Integrating the Healthcare Enterprise

IHE IT Infrastructure
Technical Framework Supplement

Asynchronous AS4 Option

Revision 1.0 – Draft for Public Comment

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Foreword

This is a supplement to the IHE IT Infrastructure Technical Framework Revision 14. Each
30   supplement undergoes a process of public comment and trial implementation before being
incorporated into the volumes of the Technical Frameworks.

This supplement is published on May 23, 2018 for public comment. Comments are invited and
can be submitted at http://www.ihe.net/ITI_Public_Comments. In order to be considered in
development of the trial implementation version of the supplement, comments must be received
35   by June 22, 2018.

This supplement describes changes to the existing technical framework documents.

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

Amend section X.X by the following:

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

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

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

Information about the organization of IHE Technical Frameworks and Supplements and the
process used to create them can be found at http://ihe.net/IHE_Process and http://ihe.net/Profiles.

The current version of the IHE IT Infrastructure Technical Framework can be found at
50   http://ihe.net/Technical_Frameworks.

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Introduction to this Supplement

This supplement introduces a new Asynchronous Web Services (WS) Exchange stack based on the OASIS Applicability Statement 4 (AS4).

The current WS-Addressing Asynchronous WS Exchange stack is an IHE specialization of the asynchronous capabilities of the WS stack that has not been widely implemented. It is based on WS-Addressing and MTOM/XOP and is left unchanged by this Supplement.

Providing a more robust Asynchronous WS Exchange Option is attractive for upcoming cross-border ehealth information exchange, such as the European eHealth Digital Service Infrastructure that deploys the XCA, XCPD, and XCDR Profiles and for countries where the adoption of the OASIS AS4 reliable and secure messaging is common when cross-sector (beyond the health sector) applicability is needed.

This new Asynchronous Web Services Exchange stack:

- Relies on the OASIS AS4 WS Stack that has been natively designed to support Asynchronous WS Exchange and offers:

  a. Message packaging governed by ebMS 3.0 and message security governed by WS-Security

  b. Support for both *push* and *pull* message exchange choreographies

  c. Payload compression

  d. Non-Repudiation of Origin and Receipt (NRO/NRR)

  e. Reception Awareness – simple and effective reliable messaging with no known interoperability issues

- Is introduced as:

  a. An option to the profiles where the current WS-Addressing based Asynchronous WS Exchange is currently available,

  b. A new option to the XDR and XCDR Profiles, where the ITI-41 is specified to support Asynchronous WS, but the option is not exposed.

Open Issues and Questions

AS4-1: Which is the best approach to convey the document content in the case of IHE transactions ITI-39, ITI-41, ITI-43 and ITI-80 that involves the inclusion of document metadata along with document content?

Several packaging alternatives can be considered:

1. *Place all document content inline as content of xds:Document elements in base64 encoded form in the XML document in the SOAP Body (and not in a MIME Attachment)*

2. *Place all document content inline as content of xds:Document elements in base64 encoded form in the XML document in a MIME Attachment*

3. *Place each individual document content inline in native format as separate MIME parts that are <u>directly</u> cross-referenced from rim:ExtrinsicObject metadata using the Volume 3,   4.2.3.2.27 DocumentEntry.URI mechanism*

4. *Place all document inline in native format as separate MIME parts that are <u>indirectly</u> cross-referenced from rim:ExtrinsicObject by placing the value of that object's "id" attribute as a Part Property in the AS4 PartInfo. As that same PartInfo element links to the MIME part content identifier using its "href" attribute, metadata and payload content are unambiguously linked.*

Proposed Solution: *Alternative 4 was chosen for Public Comments.*

Alternative 1 is suboptimal as the payloads have to be base64-encoded and base64-decoded and the overall message size increases due to the AS4 compression feature not being applicable to SOAP Body content.

Alternative 2 is also suboptimal as the payloads also have to be base64-encoded and base64-decoded. An advantage over Alternative 1 is that the message size will be optimized as the AS4 compression feature can be applied to MIME parts.

In Alternative 3 and 4 there is no base64-encoding or decoding and compression is available (if the native format is not already natively compressed). However, in Alternative 3, the RIM XML has to be aware of AS4 message MIME content identifiers, a task normally left to the AS4 engine.

Therefore, the current draft uses Alternative 4, as it has the advantages of Alternative 3, and provides a higher degree of indirection. When available, it concatenates the HomeCommunityID with the documentId to strengthen uniqueness in case the same documentID is used for different documents in different communities.

Question: *do you agree with the proposed packaging Alternative 4?*

AS4-2: _AS4 supports both a Push-and-Push mode and a Push and Pull mode. They are both covered by Appendix V.4. The two modes are described in the figures below._
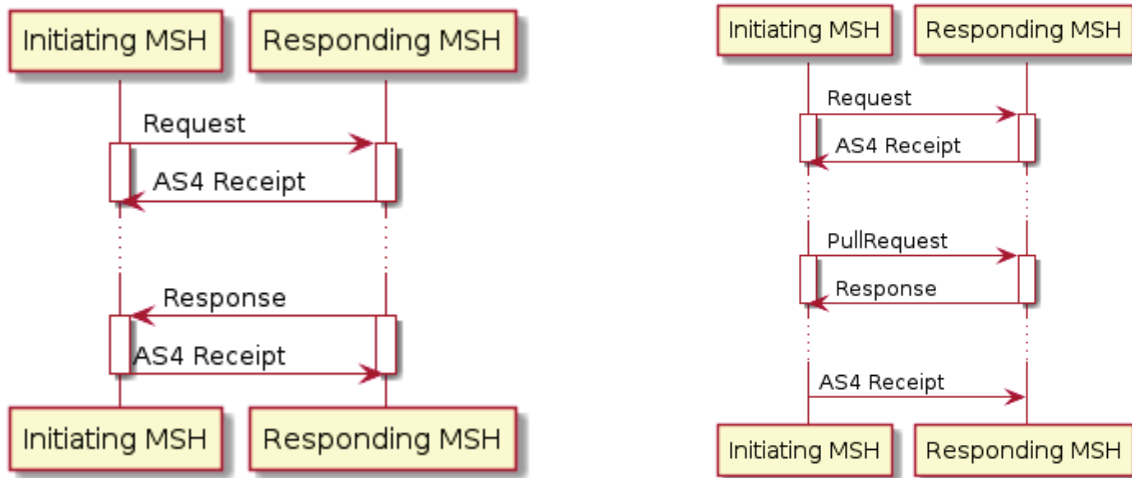
240   **_Should we:_**

1.   _Introduce both an Asynchronous-Push-Push Option and an Asynchronous-Push-Pull Option in Appendix V.4 and not specify a choice in the IHE transactions. By allowing implementations to support either one or both we leave the deployment more flexible. AS4 engines typically support both._

245   2.   _Select in the transactions covered by this Supplement either the Push-and-Push mode or the Push-and-Pull depending on the transaction. However, end-to-end considerations may influence this choice, thus requiring the flexibility of Alternative 1._

Proposed Solution: _Alternative 1 was chosen for Public Comments._

_Question__: Do you agree with the proposed Alternative 1?_

250   **_Question:_** _Is the creation of an intermediary that converts push-Push into Push-Pull considered in AS4?_

AS4-3: _The Public Comment Appendix V identifies 4 different types of MEP in the PMode possibilities, as show below:_

PMode.MEPBinding	Support required for one or more of the following values:
	http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/push
	http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/pushAndPush
	http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/pushAndPull
	http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/pullAndPush

255 *The Profiles and Transactions in this Public Comment Supplement are not specific in term of the specific PModes.MEP values they support/require. The intend was to leave flexibility by including some PModes.MEP that are not applicable to this supplement's specific transactions (e.g., Push only)*

Question:*.Should the Transactions be more specific in their specifications? Should Appendix V*
260 *be further constrained?*

Question:*.Should the one-way push be removed as it is not used today by any IHE Transaction ?*

AS4-4: *How to deal with AS4 examples?*

Proposed Resolution*: Examples of AS4 differ minimally based on the transaction conveyed*
265 *(Service, Action, To/From Roles reversed, etc.). A number of typical examples have been included in Appendix V Section 4 with notes explaining the few "attributes" that are being changed depending of the transactions. This avoids fragmenting the examples and/or spread them around the various transactions.*

Question: *Is that approach effective and acceptable?*
270

AS4-5: *The Deferred Option seems to be an Asynchronous type exchange in XCPD**. Is it still needed with the AS4 Asynchronous Option? Should it be a push and push AS4 Asynchronous P-Mode MEP?*

Proposed response: *It is proposed to keep the Deferred Option as currently specified as it is an*
275 *application (versus transport-level) mode of operation, longer term delays (hours and days) compared to the AS4 Asynchronous push and push typical delays (minutes).*

Question: *Is that approach acceptable?*

AS4-6: *Support of AS4 Asynchronous Web Service Exchange Option on ITI-18 Query Stored*
280 **Registry and ITI-43 Retrieve Document Set-b.**

XCA Profile supports the XDS Affinity Domain Option that requires ITI-18 and ITI-43 transactions from the XDS Profile, triggered by a Document Consumer to an Initiating Gateway. These transactions support the current WS-Addressing Asynchronous Web Services Option. This Supplement introduces the AS4 Asynchronous Web Services Option to align both Asynchronous
285 *Options.*

Should we:

1. *Support in the Supplement the AS4 Asynchronous Web Services Option on these two XDS transactions when the Document Consumer interacts with the Initiating Gateway of the XCA Profile.*

290   *2.*   *Extend the support of the AS4 Asynchronous Web Services Option to all actors and transactions of the XDS Profile where the Asynchronous Web Services Option already exists.*

