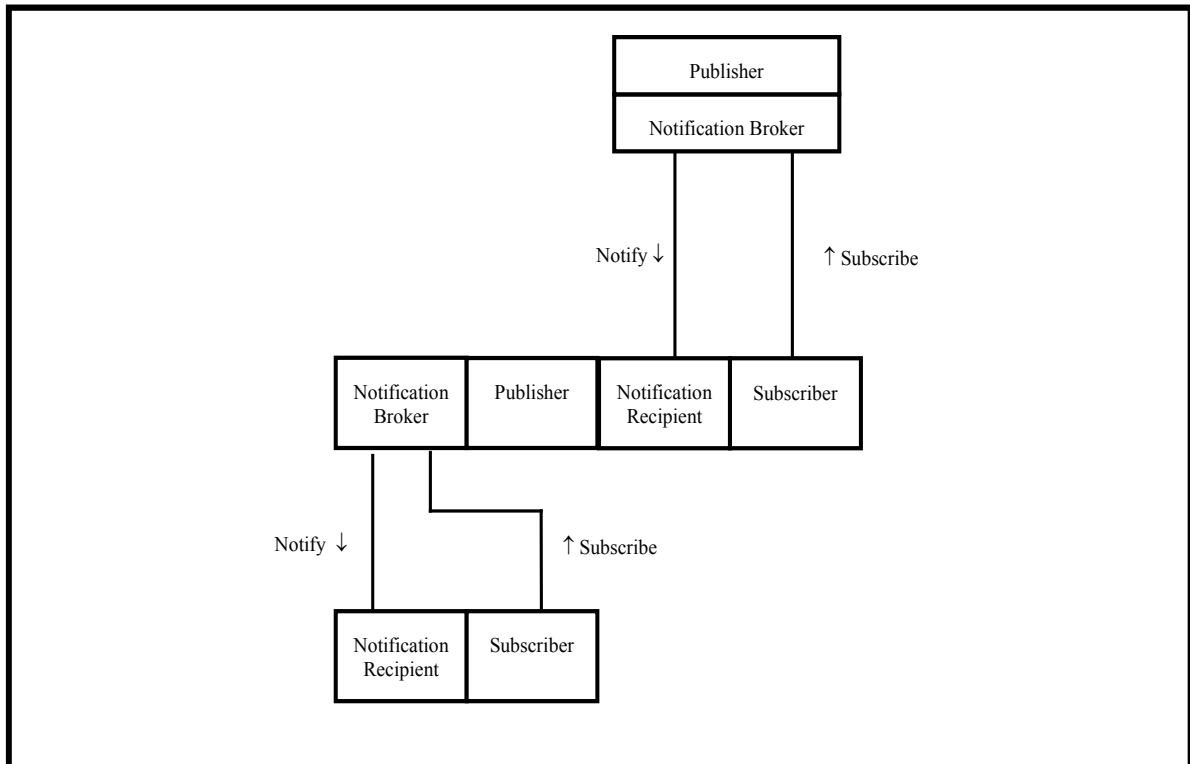
1125 **4.4.1.4 Combined Publisher/Notification Broker and Combined Subscriber/Notification Recipient**



**Figure 4.4.1.4-1: Minimal Pub/Sub Actor Diagram**

1130 In many data exchange cases there is only a need for two end points to establish a publish/subscribe relationship. Combining the Notification Recipient and Subscriber on one end, and the Publisher, and Notification Broker on the other is sufficient to provide publish/subscribe functionality. It is expected that the simplicity of this pattern will make implementations easier.