         3.   *Remove the support of the AS4 Asynchronous Web Services Option on the ITI-18 and ITI-43 transactions.*

295   ***Proposed response:*** *For public Comments, it is proposed to proceed with Alternative 1. To clarify this support, the Document Consumer Actor has been explicitly introduced in the XCA Profile (in current XCA the ITI-18 and ITI-43 transactions are required with the XDS Affinity Domain Option, but the XDS Document Consumer Actor was not explicitly).*

Question*: Is that the good approach?*

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AS4-7*: With the support of two Asynchronous options:*

- *the AS4 Asynchronous Web Service Exchange Option and*

- *the WS-Addressing Asynchronous Web Service Exchange Option,*

until the WS-Addressing Asynchronous Web Service Exchange Option is eventually retired.
305   *This results in having to rename the current "Asynchronous Web Service Exchange Option" into:* <u>*WS-Addressing*</u> *Asynchronous Web Service Exchange Option. This is what has been done by this Supplement with XCA, XCPD, XDR and XCDR.*

Proposed resolution: *Some profiles such as XDS, MPQ and XCF that reference the current **Asynchronous Web Service Exchange Option** are not updated as part of this supplement with*
310   *the support of the AS4 Asynch. Option. It is proposed to include in this supplement the update the name of the asynchronous option in those other profiles by adding "**WS-Addressing".***

Question: *Is that a good approach? If agreed the corresponding updates will be added to the supplement during public comment resolution.*

315   ***AS4-8****: With the introduction of the AS4 Asynchronous Web Service Exchange Option and the making of the WS-Addressing Asynchronous Web Service Exchange Option no longer required on Responding Gateways (lowering requirements in the current XCA Profile), this supplement introduces a gap in the way integration statements may be interpreted.*

Design Assumption in Public Comment Draft: *When making the current WS-Addressing*
320   *Asynch support as an explicit Option on the XCA Responding Gateway, one provides the flexibility to product designers and deployment to select the Asynchronous Option they prefer, either WS-Addressing or AS4 or both. It has also been decided to maintain Synchronous as a required baseline to ensure interoperability among all XCA Initiating or Responding GW that support XCA.*

325   ***Question:*** *Is the above design assumption acceptable despite the following side effect:*

- **Fact 1:** *The current Public Comment Supplement allows a product claiming support of the XCA Profile as a Responding Gateway <u>to not support</u> WS-Addressing Asynchronous Web Service Exchange*

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- **Fact 2:** *An existing product that has been defined for claiming the support of the XCA Profile as a Responding Gateway <u>supports</u> WS-Addressing Asynchronous Web Service Exchange, while the product integration statement does not explicitly claim the WS-Addressing Asynchronous Option).*

For Public Comment, it was felt more important to maintain Synchronous as a baseline given that it is so widely deployed and used and induce the above "understatement" in Integration
335 *Statements. Integration Statements of products released before this supplement would need to be updated to make the WS-Addressing Asynchronous Option explicit).*

AS4-9: The various "urn" referenced in this Supplement need to be checked to ensure that they are registered in the IHE terminology Wiki.

340 *Action: This will be done during the development of the TI version of the Supplement.*

AS4-21: Section 3.55.6 Protocol Requirements may need a review to consider redocumentation in order to better split the payload (HL7®[1]V3 Transaction) from the various SOAP transport mappings.

345 *Action: This will be done during the development of the TI version of the Supplement.*

AS4-22: Section V.4.4.6 Message Layer Security places some requirements for channel encryption that may be perceived to interact with ATNA requirements through statements such as:

350 *Signing and encryption are configured using P-Modes. The use of message layer signing is configured using the PMode[].Security. X509.Signature parameter set. The use of message layer encryption is configured using the PMode[].Security. X509.Encryption parameter set.*

Question: Is there a need for an update to the IHE ATNA Profile or some form of cross-profile
355 *consideration to be added?*

AS4-23: In Synchronous and WS-Addressing Asynchronous (See 3.55.4.1.2 and 3.55.4.2.2) for ITI-55 Cross Gateway Patient Discovery, there is a capability to set a duration time suggestion for caching correlations resulting from the interaction. For example: *The Initiating*

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[1] HL7 is the registered trademark of Health Level Seven International.

360   *Gateway may specify a duration value in the SOAP Header element of the request. This value suggests to the Responding Gateway a length of time that the Initiating Gateway recommends caching any correlation resulting from the interaction. The duration value is specified in the SOAP Header using the CorrelationTimeToLive element and contains a value conformant with the xs:duration type defined in http://www.w3.org/TR/xmlschema-2/#duration.*

365   ***Question: Should this capability be also included in the AS4 Asynchronous WebService Exchange for the request and the response? What technical approach do you recommend?***

Closed Issues

AS4-10: Should this work item engage in redocumenting the XD* transaction that have not
370 *yet been redocumented (e.g., ITI-43 Retrieve Document Set)?*

     Resolution: No systematic redocumentation effort has been made for two reasons:

- o *It was felt critical to avoid mixing of editorial redocumentation with actual technical changes introducing the AS4 Asynchronous Option. Such mixing is prone to accidental changes that would impact the current specification of*
375   *synchronous web services.*

- o *This is a rather extensive effort that would have distracted resource for the primary focus of the Supplement.*

- o *As a result, it has been decided to update the various transaction, keeping their respective documentation styles (consistency within the transaction has been*
380   *preferred).*

AS4-11: Timing issue: Is pre-work needed in 2018 Final Text publication to issue a CP-1122 to clear up editorial structure "baggage" to make the AS4 supplement simpler and easier to apply when eventually approved?

385   *Resolution: It is a possibility that has been applied to Appendix V. There are three types of changes needed for Appendix V:*

1. *Improve the structure and remove some of the somewhat obsolete discussion material. Creating a new structure that will be capable to perform more simply the extensions to add the definition of the AS4 asynchronous webservices is*
390   *proposed to be addressed by a redocumentation CP-1122.*

2. *Correct references to an ongoing effort by HL7 on web services that never resulted in a published standard and update the references to current OASIS webservices standards. This will not be addressed by this supplement, but by a distinct CP-1123.*

395　　　　3.　*Introduce the AS4 based asynchronous web services exchange options, which is the focus of this supplement. There this supplement will build upon the redocument CP identified in point 1.*

AS4-12:　The use of the SOAP specific attributes for both the Synchronous and the AS4
400　**Asynchronous Web Services stacks will not be moved to Appendix V.** *This would reduce the documentation details in the various transactions referencing Appendix V. However, there are sufficient differences for each transaction to document and it was not the way it was done so far.*

Resolution: *The style proposed in the Public Comment version is to leave this documentation in the Transaction and use in the case of Asynchronous the same*
405　*approach as the one used for Synchronous.*

General Introduction and Shared Appendices

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

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> *Update the following appendices to the General Introduction as indicated below. Note that these are **not** appendices to Volume 1.*

415 ## Appendix D – Glossary

> *Add the following **new** glossary terms to the IHE Technical Frameworks General Introduction Appendix D.*

Glossary Term	Definition
ebMS3.0	Electronic Business Messaging 3.0: A family of standards from OASIS
AS4	Applicability Statement 4: A profile of ebMS3.0

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Volume 1 – Profiles

> **<mark>*XDR Profile*</mark>**
>
> *Update Vol 1 Section 15.2 as follows:*

425 ## 15.2 XDR Integration Profile Options

Options that may be selected for this Integration Profile are listed in Table 15.2-1 along with the Actors to which they apply. Dependencies between options when applicable are specified in notes.

Table 15.2-1: XDR - Actors and Options

Actor	Options	Vol. & Section
Document Source	Basic Patient Privacy Enforcement	ITI TF-1: 15.2.2
	AS4 Asynchronous Web Services Exchange	**ITI TF-1: 15.2.4**
Metadata-Limited Document Source	Basic Patient Privacy Enforcement	ITI TF-1: 1 5.2.2
	AS4 Asynchronous Web Services Exchange	**ITI TF-1: 15.2.4**
Document Recipient	Basic Patient Privacy Enforcement	ITI TF-1: 15.2.2
	Accepts Limited Metadata	ITI TF-1: 15.2.3
	AS4 Asynchronous Web Services Exchange	**ITI TF-1: 15.2.4**

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15.2.1 Intentionally Left Blank

15.2.2 Basic Patient Privacy Enforcement Option

For this option, see ITI TF-1: 10.2.9

15.2.3 Accepts Limited Metadata

435 When the Document Recipient declares this option, it will accept metadata entries from a Metadata-Limited Document Source which use the less rigorous metadata attribute requirements as shown in ITI TF-2b: Table 3.41.4.1.2-2.

15.2.4 AS4 Asynchronous Web Services Exchange Option

Asynchronous processing is necessary to support scaling to large numbers of sources and recipients because Asynchronous Web Services Exchange allows for more efficient handling of latency and scale. This AS4 Asynchronous Web Services Exchange stack relies on the OASIS AS4 WS Stack that has been natively designed to support Asynchronous WS Exchange and offers (see also ITI TF:2x Appendix V.5):

    a. Message packaging governed by ebMS 3.0 and message security governed by WS-Security

    b. Support for both *push* and *pull* message exchange choreographies

    c. Payload compression

    d. Non-Repudiation of Origin and Receipt (NRO/NRR)

    e. Reception Awareness – simple and effective reliable messaging with no known interoperability issues

Document Sources which support AS4 Asynchronous Web Services Exchange Option shall support AS4 Asynchronous Web Services Exchange on the Provide and Register Document Set-b [ITI-41] transaction.

Metadata-Limited Document Sources which support AS4 Asynchronous Web Services Exchange Option shall support AS4 Asynchronous Web Services Exchange on the Provide and Register Document Set-b [ITI-41] transaction.

Document Recipients which support AS4 Asynchronous Web Services Exchange Option shall support AS4 Asynchronous Web Services Exchange on the Provide and Register Document Set-b [ITI-41] transaction.

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> ### XCA Profile
>
> *Update Vol 1 Section 18.1 and 18.2 as follows (including the updated Figure 18.1-1):*

465 **18.1 Actors/ Transactions**

Figure 18.1-1 shows the actors directly involved in the XCA Integration Profile and the relevant transactions between them.

Note: The Document Consumer is shown in Figure 18.1-1 to clarify the responsibility of the XDS Affinity Domain Option discussed in Section 18.2.
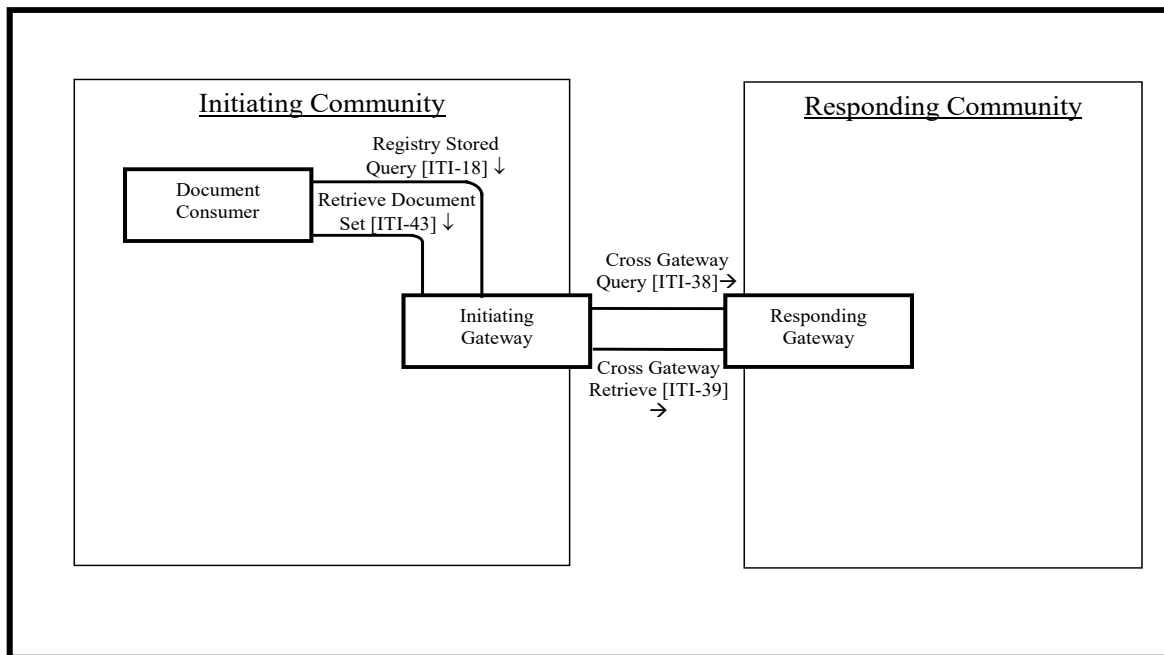
470

Figure 18.1-1: XCA Actor Diagram

Table 18.1-1 lists the transactions for each actor directly involved in the XCA 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 475 defined by this Integration Profile and that implementations may choose to support is listed in Section 18.2.

Table 18.1-1: XCA Integration Profile - Actors and Transactions

Actors	Transactions	Optionality	Section
Initiating Gateway	Cross Gateway Query [ITI-38]	R	ITI TF-2b: 3.38
	Cross Gateway Retrieve [ITI-39]	R	ITI TF-2b: 3.39

Actors	Transactions	Optionality	Section
	Registry Stored Query [ITI-18]	O	ITI TF-2a: 3.18
	Retrieve Document Set [ITI-43]	O	ITI TF-2b: 3.43
Responding Gateway	Cross Gateway Query [ITI-38]	R	ITI TF-2b: 3.38
	Cross Gateway Retrieve [ITI-39]	R	ITI TF-2b: 3.39
Document Consumer	**Registry Stored Query [ITI-18]**	**R**	**ITI TF-2a: 3.18**
	Retrieve Document Set [ITI-43]	**R**	**ITI TF-2b: 3.43**

Note: When an Initiating or Responding Gateway is grouped with a Document Consumer, there are additional requirements.
See Section 18.2.3 for a description of grouping.

18.2 XCA Integration Profile Options

Options that may be selected for this Integration Profile are listed in the Table 18.2-1 along with the Actors to which they apply. Dependencies between options when applicable are specified in notes.

Table 18.2-1: XCA Integration Profile - Actors and Options

Actor	Options	Vol. & Section
Initiating Gateway	XDS Affinity Domain Option	ITI TF-1: 18.2.1
	WS-Addressing Asynchronous Web Services Exchange	ITI TF-1: 18.2.2
	On-Demand Documents	ITI TF-1: 18.2.4
	AS4 Asynchronous Web Services Exchange	**ITI TF-1: 18.2.6**
Responding Gateway	On-Demand Documents	ITI TF-1: 18.2.4
	Persistence of Retrieved Documents	ITI TF-1: 18.2.5
	WS-Addressing Asynchronous Web Services Exchange	**ITI TF-1: 18.2.2**
	AS4 Asynchronous Web Services Exchange	**ITI TF-1: 18.2.6**
Document Consumer	**Document Replacement (See note)**	**ITI TF-1: 10.2.1**
	Document Addendum (See note)	**ITI TF-1: 10.2.2**
	Document Transformation (See note)	**ITI TF-1: 10.2.3**
	Folder Management (See note)	**ITI TF-1: 10.2.4**
	Basic Patient Privacy Enforcement (See note)	**ITI TF-1: 10.2.9**
	WS-Addressing Asynchronous Web Services Exchange	**ITI TF-1: 18.2.2**
	AS4 Asynchronous Web Services Exchange	**ITI TF-1: 18.2.6**

Note: The Options on the Document Consumer Actor, besides the two Asynchronous ones, are identical to those defined in the XDS Profile (See ITI TF-1: 10.2).

Update Vol 1 Section 18.2.2 as follows:

18.2.2 <u>WS-Addressing</u> Asynchronous Web Services Exchange Option

495 **<u>Asynchronous processing is necessary to support scaling to large numbers of sources and recipients because Asynchronous Web Services Exchange allows for more efficient handling of latency and scale. This WS-Addressing Asynchronous Web Services Exchange stack relies on the Web Service Addressing Stack (see also ITI TF:2x Appendix V.3).</u>**

Initiating Gateways which support <u>**WS-Addressing**</u> Asynchronous Web Services Exchange shall
500 support <u>**WS-Addressing**</u> Asynchronous Web Services Exchange on the Cross Gateway Query [ITI-38] and Cross Gateway Retrieve [ITI-39] transactions.

If the Initiating Gateway supports both the XDS Affinity Domain Option and the <u>**WS-Addressing**</u> Asynchronous Web Services Option, ~~it~~ <u>**the Initiating Gateway**</u> shall support <u>**WS-Addressing**</u> Asynchronous Web Services Exchange on the Registry Stored Query [ITI-18] and
505 Retrieve Document Set [ITI-43] transactions. **<u>These transactions are triggered by a Document Consumer Actor that also supports WS-Addressing Asynchronous Web Services.</u>**

<u>Responding Gateways which support WS-Addressing Asynchronous Web Services Exchange shall support WS-Addressing Asynchronous Web Services Exchange on the Cross Gateway Query [ITI-38] and Cross Gateway Retrieve [ITI-39] transactions.</u>

510

Add a new Vol 1 Section 18.2.6 as follows:

18.2.6 AS4 Asynchronous Web Services Exchange Option

Asynchronous processing is necessary to support scaling to large numbers of communities
515 because Asynchronous Web Services Exchange allows for more efficient handling of latency and scale. This AS4 Asynchronous Web Services Exchange stack relies on the OASIS AS4 WS Stack that has been natively designed to support Asynchronous WS Exchange and offers (see also ITI TF-2x: Appendix V.5):

a. Message packaging governed by ebMS 3.0 and message security governed by WS-
520   Security

b. Support for both *push* and *pull* message exchange choreographies

c. Payload compression

d. Non-Repudiation of Origin and Receipt (NRO/NRR)

e. Reception Awareness – simple and effective reliable messaging with no known
525   interoperability issues

Initiating Gateways which support AS4 Asynchronous Web Services Exchange shall support AS4 Asynchronous Web Services Exchange on the Cross Gateway Query [ITI-38] and Cross Gateway Retrieve [ITI-39] transactions.

530 If the Initiating Gateway supports both the XDS Affinity Domain Option and the AS4 Asynchronous Web Services Option, the Initiating Gateway shall support AS4 Asynchronous Web Services Exchange on the Registry Stored Query [ITI-18] and Retrieve Document Set [ITI-43] transactions. These transactions are triggered by a Document Consumer Actor that also supports AS4 Asynchronous Web Services.

535 Responding Gateways which support AS4 Asynchronous Web Services Exchange shall support AS4 Asynchronous Web Services Exchange on the Cross Gateway Query [ITI-38] and Cross Gateway Retrieve [ITI-39] transactions.