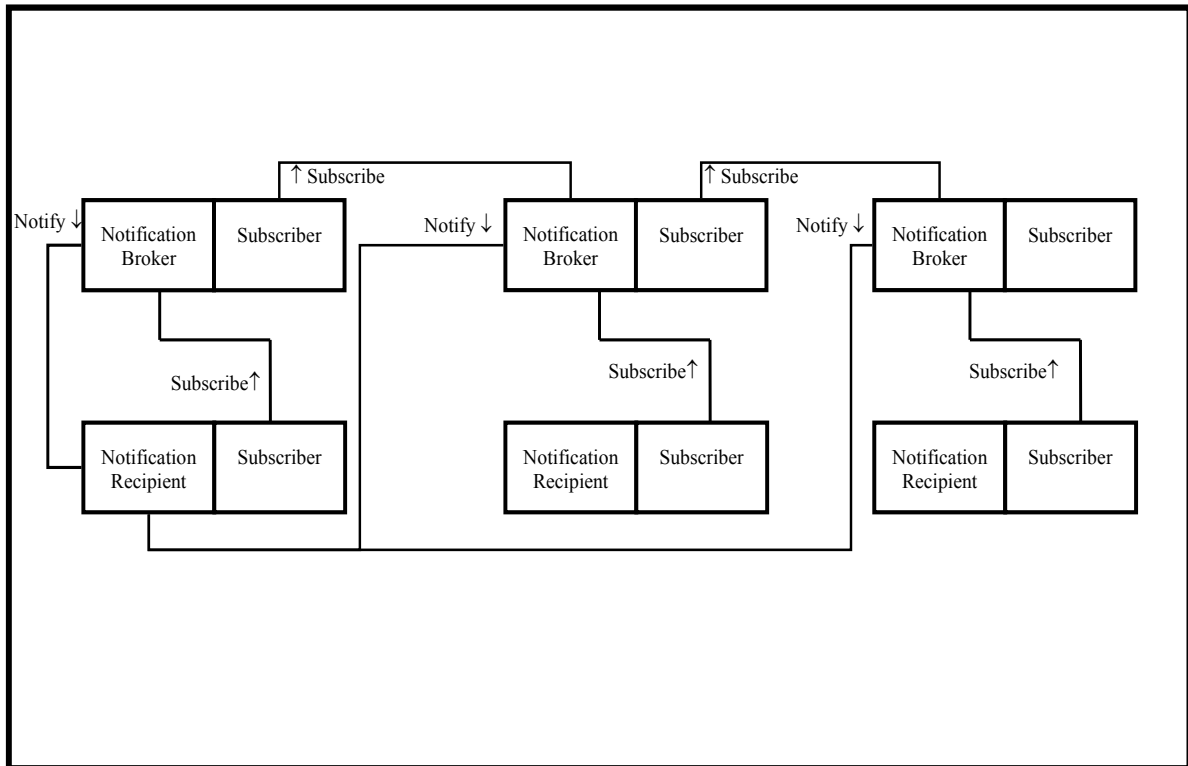
#### 4.4.1.5 Cascading Notifications



**Figure 4.4.1.5-1: Cascading Notifications**

1135 In some cases, the Notification Recipient may be grouped with another publisher, which allows the results of matching one subscription filter to become the input to another set of subscription filter matches. This figure shows a possible configuration for such a case.

#### 4.4.1.6 Cascading Subscriptions



1140

**Figure 4.4.1.6-1: Cascading Subscriptions**

In some cases, the Notification Broker may be grouped with a Subscriber, which allows a subscribe request sent to the Notification Broker to be forwarded to other Notification Brokers. This figure shows a possible configuration for such a case.

#### 4.4.2 Publish/Subscribe Transactions and Patterns

1145

Figure 4.4.1-1 shows the set of transactions available for implementing publish/subscribe functionality. The following subsections will describe the transactions and some possible uses.

The publish/subscribe transactions described in this section use the [OASIS Web Services Notification family of standards as the basis for the format of the transactions.](#)