> ***XCPD Profile***
>
> *Update Vol 1 Section 27.1.1 as follows:*

540 ## 27.1.1 Actors

27.1.1.1 Initiating Gateway

The Initiating Gateway supports all outgoing inter-community communications. XCPD uses this actor to initiate the Cross Gateway Patient Discovery [ITI-55]. ~~The Initiating Gateway is required to support synchronous transaction messaging and may declare an option to~~
545 ~~support Asynchronous Web Services Exchange. Choosing Asynchronous Web Services Exchange will allow the Initiating Gateway to support workflows which scale to large numbers of communities because Asynchronous Web Services Exchange allows for more efficient handling of latency and scale.~~

27.1.1.2 Responding Gateway

550 The Responding Gateway supports all incoming inter-community communications. XCPD uses this actor to receive the Cross Gateway Patient Discovery [ITI-55]. ~~The Responding Gateway is required to support either or both the Asynchronous Web Services Exchange all implemented transactions. This allows the Initiating Gateway to choose the better of the two messaging patterns (synchronous or asynchronous) that fit the needs of the workflow.~~
555 ~~Support for Asynchronous Web Services Exchange allows for workflows which scale to large numbers of communities because it can handle latency and scale more efficiently.~~

> *Update Vol 1 Section 27.2 as follows:*

27.2 XCPD Integration Profile Options

560 Options that may be selected for this Integration Profile are listed in Table 27.2-1 along with the Actors to which they apply. Dependencies between options when applicable are specified in notes.

Table 27.2-1: XCPD - Actors and Options

Actor	Options	Vol. & Section
Initiating Gateway	**WS-Addressing** Asynchronous Web Services Exchange	ITI TF-1: 27.2.1
	AS4 Asynchronous Web Services Exchange	**ITI TF-1: 27.2.3**
	Deferred Response	ITI TF-1: 27.2.2
Responding Gateway	Deferred Response	ITI TF-1: 27.2.2
	WS-Addressing Asynchronous Web Services Exchange	**ITI TF-1: 27.2.1**

Actor	Options	Vol. & Section
	AS4 Asynchronous Web Services Exchange	**ITI TF-1: 27.2.3**

27.2.1 <u>WS-Addressing</u> Asynchronous Web Services Exchange Option

565 **Asynchronous processing is necessary to support scaling to large numbers of communities because Asynchronous Web Services Exchange allows for more efficient handling of latency and scale (see also ITI TF:2x Appendix V.3).**

Initiating Gateways which support **WS-Addressing** Asynchronous Web Services Exchange **Option** shall support **WS-Addressing** Asynchronous Web Services Exchange on the Cross

570 Gateway Patient Discovery [ITI-55]. ~~Asynchronous processing is necessary to support scaling to large numbers of communities because Asynchronous Web Services Exchange allows for more efficient handling of latency and scale.~~

Responding Gateways which support WS-Addressing Asynchronous Web Services Exchange Option shall support WS-Addressing Asynchronous Web Services Exchange on

575 **the Cross Gateway Patient Discovery [ITI-55].**

27.2.2 Deferred Response Option

…

27.2.3 AS4 Asynchronous Web Services Exchange Option

580 **Asynchronous processing is necessary to support scaling to large numbers of communities because Asynchronous Web Services Exchange allows for more efficient handling of latency and scale. This new Asynchronous Web Services Exchange stack relies on the OASIS AS4 WS Stack that has been natively designed to support Asynchronous WS Exchange and offers (see also ITI TF:2x Appendix V.5):**

585   **a. Message packaging governed by ebMS 3.0 and message security governed by WS-Security**

    b. Support for both push and pull message exchange choreographies

    c. Payload compression

    d. Non-Repudiation of Origin and Receipt (NRO/NRR)

590   **e. Reception Awareness – simple and effective reliable messaging with no known interoperability issues**

Initiating Gateways which support AS4 Asynchronous Web Services Exchange Option shall support AS4 Asynchronous Web Services Exchange on the Cross Gateway Patient Discovery [ITI-55] transaction.

595   **<u>Responding Gateways which support AS4 Asynchronous Web Services Exchange Option shall support AS4 Asynchronous Web Services Exchange on the Cross Gateway Patient Discovery [ITI-55] transaction.</u>**

> **XCDR Trial Implementation Supplement:**
>
> 600 | *Update Section 40.2 as follows:*

40.2 XCDR Actor Options

Options that may be selected for each actor in this profile, if any, are listed in Table 40.2-1. Dependencies between options when applicable are specified in notes.

Table 40.2-1: XCDR - Actors and Options

Actor	Options	Reference
Initiating Gateway	Basic Patient Privacy Enforcement	ITI TF-1: 40.2.1 ITI TF-2c: 3.80.4.1.3.1
	AS4 Asynchronous Web Services Exchange	**ITI TF-1: 40.2.2**
Responding Gateway	Basic Patient Privacy Enforcement	ITI TF-1: 40.2.1 ITI TF-2c: 3.80.4.1.3.1
	AS4 Asynchronous Web Services Exchange	**ITI TF-1: 40.2.2**

605

40.2.1 Basic Patient Privacy Enforcement

An Initiating Gateway shall be able to be configured with the Patient Privacy Policies, Patient Privacy Policy Identifiers (OIDs) and associated information necessary to understand and enforce the community Policy where the XCDR Initiating and Responding Gateways operate.
610 See ITI TF-2c: 3.80.4.1.3.1.

40.2.2 AS4 Asynchronous Web Services Exchange

Asynchronous processing is necessary to support scaling to large numbers of sources and recipients because Asynchronous Web Services Exchange allows for more efficient handling of latency and scale. This new Asynchronous Web Services Exchange stack relies
615 **on the OASIS AS4 WS Stack that has been natively designed to support Asynchronous Web S Exchange and offers (see also ITI TF-2x: Appendix V.5):**

   a. **Message packaging governed by ebMS 3.0 and message security governed by WS-Security**

   b. **Support for both push and pull message exchange choreographies**

620   c. **Payload compression**

   d. **Non-Repudiation of Origin and Receipt (NRO/NRR)**

   e. **Reception Awareness – simple and effective reliable messaging with no known interoperability issues**

625 **Initiating Gateways which support AS4 Asynchronous Web Services Exchange Option shall support AS4 Asynchronous Web Services Exchange on the Cross Gateway Document Provide [ITI-80] transaction.**

Responding Gateways which support AS4 Asynchronous Web Services Exchange Option shall support AS4 Asynchronous Web Services Exchange on the Cross Gateway Document Provide [ITI-80] transaction.

630

> *Update Profile Options in XDS, MPQ and XCF to rename "Asynchronous Web Services Exchange" to "WS-Addressing Asynchronous Web Services Exchange", to avoid proliferation of inconsistent names on the same option.*

635 To do. This is planned to be added during Public Comment resolution (See Open Issue AS4-7).

Volume 2 – Transactions

> *In Vol 2a Section 3.18 ==Registry Stored Query [ITI-18]==, update the specific sections listed below*
> 640 *with the changes highlighted.*

> *Update Vol 2A Section 3.18 as follows.*

3.18 Registry Stored Query [ITI-18]

645 This section corresponds to Transaction ITI-18 of the IHE Technical Framework. Transaction ITI-18 is used by the Document Registry and Document Consumer Actors.

Actors that support the **WS-Addressing** Asynchronous Web Services Exchange Option and implement the Registry Stored Query transaction shall support the following:

- Document Consumer shall support **WS-Addressing** Asynchronous Web Services
650 Exchange for the Registry Stored Query [ITI-18] and Retrieve Document Set [ITI-43] transactions

- Document Registry shall support **WS-Addressing** Asynchronous Web Services Exchange for the Registry Stored Query [ITI-18] and Register Document Set – b [ITI-42] transactions

655 **Actors that support the AS4 Asynchronous Web Services Exchange Option and implement the Registry Stored Query transaction shall support the following:**

- **Document Consumer shall support AS4 Asynchronous Web Services Exchange for the Registry Stored Query [ITI-18] and Retrieve Document Set [ITI-43] transactions**

660 - **Document Registry shall support AS4 Asynchronous Web Services Exchange for the Registry Stored Query [ITI-18] and Register Document Set – b [ITI-42] transactions**

Refer to ITI TF-2x: ~~V.5 Synchronous and Asynchronous Web Services Exchange for an explanation of Asynchronous Web Services Exchange.~~ **Appendix V Web Services for IHE Transactions for an explanation of Asynchronous Web Services Exchange.**

665

670

> *Update Vol 2a Section 3.18.4.1.2.7 as follows.*

3.18.4.1.2.7 Web Services Transport

The requirements for Web Services transport for Asynchronous, WS-Addressing Synchronous and AS4 Asynchronous are described in this section.

675 **For the support of Synchronous and WS-Addressing Asynchronous web service exchange case the requirements are the following.**

The query request and response will be transmitted using Web Services, according to the requirements specified in ITI TF-2x: Appendix V., the specific values for the WSDL describing the Stored Query Service are described in this section.

680 The Document Registry shall accept a Registry Stored Query Request formatted as a SIMPLE SOAP message and respond with a Registry Stored Query Response formatted as a SIMPLE SOAP message. The Document Consumer shall generate the Registry Stored Query Request formatted as a SIMPLE SOAP message and accept a Registry Stored Query Response formatted as a SIMPLE SOAP message.