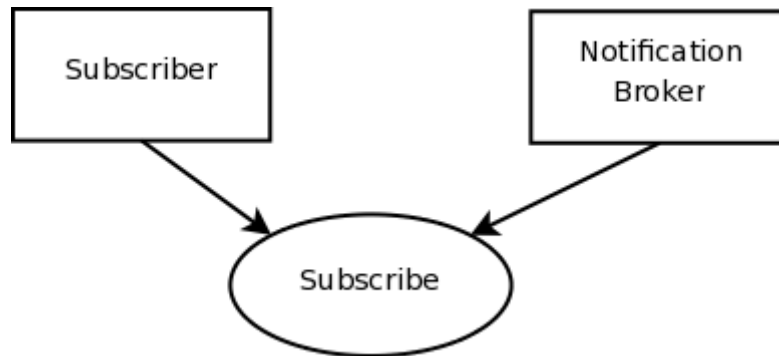
##### 4.4.2.1 Subscribe

1150

###### 4.4.2.1.1 Scope

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

#### 4.4.2.1.2 Use Case Roles



1155 **Actor:** Subscriber

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

**Actor:** Notification Broker

**Role:** Manages subscriptions of Notification Recipients

#### 1160 4.4.2.1.3 Referenced Standards

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

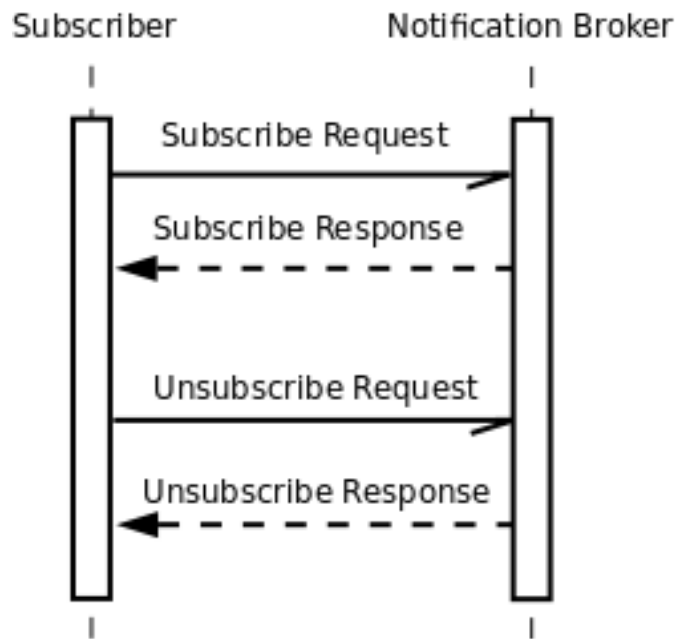
[WS-BaseNotification 1.3 OASIS Standard](#)

[WS-BrokeredNotification 1.3 OASIS Standard](#)

[WS-Topics 1.3 OASIS Standard](#)

1165 [IHE ITI TF-2x: Appendix V](#)

#### 4.4.2.1.4 Interaction Diagram



1170

**Figure 4.4.2.1.4-1: Subscribe Sequence**

##### 4.4.2.1.4.1 Subscribe Request Message

###### 4.4.2.1.4.1.1 Trigger

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

1175

###### 4.4.2.1.4.1.2 Message Semantics

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

1180

###### 4.4.2.1.4.1.2 Expected Actions

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

1185

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

1190 The Subscriber may indicate the duration of the subscription using the *wsnt:InitialTerminationTime* element, where a time stamp (expressed as an XML Schema *dateTime* data type value) or a duration (expressed as an XML Schema *duration* data type value) can be used.

#### 4.4.2.1.4.1.4 Example

```
1195 <?xml version="1.0" encoding="UTF-8"?>
1200 <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:rsm="urn:oasis:names:tc:ebxml-regrep:xsd:rsm: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:rsm:3.0 ../schema/ebRS/rsm.xsd">
  <s:Header>
    <a:Action>http://docs.oasis-open.org/wsn/bw-
1205 2/NotificationProducer/SubscribeRequest</a:Action>
    <a:MessageID>382dc7-8e84-9fdc-8443-48fd83bca938</a:MessageID>
  </s:Header>
  <s:Body>
    <wsnt:Subscribe>
1210 <!-- 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>
1215 <wsnt:TopicExpression Dialect="Some topic language">
      <!-- topic expression -->
    </wsnt:TopicExpression>
    <!--additional filter content -->
    </wsnt:Filter>
1220 <wsnt:InitialTerminationTime>2008-05-31T00:00:00.000000Z</wsnt:InitialTerminationTime>
    </wsnt:Subscribe>
  </s:Body>
</s:Envelope>
```

#### 1225 4.4.2.1.4.2 Subscribe Response Message

##### 4.4.2.1.4.2.1 Trigger

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

##### 4.4.2.1.4.2.1 Message Semantics

1230 The Subscribe Response message shall comply with the requirements in the WS-BaseNotification standard, including the use of the appropriate SOAP Fault messages. Note that the value of the WS-Addressing Action element is prescribed in the standard, and differs from the requirements of Appendix V.

1235 The subscription identifier is assigned by the Notification Broker as a subscription reference, communicated in the response in the SOAP body in `wsnt:SubscribeResponse/wsnt:SubscriptionReference` (a WS-Addressing end point). The subscription reference shall consist of:

- an *Address* element, containing a web services end point
- an optional Reference Parameter, containing an *ihe:SubscriptionId* element, which, when present, shall contain a UUID uniquely identifying the subscription. The reference parameter is optional, since the URI in the *Address* element can be constructed to uniquely represent each subscription.

1245 In order to unsubscribe, the request shall be sent to the end point specified in the Address component of the SubscriptionReference, and, if the *ihe:SubscriptionId* element was sent as a Reference Parameter of the subscription reference, it shall be sent as part of the SOAP header according to the rules described in WS-Addressing.