685 **IHE-WSP201) The attribute /wsdl:definitions/@name shall be "DocumentRegistry".**

The following WSDL naming conventions shall apply:

```
      wsdl:definitions/@name="DocumentRegistry":
query message     -> "RegistryStoredQuery_Message"
      query response   -> "RegistryStoredQuery_Response_Message"
      portType         -> "DocumentRegistry_PortType"
      operation        -> "RegistryStoredQuery"
      SOAP 1.2 binding -> "DocumentRegistry_Binding_Soap12"
      SOAP 1.2 port    -> "DocumentRegistry_Port_Soap12"
```

690

695 **IHE-WSP202) The targetNamespace of the WSDL shall be "urn:ihe:iti:xds-b:2007"**

Document Registry: These are the requirements for the Registry Stored Query transaction presented in the order in which they would appear in the Document Registry WSDL definition:

- The following types shall be imported (xsd:import) in the /definitions/types section:

    o namespace=" urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0",
700   schemaLocation="query.xsd"

- The /definitions/message/part/@element attribute of the Registry Stored Query Request message shall be defined as "query:AdhocQueryRequest"

- The /definitions/message/part/@element attribute of the Registry Stored Query Response message shall be defined as "query:AdhocQueryResponse"

705 - Refer to Table 3.18.4.1.2.7-1 below for additional attribute requirements

- To support the Asynchronous Web Services Exchange Option on the Document Consumer, the Document Registry shall support the use of a non-anonymous response EPR in the WS-Addressing replyTo header.

Table 3.18.4.1.2.7-1: Additional Attribute Requirements

Attribute	Value
/definitions/portType/operation@name	DocumentRegistry_RegistryStoredQuery
/definitions/portType/operation/input/ @wsaw:Action	urn:ihe:iti:2007:RegistryStoredQuery
/definitions/portType/operation/output/ @wsaw:Action	urn:ihe:iti:2007:RegistryStoredQuery Response
/definitions/binding/operation/wsoap12 :operation/@soapActionRequired	false

710

The following WSDL fragment shows an example of Registry Stored Query transaction definition:

```
715
      <?xml version="1.0" encoding="utf-8"?>
      <definitions ...>
        ...
        <types>
            <xsd:schema elementFormDefault="qualified"
      targetNamespace="urn:ihe:iti:xds-b:2007">
720
                <xsd:import
                    namespace="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
                    schemaLocation="schema\query.xsd"/>
                ...
            </xsd:schema>
725
        </types>
        <message name="RegistryStoredQuery_Message">
            <documentation>Registry Stored Query</documentation>
            <part name="body" element="query:AdhocQueryRequest"/>
        </message>
730
        <message name="RegistryStoredQueryResponse_Message">
            <documentation>Registry Stored Query Response</documentation>
            <part name="body" element="query:AdhocQueryResponse"/>
        </message>
        ...
735
        <portType name="DocumentRegistry_PortType">
            <operation name="DocumentRegistry_RegistryStoredQuery">
                <input message="ihe:RegistryStoredQuery_Message"
                        wsaw:Action="urn:ihe:iti:2007:RegistryStoredQuery"/>
                <output message="ihe:RegistryStoredQueryResponse_Message"
740
        wsaw:Action="urn:ihe:iti:2007:RegistryStoredQueryResponse"/>
            </operation>
            ...
        </portType>
745
        ...
      </definitions>
```

A full WSDL for the Document Repository and Document Registry Actors is found in ITI TF-2x: Appendix W.

750

The requirements for the Registry Stored Query Request using the AS4 Asynchronous transport are described below.

- **The <eb:Service> SOAP element shall be set to the value: urn:ihe:iti:2007:Registry StoredQuery**

755
- **The <eb:Action> SOAP element shall contain the value: urn:ihe:iti:2007:Registry StoredQuery**

- **The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Requester**

- **The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Provider**

- **The <soap12:Body> shall contain one <query:AdhocQueryRequest> element**

760
- **The <query:AdhocQueryRequest > element shall contain:**

- **one <rim:AhocQuery> element representing the Adhoc Query Request (see ITI TF-2a: 18.4.1.2.1 through 18.4.1.2.6 for details of expressing an Adhoc Query Request).**

These are the requirements for the Registry Stored Query AS4 Asynchronous Response
765 **transaction:**

- **The <eb:Service> SOAP element shall be set to the value: urn:ihe:iti:2007:RegistryStoredQuery**

- **The <eb:Action> SOAP element shall contain the value: urn:ihe:iti:2007:RegistryStoredQueryResponse**

770
- **The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Provider**

- **The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Requester**

- **The <soap12:Body> shall contain one <query:AdhocQueryResponse> element**

- **The < query:AdhocQueryResponse > element shall contain:**

  o **one < rim:RegistryObjectList> element representing the Adhoc Query Response**
775 **(see ITI TF-2a: 3.18.4.1.2.1 through 3.18.4.1.2.6 for details of expressing an Adhoc Query Response).**

Samples for Registry Stored Query request and response can be found in ITI TF-2x: Appendix V.4.8

780 | *Update Vol 2a Section 3.18.5.1.1 as follows.* |

3.18.5.1.1 Document Consumer audit message:

	Field Name	Opt	Value Constraints
Event **AuditMessage/** **EventIdentification**	EventID	M	EV(110112, DCM, "Query")
	EventActionCode	M	"E" (Execute)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-18", "IHE Transactions", "Registry Stored Query")
Source (Document Consumer) (1)			
Human Requestor (0..n)			
Destination (Document Registry) (1)			
Audit Source (Document Consumer) (1)			
Patient (0..1)			
Query Parameters (1)			

Where:

Source AuditMessage/ ActiveParticipant	UserID	M	If **WS-Addressing** Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. **If AS4 Asynchronous Web Services Exchange is used, the content of the eb:From/eb:Party Id.** Otherwise, not specialized.
	AlternativeUserID	M	The process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address.

…

Update Vol 2a Section 3.18.5.1.2 as follows.

785 ### 3.18.5.1.2 Document Registry audit message:

	Field Name	Opt	Value Constraints
Event AuditMessage/ EventIdentification	EventID	M	EV(110112, DCM, "Query")
	EventActionCode	M	"E" (Execute)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-18", "IHE Transactions", "Registry Stored Query")
Source (Document Consumer) (1)			
Destination (Document Registry) (1)			
Audit Source (Document Registry) (1)			
Patient (0..1)			
Query Parameters (1)			

Where:

Source AuditMessage/ ActiveParticipant	UserID	M	If **WS-Addressing** Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. **If AS4 Asynchronous Web Services Exchange is used, the content of the eb:From/eb:Party Id.** Otherwise, not specialized.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address.

…

790

> *In Vol 2b Section 3.38 ==Cross Gateway Query [ITI-38]==, update the specific sections listed below with the changes highlighted. These changes are of three types:*

> *Update Vol 2b Section 3.38.1 as follows.*

795 **3.38.1 Scope**

The scope of the Cross Gateway Query transaction is based on the Registry Stored Query [ITI-18] transaction. The same set of stored queries is required to be supported and the options controlling what kind of data is returned are the same. Differences from the Registry Stored Query transactions are:

800
- The Cross Gateway Query is between an Initiating Gateway and Responding Gateway.

- Initiating Gateway shall specify the homeCommunityId attribute in all Cross-Community Queries which do not contain a patient identifier.

- The homeCommunityID attribute shall be returned within all appropriate elements.

805
- Responding Gateways ~~shall~~ **may** support the **WS-Addressing** Asynchronous Web Services Exchange Option on the Cross Gateway Query. ~~Support for this function is required in order to enable use of Asynchronous Web Services Exchange in any cross-community interaction. Without this support an Initiating Gateway would require unique configuration, per Responding Gateway, to know if Asynchronous Web Services Exchange was supported. It is expected that Asynchronous Web Services Exchange will be desired by the majority of communities.~~

810

- **Responding Gateways may support the AS4 Asynchronous Web Services Exchange Option on the Cross Gateway Query. To check if Responding Gateways supports the Asynchronous Option, the AS4 Test Service may be used (See ITI TF:2x Appendix V.4).**

815
- **WS-Addressing** Asynchronous Web Services Exchange ~~is~~ **is an option on the Initiating Gateway, see ITI TF-1: 18.2.2.**

- **AS4 Asynchronous Web Services Exchange is** an option~~s~~ on the Initiating Gateway, see ITI TF-1: 18.2.2.

820
- For stored queries that rely on concepts that a community may not support, namely associations, folders and submission sets, a Responding Gateway is allowed to respond with zero entries.

There shall be an agreed upon common coding/vocabulary scheme used for the Cross Gateway Query. For example, a common set of privacy consent vocabularies shall be used.

825

> *Update Vol 2b Section 3.38.3 as follows.*

3.38.3 Referenced Standard

~~Implementers of this transaction shall comply with all requirements described in ITI TF-~~
830 ~~2x: Appendix V Web Services for IHE Transactions.~~

~~ebRIM   OASIS/ebXML Registry Information Model v3.0~~

~~ebRS   OASIS/ebXML Registry Services Specifications v3.0~~

~~ITI TF-3:4   Metadata used in Document Sharing profiles~~

835

ebRIM	OASIS/ebXML Registry Information Model v3.0 This model defines the types of metadata and content that can be stored in an ebXML Registry, a basis for and subset of Document Sharing metadata.
ebRS	OASIS/ebXML Registry Services Specifications v3.0 This defines the services and protocols for an ebXML Registry, used as the basis for the XDS Document Registry
See ITI TF-2x: Appendix V for other referenced standards for SOAP encoding. See ITI TF-3: 4.2 for other referenced standards for metadata element encoding.	

> *Update Vol 2b Section 3.38.5 as follows.*

3.38.5 Protocol Requirements

840 **The requirements for Web Services transport for Asynchronous, WS-Addressing Synchronous and AS4 Asynchronous are described in this section.**

For the support of Synchronous and WS-Addressing Asynchronous web service exchange case the requirements are the following.

The Cross Gateway Query request and response will be transmitted using Synchronous or WS-
845 Addressing/AS4 Asynchronous Web Services Exchange, according to the requirements specified in ITI TF-2x: Appendix V. The protocol requirements are identical to the Registry Stored Query except as noted below.

~~**Table 3.38.5-1: WSDL Namespace Definitions**~~

~~soap~~	~~http://schemas.xmlsoap.org/wsdl/soap/~~
~~soap12~~	~~http://schemas.xmlsoap.org/wsdl/soap12/~~
~~wsaw~~	~~http://www.w3.org/2006/05/addressing/wsdl/~~

~~xsd~~	~~http://www.w3.org/2001/XMLSchema~~
~~ihe~~	~~urn:ihe:iti:xds-b:2007~~
~~rs~~	~~urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0~~
~~lem~~	~~urn:oasis:names:tc:ebxml-regrep:xsd:lem:3.0~~
~~query~~	~~urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0~~

850   **Responding Gateway:** These are the requirements for the Cross Gateway Query **synchronous or WS-Addressing Asynchronous Web Service** transaction presented in the order in which they would appear in the Responding Gateway WSDL definition:

- The following types shall be imported (xsd:import) in the /definitions/types section:

855
  - namespace=" urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0", schemaLocation="query.xsd"

- The /definitions/message/part/@element attribute of the Cross Gateway Query Request message shall be defined as "query:AdhocQueryRequest"

- The /definitions/message/part/@element attribute of the Cross Gateway Query Response message shall be defined as "query:AdhocQueryResponse"

860   - Refer to Table 3.38.5-2 below for additional attribute requirements

Table 3.38.5-2: Additional Attribute Requirements

Attribute	Value
/definitions/portType/operation@name	RespondingGateway_CrossGatewayQuery
/definitions/portType/operation/input/@wsaw:Action	urn:ihe:iti:2007:CrossGatewayQuery
/definitions/portType/operation/output/@wsaw:Action	urn:ihe:iti:2007:CrossGatewayQueryResponse
/definitions/binding/operation/wsoap12:operation/@soapAction Required	false

These are the requirements that affect the wire format of the SOAP message. The other WSDL properties are only used within the WSDL definition and do not affect interoperability. Full
865   sample request and response messages are in Section 3.38.5.1 Sample SOAP Messages.

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

The requirements for the Cross Gateway Query Request using the AS4 Asynchronous transport are described below.

870   **Initiating Gateway: These are the requirements for the Cross Gateway Query AS4 Asynchronous Request transaction:**

- **The <eb:Service> SOAP element shall be set to the value: urn:ihe:iti:2007:CrossGatewayQuery**

875
- **The <eb:Action> SOAP element shall contain the value: urn:ihe:iti:2007:CrossGatewayQuery**

- **The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Requester**

- **The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Provider**

- **The <soap12:Body> shall contain one < query:AdhocQueryRequest > element**

- **The <query:AdhocQueryRequest > element shall contain:**

880
  - **one <rim:AhocQuery> element representing the Adhoc Query Request (see ITI TF-2a: 18.4.1.2.1 through 18.4.1.2.6 for details of expressing an Adhoc Query Request).**

These are the requirements for the Cross Gateway Query AS4 Asynchronous Response transaction:

885
- **The <eb:Service> SOAP element shall be set to the value: urn:ihe:iti:2007:CrossGatewayQuery**

- **The <eb:Action> SOAP element shall contain the value: urn:ihe:iti:2007:CrossGatewayQueryResponse**

- **The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Provider**

890
- **The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Requester**

- **The <soap12:Body> shall contain one <query:AdhocQueryResponse> element**

- **The < query:AdhocQueryResponse > element shall contain:**

  - **one < rim:RegistryObjectList> element representing the Adhoc Query Response (see ITI TF-2a: 3.18.4.1.2.1 through 3.18.4.1.2.6 for details of expressing an**
895
  Adhoc Query Response).

Samples for Cross Gateway Query request and response can be found in ITI TF-2x: Appendix V.4.8

900 | *Update Vol 2a Section 3.38.5.1 as follows.* |

3.38.5.1 Sample SOAP Messages

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

905 ~~the W3C WS-Addressing standard.~~ The body of the SOAP message is omitted for brevity; in a real scenario the empty element will be populated with the appropriate metadata.

Samples presented in this section are also available online on the IHE FTP site, see ITI TF-2x: Appendix W.

910 *Update Vol 2b Section 3.38.5.1.1.2 as follows.*

3.38.5.1.1.2 Asynchronous Web Services Exchange

For the WS-Addressing Asynchronous Option, the sample messages also show the WS-Addressing headers <Action/>, <MessageID/>, <ReplyTo/>…; these WS-Addressing headers are populated according to the W3C WS-Addressing standard

915
```
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
xmlns:a="http://www.w3.org/2005/08/addressing">
  <s:Header>
    <a:Action s:mustUnderstand="1">urn:ihe:iti:2007:CrossGatewayQuery</a:Action>
920    <a:MessageID>urn:uuid:def119ad-dc13-49c1-a3c7-e3742531f9b3</a:MessageID>
    <a:ReplyTo>
      <a:Address>http://192.168.2.4:9080/XcaService/InitiatingGatewayReceiver.svc</a:Address>
    </a:ReplyTo>
    <a:To s:mustUnderstand="1">http://localhost/XcaService/RespondingGatewayReceiver.svc</a:To>
925  </s:Header>
  <s:Body>
    <query:AdhocQueryRequest xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"/>
  </s:Body>
</s:Envelope>
```
930

ForAS4 Asynchronous Option, samples are found in ITI TF-2x: Appendix V.4.8

Update Vol 2b Section 3.38.5.1.2.2 as follows.

935 ### 3.38.5.1.2.2 Asynchronous Web Services Exchange

For the WS-Addressing Asynchronous Option, the sample messages for the WS-Addressing Asynchronous Option also show the WS-Addressing headers <Action/>, <MessageID/>, <ReplyTo/>…; these WS-Addressing headers are populated according to the W3C WS-Addressing standard

940
```
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
xmlns:a="http://www.w3.org/2005/08/addressing">
  <s:Header>
    <a:Action s:mustUnderstand="1">urn:ihe:iti:2007:CrossGatewayQueryResponse</a:Action>
945    <a:MessageID>urn:uuid:D6C21225-8E7B-454E-9750-821622C099DB</a:MessageID>
    <a:RelatesTo>urn:uuid:def119ad-dc13-49c1-a3c7-e3742531f9b3</a:RelatesTo>
    <a:To s:mustUnderstand="1">http://localhost:2647/XcaService/InitiatingGatewayReceiver.svc
    </a:To>
```

```
950    </s:Header>
         <s:Body>
           <query:AdhocQueryResponse xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"/>
         </s:Body>
       </s:Envelope>
```

955   **ForAS4 Asynchronous Option, samples are found in ITI TF:2x Appendix V.4.8**

In Vol 2b Section 3.39 Cross Gateway Retrieve [ITI-39], update the specific sections listed below with the changes highlighted. These changes are of three types:

960   *Update Vol 2b Section 3.39.1 as follows.*

3.39.1 Scope

The scope of the Cross Gateway Retrieve transaction is semantically the same as the Retrieve Document Set transaction [ITI-43]. Differences from the Retrieve Document Set transactions are:

965   • The Cross Gateway Retrieve is between an Initiating Gateway and a Responding Gateway.

   • The 'homeCommunityId' parameter is required. This means that the homeCommunityId parameter which is optional on the Retrieve Document Set transaction is required by this transaction.

970   • Responding Gateways ~~shall~~ **may** support the **WS-Addressing** Asynchronous Web Services Exchange Option on the Cross Gateway Retrieve. ~~Support for this function is required in order to enable use of Asynchronous Web Services Exchange in any cross-community interaction. Without this support an Initiating Gateway would require unique configuration, per Responding Gateway, to know if Asynchronous~~

975   ~~Web Services Exchange was supported. It is expected that Asynchronous Web Services Exchange will be desired by the majority of communities.~~

   • **Responding Gateways may support the AS4 Asynchronous Web Services Exchange Option on the Cross Gateway Retrieve. To check if Responding Gateways support the Asynchronous Option, the AS4 Test Service may be used (See Appendix V).**

980   • **WS-Addressing** Asynchronous Web Services Exchange ~~is an option on the Initiating Gateway, see ITI TF-1: 18.2.2.~~

   • **AS4 Asynchronous Web Services Exchange** is an option~~s~~ on the Initiating Gateway, see ITI TF-1: 18.2.2.

985

> *Update Vol 2b Section 3.39.3 as follows. MTOM and XOP as referenced standards are specific to the Web Services Stack and are covered in Appendix V. Only the references to standards specific to the "application level" payload of the transaction are kept in this section.*

990 ### 3.39.3 Referenced Standard~~s~~

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

~~ebRIM   OASIS/ebXML Registry Information Model v3.0~~

~~ebRS   OASIS/ebXML Registry Services Specifications v3.0~~

995 ~~ITI TF-3:4   Metadata used in Document Sharing profiles~~

~~MTOM   SOAP Message Transmission Optimization Mechanism~~
~~http://www.w3.org/TR/soap12-mtom/~~

ebRIM	OASIS/ebXML Registry Information Model v3.0
	This model defines the types of metadata and content that can be stored in an ebXML Registry, a basis for and subset of Document Sharing metadata.
ebRS	OASIS/ebXML Registry Services Specifications v3.0
	This defines the services and protocols for an ebXML Registry, used as the basis for the XDS Document Registry
See ITI TF-2x: Appendix V for other referenced standards for SOAP encoding.	
See ITI TF-3: 4.2 for other referenced standards for metadata element encoding.	

1000

> *Update Vol 2b Section 3.39.5 as follows.*

3.39.5 Protocol Requirements

The requirements for Web Services transport for Asynchronous, WS-Addressing Synchronous and AS4 Asynchronous are described in this section.

1005

For the support of Synchronous and WS-Addressing Asynchronous web service exchange case the requirements are the following.