#### 4.4.2.1.4.2.3 Expected Actions

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

1250 If the Subscriber had not indicated a requested duration for the subscription, the Notification Broker may send an assigned duration for the subscription (if any), using the *wsnt:TerminationTime* element.

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

1255 The Subscriber shall associate the accepted subscription request with the subscription reference address assigned by the Notification broker in order to be able to send cancellations for existing subscriptions.

#### 4.4.2.1.4.2.4 Example

```
1260 <?xml version="1.0" encoding="UTF-8"?>
1265 <s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
  xmlns:a="http://www.w3.org/2005/08/addressing"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
  xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
  envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
  http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
  <s:Header>
    <a:Action>http://docs.oasis-open.org/wsn/bw-
1270 2/NotificationProducer/SubscribeResponse</a:Action>
  </s:Header>
  <s:Body>
    <wsnt:SubscribeResponse>
1275 <!-- A WS-Addressing endpoint, where modification and cancelation requests for this
  subscription must be sent -->
    <wsnt:SubscriptionReference>
      <!-- a unique web services end point identifies the subscription,
  ihe:SubscriptionId is not necessary in this case -->
```



1280

```
<a:Address>https://NotificationBrokerServer/UniqueSubscription/382dcdc7-8e84-9fdc-8443-48fd83bca938</a:Address>
</wsnt:SubscriptionReference>
<wsnt:TerminationTime>2008-05-31T00:00:00Z</wsnt:TerminationTime>
</wsnt:SubscribeResponse>
</s:Body>
</s:Envelope>
```

1285

#### 4.4.2.1.4.3 Unsubscribe Request Message

##### 4.4.2.1.4.3.1 Trigger

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

##### 4.4.2.1.4.3.2 Message Semantics

1290

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

##### 4.4.2.1.4.3.3 Expected Actions

The subscriber shall send this message to the end point associated with the existing subscription.

1295

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

##### 4.4.2.1.4.3.4 Example

1300

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
  xmlns:a="http://www.w3.org/2005/08/addressing"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
  xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
  <s:Header>
    <a:Action>http://docs.oasis-open.org/wsn/bw-2/SubscriptionManager/UnsubscribeRequest</a:Action>
    <a:MessageID>382dcdc9-8e86-9fde-8445-48fd83bca93a</a:MessageID>
    <a:To>https://NotificationBrokerServer/Unique Subscription/382dcdc7-8e84-9fdc-8443-48fd83bca938</a:To>
  </s:Header>
  <s:Body>
    <wsnt:Unsubscribe/>
  </s:Body>
</s:Envelope>
```

1305

1310

1315

#### 4.4.2.1.4.4 Unsubscribe Response Message

##### 1320 4.4.2.1.4.4.1 Trigger

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

##### 4.4.2.1.4.4.2 Message Semantics

1325 The Subscription Response message shall comply with the requirements in the WS-BaseNotification standard. This message indicates that an Unsubscribe message was successfully processed. Note that the value of the WS-Addressing Action element is prescribed in the standard, and differs from the requirements of Appendix V.

##### 4.4.2.1.4.4.3 Expected Actions

The Notification Broker shall cancel the corresponding subscription.

1330 The Subscriber shall mark the corresponding subscription as successfully terminated.

##### 4.4.2.1.4.4.4 Example