The Cross Gateway Retrieve request and response will be transmitted using Synchronous or **WS-Addressing** Asynchronous Web Services Exchange, according to the requirements specified in
1010   ITI TF-2x: Appendix V.3. The protocol requirements are identical to the Retrieve Document Set except as noted below.

~~Table 3.39.5-1: WSDL Namespace Definitions~~

~~soap~~	~~http://schemas.xmlsoap.org/wsdl/soap/~~
~~soap12~~	~~http://schemas.xmlsoap.org/wsdl/soap12/~~
~~wsaw~~	~~http://www.w3.org/2006/05/addressing/wsdl/~~
~~xsd~~	~~http://www.w3.org/2001/XMLSchema~~
~~ihe~~	~~urn:ihe:iti:xds-b:2007~~
~~rs~~	~~urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0~~
~~lem~~	~~urn:oasis:names:tc:ebxml-regrep:xsd:lem:3.0~~
~~query~~	~~urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0~~

Responding Gateway: These are the requirements for the **synchronous or WS-Addressing**
Asynchronous Cross Gateway Retrieve transaction presented in the order in which they would
appear in the Responding Gateway WSDL definition:

- The following types shall be imported (xsd:import) in the /definitions/types section:
  o namespace="urn:ihe:iti:xds-b:2007", schema="IHEXDS.xsd"
- The /definitions/message/part/@element attribute of the Cross Gateway Retrieve Request
  message shall be defined as "ihe:RetrieveDocumentSetRequest"
- The /definitions/message/part/@element attribute of the Cross Gateway Retrieve
  Response message shall be defined as "ihe:RetrieveDocumentSetResponse"
- Refer to Table 3.39.5-2 below for additional attribute requirements

Table 3.39.5-2: Requirements for portType and Binding attributes

Attribute	Value
/definitions/portType/operation@name	RespondingGateway_CrossGatewayRetrieve
/definitions/portType/operation/input/@wsaw:Action	urn:ihe:iti:2007:CrossGatewayRetrieve
/definitions/portType/operation/output/@wsaw:Action	urn:ihe:iti:2007:CrossGatewayRetrieveResponse
/definitions/binding/operation/wsoap12:operation/@soapActionRequired	false

These are the requirements that affect the wire format of the SOAP message. The other WSDL
properties are only used within the WSDL definition and do not affect interoperability. Full
sample request and response messages are in Section 3.43.5.1 Sample SOAP Messages.

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

The <ihe:RetrieveDocumentSetRequest/> element is defined in Section 3.43.5. When used
within the Cross Gateway Retrieve the <ihe:HomeCommunityId/> element is required.

The <ihe:RetrieveDocumentSetResponse/> element is defined in Section 3.43.5.

The requirements for the Cross Gateway Retrieve using the AS4 Asynchronous transport are described below.

Initiating Gateway: These are the requirements for the Cross Gateway Retrieve AS4 Asynchronous Request transaction:

- **The <eb:Service> SOAP element shall be set to the value: urn:ihe:iti:2007:CrossGatewayRetrieve**

- **The <eb:Action> SOAP element shall contain the value: urn:ihe:iti:2007:CrossGatewayRetrieve**

- **The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Requester**

- **The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Provider**

- **The <soap12:Body> shall contain one <xds:RetrieveDocumentSetRequest> element**

- **The <xds:RetrieveDocumentSetRequest> element shall contain:**

  - **one or more <xds:DocumentRequest> element representing the Cross Gateway Retrieve Request (see ITI TF-2b: 3.43.4.1.2 for details of expressing a Cross Gateway Retrieve Request).**

Responding Gateway: These are the requirements for the Cross Gateway Retrieve AS4 Asynchronous Response transaction:

- **The <eb:Service> SOAP element shall be set to the value: urn:ihe:iti:2007:CrossGatewayRetrieve**

- **The <eb:Action> SOAP element shall contain the value: urn:ihe:iti:2007:CrossGatewayRetrieveResponse**

- **The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Provider**

- **The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Requester**

- **The <soap12:Body> shall contain one <xds:RetrieveDocumentSetResponse> element**

- **The <xds:RetrieveDocumentSetResponse> element shall contain:**

  - **One <rs:RegistryResponse> element containing the status attribute**

  - **Zero or more <xds:DocumentResponse> element representing the Cross Gateway Retrieve Response (see ITI TF-2b: 3.43.4.2.2 for details of expressing a Retrieve Document Set Response).**

1065   ▪ **The document element For each document in the < xds:DocumentResponse>
           element, an id attribute shall be set to allow correlation to the corresponding
           MIME part as explain in ITI TF-2x: Appendix V.4.6.2**

Update Vol 2b Section 3.39.5.1 as follows.

1070 ## 3.39.5.1 Sample SOAP Messages

The samples in the following two sections show a typical SOAP request and its relative SOAP
response. ~~The sample messages also show the WS-Addressing headers <Action/>,
<MessageID/>, <ReplyTo/>…; these WS-Addressing headers are populated according to
the W3C WS-Addressing standard.~~ The body of the SOAP message is omitted for brevity; in a
1075 real scenario the empty element will be populated with the appropriate metadata.

Samples presented in this section are also available online on the IHE FTP site, see ITI TF-2x:
Appendix W.

Update Vol 2b Section 3.39.5.1.1.2 as follows.

1080 ## 3.39.5.1.1.2 Asynchronous Web Services Exchange

A sample WS-Addressing asynchronous messages, is shown below:

```
<s:Envelope
            xmlns:s="http://www.w3.org/2003/05/soap-envelope"
1085        xmlns:a="http://www.w3.org/2005/08/addressing">
        <s:Header>
            <a:Action s:mustUnderstand="1">urn:ihe:iti:2007:CrossGatewayRetrieve</a:Action>
            <a:MessageID>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:MessageID>
            <a:ReplyTo>
1090
            <a:Address>http://192.168.2.4:9080/XcaService/InitiatingGatewayReceiver.svc
                    </a:Address>
            </a:ReplyTo>
            <a:To
1095 s:mustUnderstand="1">http://localhost:2647/XcaService/RespondingGatewayReceiver.svc</a:To>
        </s:Header>
        <s:Body>
            <RetrieveDocumentSetRequest xmlns="urn:ihe:iti:xds-b:2007">
                <DocumentRequest>
1100                <HomeCommunityId>urn:oid:1.2.3.4</HomeCommunityId>
                    <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
                    <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
                </DocumentRequest>
                <DocumentRequest>
1105                <HomeCommunityId>urn:oid:1.2.3.5</HomeCommunityId>
                    <RepositoryUniqueId>1.3.6.1.4...2000</RepositoryUniqueId>
                    <DocumentUniqueId>1.3.6.1.4...2301</DocumentUniqueId>
                </DocumentRequest>
            </RetrieveDocumentSetRequest>
1110    </s:Body>
</s:Envelope>
```

For AS4 Asynchronous Option, samples are found in ITI TF: 2x Appendix V.4.8

1115

Update Vol 2b Section 3.39.5.1.2.2 as follows.

3.39.5.1.2.2 Asynchronous Web Services Exchange

A sample WS-Addressing asynchronous messages, is shown below:

```
1120    <s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
        xmlns:a="http://www.w3.org/2005/08/addressing">
               <s:Header>
                      <a:Action
        s:mustUnderstand="1">urn:ihe:iti:2007:CrossGatewayRetrieveResponse</a:Action>
1125                  <a:MessageID>urn:uuid:D6C21225-8E7B-454E-9750-821622C099DB</a:MessageID>
                      <a:RelatesTo>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:RelatesTo>
                      <a:To
        s:mustUnderstand="1">http://localhost:2647/XcaService/InitiatingGatewayReceiver.svc</a:To>
               </s:Header>
1130           <s:Body>
                      <RetrieveDocumentSetResponse
                             xmlns="urn:ihe:iti:xds-b:2007"
                             xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
                             xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
1135                         xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
                             xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0">
                             <rs:RegistryResponse status="urn:oasis:names:tc:ebxml-
        regrep:ResponseStatusType:Success"/>
                             <DocumentResponse>
1140                                <HomeCommunityId>urn:oid:1.2.3.4</HomeCommunityId>
                                    <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
                                    <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
                                    <mimeType>text/xml</mimeType>

1145    <Document>UjBsR09EbGhjZ0dTQUxNQUFBBUUNBRU1tQ1p0dU1GGUXhEUzhi</Document>
                             </DocumentResponse>
                             <DocumentResponse>
                                    <HomeCommunityId>urn:oid:1.2.3.5</HomeCommunityId>
                                    <RepositoryUniqueId>1.3.6.1.4...2000</RepositoryUniqueId>
1150                                <DocumentUniqueId>1.3.6.1.4...2301</DocumentUniqueId>
                                    <mimeType>text/xml</mimeType>

        <Document>UjBsR09EbGhjZ0dTQUxNQUFBBUUNBRU1tQ1p0dU1GGUXhEUzhi</Document>
                             </DocumentResponse>
1155              </RetrieveDocumentSetResponse>
               </s:Body>
        </s:Envelope>
```

For AS4 Asynchronous Option, samples are found in ITI TF: 2x Appendix V.4.8

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> *In Vol 2b Section 3.41 **Provide and Register Document Set-b [ITI-41]**, update the specific sections listed below with the changes highlighted. These changes are of three types:*

3.41 Provide and Register Document Set-b [ITI-41]

> *Update Vol 2b Section 3.41.3 as follows. MTOM and XOP as referenced standards are specific to the Web Services Stack and are covered in Appendix V. Only the references to standards specific to the "application level" payload of the transaction are kept in this section (E change)*

1170

3.41.3 Referenced Standards

ebRIM	OASIS/ebXML Registry Information Model v3.0
	This model defines the types of metadata and content that can be stored in an ebXML Registry, a basis for and subset of Document Sharing metadata.
ebRS	OASIS/ebXML Registry Services Specifications v3.0
	This defines the services and protocols for an ebXML Registry, used as the basis for the XDS Document Registry
~~MTOM~~	~~SOAP Message Transmission Optimization Mechanism http://www.w3.org/TR/soap12-mtom/~~
	~~This is a method for optimizing the transmission and/or wire format of SOAP messages.~~
~~XOP~~	~~XML-binary Optimized Packaging http://www.w3.org/TR/2005/REC-xop10-20050125/~~
	~~This is a means of more efficiently of converting an XML Infoset with certain types of content into a stream of bytes for transmission.~~
See ITI TF-2x: Appendix V for other referenced standards for SOAP encoding. See ITI TF-3: 4.2 for other referenced standards for metadata element encoding.	