```
1335 <?xml version="1.0" encoding="UTF-8"?>
    <s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
      xmlns:a="http://www.w3.org/2005/08/addressing"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xmlns:wsnt="http://docs.oasis-open.org/wsn/b-2"
      xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
1340 envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
      http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd">
      <s:Header>
        <a:Action>http://docs.oasis-open.org/wsn/bw-
1345 2/SubscriptionManager/UnsubscribeRequest</a:Action>
      </s:Header>
      <s:Body>
        <wsnt:UnsubscribeResponse/>
      </s:Body>
    </s:Envelope>
```

#### 4.4.2.1.5 Security Considerations

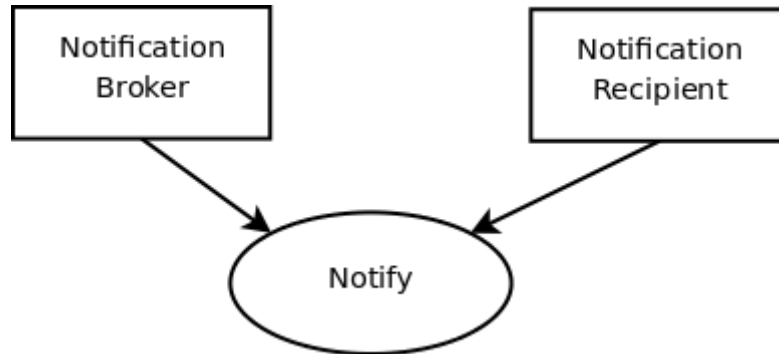
1350 IHE Profiles shall provide a complete risk assessment when using this pattern.

#### 4.4.2.2 Notify

##### 4.4.2.2.1 Scope

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

1355 **4.4.2.2.2 Use Case Roles**



**Actor:** Notification Broker

**Role:** Sends notifications to subscribed Notification Recipients based on events for which there is a subscription.

1360 **Actor:** Notification Recipient

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

**4.4.2.2.3 Referenced Standards**

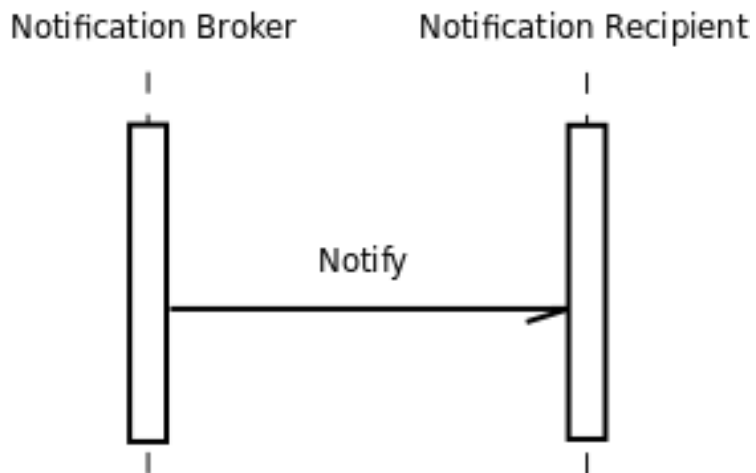
[OASIS Web Services Notification Family of Standards](#)

[WS-BaseNotification 1.3 OASIS Standard](#)

1365 [WS-BrokeredNotification 1.3 OASIS Standard](#)

[WS-Topics 1.3 OASIS Standard](#)

**4.4.2.2.4 Interaction Diagram**



**Figure 4.4.2.2.4-1: Notify Sequence**

1370 **4.4.2.2.4.1 Notify Message**

**4.4.2.2.4.1.1 Trigger**

When an event occurs, where the topics of the event match the filter requirements of one or more existing subscriptions, the Notification Broker will trigger a Notify message to the corresponding Notification Recipient.

1375 **4.4.2.2.4.1.2 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 Appendix V. The content of the *wsnt:Notify/wsnt:NotificationMessage/wsnt:Message* element depends on the environment in which the Publish/Subscribe infrastructure is implemented. Within an IHE profile, the transaction definition of the particular profile will define the content that is carried in the *wsnt:Notify/wsnt:NotificationMessage/wsnt:Message* element of the Notify message.

1380

**4.4.2.2.4.1.3 Expected Actions**

1385 The Notification Recipient may take some action, based on the notification information, e.g. convey the notification information to other systems and/or users.

The Notification Broker may send the topic expression of the subscription, and/or the address of the information source where the event originated. Both of these options increase certain security risks; their use should be determined by local policy to security and confidentiality.

**4.4.2.2.4.1.4 Example**

1390

```
<?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"
  xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
  envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
  http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd urn:ihe:iti:pub-
  sub:2008 ../schema/IHE/XDS.b_PublishSubscribe.xsd urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0
  ../schema/ebRS/rim.xsd">
  <s:Header>
    <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/Unique Subscription/382dcdca7-
          8e84-9fdc-8443-48fd83bca93b</a:Address>
        </wsnt:SubscriptionReference>
        <wsnt:Topic Dialect="some topic dialect">
```

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```
<!-- The topic associated with the content of the notification -->
</wsnt:Topic>
<wsnt:ProducerReference>
  <a:Address>https://Publisher</a:Address>
</wsnt:ProducerReference>
</wsnt:Message>
  <!-- Notification content -->
</wsnt:Message>
</wsnt:NotificationMessage>
</wsnt:Notify>
</s:Body>
</s:Envelope>
```

#### 4.4.2.2.5 Security Considerations

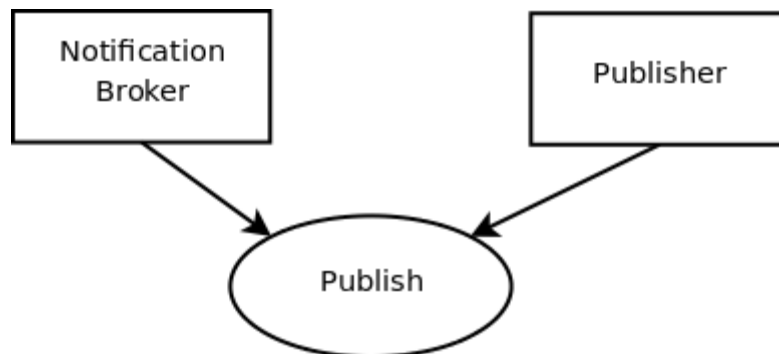
Profiles shall provide a complete risk assessment when using this pattern.

#### 4.4.2.3 Publish

##### 1430 4.4.2.3.1 Scope

This transaction publishes information from the Publisher to the Notification Broker about an event for which there may be a subscription.

##### 4.4.2.3.2 Use Case Roles



1435 **Actor:** Publisher

**Role:** Publishes a well-defined stream of events to the Notification Broker.

**Actor:** Notification Broker

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

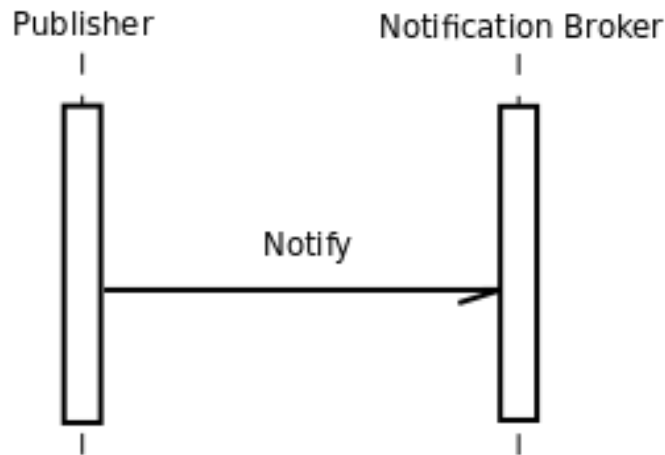
##### 4.4.2.3.3 Referenced Standards

- 1440 [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](#)

IHE ITI TF-2x: Appendix V

1445 **4.4.2.3.4 Interaction Diagram**



**Figure 4.4.2.3.4-1 Publish Sequence**

**4.4.2.3.4.1 Notify Message**

**4.4.2.3.4.1.1 Trigger**

1450 When a relevant event as defined by an IHE profile occurs the Publisher will trigger a Notify message to the corresponding Notification Broker.

**4.4.2.3.4.1.2 Message Semantics**

1455 The transport format of the Notify message is identical to the format of the Notify message in the Notify transaction (see ITI TF-3: 4.4.2.2.4.1). When profiles implement this pattern, the content of the message may be the same or different from the Notify transaction.

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

**4.4.2.3.4.1.3 Expected Actions**

1460 The Notify message shall comply with the requirements in the WS-BaseNotification standard. The Notification Broker shall evaluate the Publish transaction, and if there are matching subscriptions, it shall send the corresponding Notification transaction to the appropriate Notification Recipients.

**4.4.2.3.4.1.4 Example**

```
<?xml version="1.0" encoding="UTF-8"?>
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope">
```

1465

```
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"
1470 xsi:schemaLocation="http://www.w3.org/2003/05/soap-envelope http://www.w3.org/2003/05/soap-
envelope http://www.w3.org/2005/08/addressing http://www.w3.org/2005/08/addressing/ws-addr.xsd
http://docs.oasis-open.org/wsn/b-2 http://docs.oasis-open.org/wsn/b-2.xsd urn:ihe:iti:pub-
sub:2008 ../schema/IHE/XDS.b_PublishSubscribe.xsd urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0
../schema/ebRS/rim.xsd">
1475 <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>
1480 </s:Header>
    <s:Body>
        <wsnt:Notify>
            <wsnt:NotificationMessage>
                <wsnt:ProducerReference>
                    <a:Address>https://Publisher</a:Address>
1485 </wsnt:ProducerReference>
                <wsnt:Message>
                    <!-- Publish Content -->
                </wsnt:Message>
            </wsnt:NotificationMessage>
1490 </wsnt:Notify>
        </s:Body>
    </s:Envelope>
```

#### 4.4.2.3.5 Security Considerations

IHE Profiles shall provide a complete risk assessment when using this pattern.

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