> *Replace Vol 2b Section 3.41.4.1.2 by the following updated section*

3.41.4.1.2 Message Semantics

~~The Provide and Register Document Set-b Request message shall use SOAP 1.2 and MTOM with XOP encoding (labeled MTOM/XOP in this specification). Implementers of this transaction shall comply with all requirements described in: ITI TF-2x: Appendix V: Web Services for IHE Transactions.~~

The Provide and Register Document Set-b Request message:

- **Shall comply with the Synchronous Web Services Exchange protocol stack with all requirements specified in: ITI TF-2x: Appendix V.3: Synchronous Web Services. These are based on SOAP 1.2 and MTOM with XOP encoding (labeled MTOM/XOP in this specification).**

1185 **For the Synchronous Web Services Exchange protocol stack**, ~~T~~the use of MTOM/XOP is governed by the following rules:

1. The Content Sender shall generate the Provide and Register Document Set-b Request message in MTOM/XOP format.

1190 2. The Content Receiver shall accept documents in a Provide and Register Document Set-b Request message in MTOM/XOP format.

- **May optionally comply with the WS-Addressing Asynchronous Web Services Exchange protocol stack with all requirements specified in: ITI TF-2x: Appendix V.3: WS-Addressing Asynchronous Web Services. These are based on SOAP 1.2 and MTOM with XOP encoding (WS-Addressing in this specification).**

1195 **For the WS-Addressing Asynchronous Web Services Exchange protocol stack, the use of is governed by the following rules:**

1. **The Content Sender shall generate the Provide and Register Document Set-b Request message in WS-Addressing format.**

2. **The Content Receiver shall accept documents in a Provide and Register**
1200 **Document Set-b Request message in WS-Addressing format.**

- **May optionally comply the AS4 Asynchronous Web Services Exchange protocol stack with all requirements specified in: ITI TF-2x: Appendix V.4: AS4 Asynchronous Web Services. These are based on the AS4 profile of ebMS3.0 and**
1205 **use SOAP 1.2 with Attachments (AS4 in this specification).**

For the AS4 Asynchronous Web Services Exchange protocol stack, the use of AS4 is governed by the following rules:

1. **The Content Sender shall generate the Provide and Register Document Set-b Request message in AS4 format.**

1210 2. **The Content Receiver shall accept documents in a Provide and Register Document Set-b Request message in AS4 format.**

The Provide and Register Document Set-b request message shall contain a Submission Request, as defined in ITI TF-3: 4.1.4, and may contain documents. See ITI TF-3: 4.2.1.4 for a description
1215 of the ebRS/ebRIM representation of a Submission Request. The metadata requirements for this Submission Request are defined in ITI TF-3: 4.3.1. The Submission Request shall contain exactly one DocumentEntry object for each Document contained in the request message, and vice versa.

All DocumentEntry objects in this Submission Request shall be Stable DocumentEntry objects
1220 and, therefore, will not be On-Demand DocumentEntry objects. Associations included in the

Submission Request may reference On-Demand DocumentEntry objects that have been registered previously.

The sections in ITI TF-3: 4.1 specify the mapping of XDS concepts to ebRS and ebRIM semantics and document metadata. A full example of document metadata submission can be found in ITI TF-2x: Appendix W.

XML namespace prefixes used in text and examples below are for informational purposes only and are documented in ITI TF-2x: Appendix V, Table V.2.4-1.

A full XML Schema Document for the XDS types is available online on the IHE FTP site, see ITI TF-2x: Appendix W.

The requirements for the request message **with the Synchronous and the WS-Addressing Web Services stack** are:

- ~~the Content-Type HTTP header shall have an action parameter with the value urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-b~~

- the <wsa:Action> SOAP element shall contain the value urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-b

- the <soap12:Body> shall contain one <xds:ProvideAndRegisterDocumentSetRequest> element

- the <xds:ProvideAndRegisterDocumentSetRequest> element shall contain:

  o one <lcm:SubmitObjectsRequest> element representing the Submission Request (see ITI TF-3: 4.2.1.4 for details of expressing a Submission Request).

  o one <xds:Document> element for each <rim:ExtrinsicObject> contained in the <lcm:SubmitObjectsRequest>

- the <xds:Document> element shall:

  o have an @id attribute whose value matches the value of the corresponding rim:ExtrinsicObject/@id

  o contain the document using the xsi:base64Binary data type (Note: This is the logical representation of the document in the XML. The wire format may be different; see ITI TF-2x: ~~Appendix V.8~~ **Appendix V.3.6).**

Below is an example of the SOAP Body for a Provide and Register Document Set-b Request message **applicable to the Synchronous Web Services stack.**

```
        <soap12:Body>
          <xds:ProvideAndRegisterDocumentSetRequest>
            <lcm:SubmitObjectsRequest>
1255            <!-- Submission Request contents - See ITI TF-3: 4.2.1.4 -->
              <rim:RegistryObjectList>

                 <!-- Registry Metadata goes here -->

1260          </rim:RegistryObjectList>
            </lcm:SubmitObjectsRequest>
            <xds:Document id="Document01">SGVyZSBpcyBteSBkb2N1bWVudA==</xds:Document>
          </xds:ProvideAndRegisterDocumentSetRequest>
        </soap12:Body>
```

1265

The requirements for the request message with the AS4 Asynchronous Web Services stack are:

- **The <eb:Service> SOAP element shall be set to the value: urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-b**

1270 - **The <eb:Action> SOAP element shall contain the value: urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-b**

- **The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Requester**

- **The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Provider**

- **The <soap12:Body> shall contain one**
1275 **<xds:ProvideAndRegisterDocumentSetRequest> element**

- **The <xds:ProvideAndRegisterDocumentSetRequest> element shall contain:**

  - **one <lcm:SubmitObjectsRequest> element representing the Submission Request (see ITI TF-3: 4.2.1.4 for details of expressing a Submission Request).**

  - **For each <rim:ExtrinsicObject> contained in the <xds:SubmitObjectsRequest>**
1280 **element, an @id attribute shall be set in order to allow correlation to the corresponding MIME part as explain in ITI TF-2x: Appendix V.4.6.2.**

~~Below is~~ **ITI TF-2x: Appendix V.4.6.2 includes** an example of the SOAP Body for a Provide and Register Document Set-b Request message **applicable to the AS4 Asynchronous Web Services stack.**

1285

1290

Update Vol 2b Section 3.41.4.1.2.1 by the following updated section

3.41.4.1.2.1 XDS Document Source Options

The XDS Document Source may choose to support options which are listed in ITI TF-1: Table 10.2-1b and described in the sections that follow it.

If the XDS Document Source supports the Document Replacement Option, it shall be able to generate replace semantics as defined in ITI TF-3: 4.2.2.2.3.

If the XDS Document Source supports the Document Addendum Option, it shall be able to generate append semantics as defined in ITI TF-3: 4.2.2.2.1.

If the XDS Document Source supports the Document Transformation Option, it shall be able to generate transformation semantics as defined in ITI TF-3: 4.2.2.2.2.

If the XDS Document Source supports the Folder Management Option, it shall be able to generate folder semantics as defined in ITI TF-3: 4.2.1.3 and ITI TF-3: 4.2.2.1.5.

If the XDS Document Source supports the **WS-Addressing** Asynchronous Web Services Exchange Option, it shall be able to generate a **WS-Addressing** Asynchronous Web Services request as defined in ITI TF-2x: ~~Appendix V.5~~ **Appendix V.3**.

If the XDS Document Source supports the AS4 Asynchronous Web Services Exchange Option, it shall be able to generate an AS4 Asynchronous Web Services request as defined in ITI TF-2x: Appendix V.4.

Refer to ITI TF-1: 10.2.9 for support of the Basic Patient Privacy Enforcement Option.

Update Vol 2b Section 3.41.4.1.3.1 as follows:

3.41.4.1.3.1 Document Recipient Expected actions

In addition to the Expected Actions of all Content Receivers (described in the beginning of Section 3.41.4.1.3), a Document Recipient shall meet the following requirements.

A Document Recipient that supports the AS4 Asynchronous Web Services Option shall be able to process the AS4 Asynchronous Web Services request as defined in ITI TF-2x: Appendix V.4 and return an AS4 Asynchronous Web Services response as defined in ITI TF-2x: Appendix V.4.

A Document Recipient shall be able to interpret a submission without any context, such as knowledge of a prior submission.

The Document Recipient may validate the presence of metadata attributes. If the Document Recipient declares the Accepts Limited Metadata Option and the limitedMetadata attribute is present, such validation shall not exceed the requirements in the column labeled "XDR MS" (XDR Metadata-Limited Document Source) of ITI TF-3: Table 4.3.1-3. Otherwise, such

---

validation shall not exceed the requirements in the column labeled "XDR DS" (XDR Document Source) of ITI TF-3: Table 4.3.1-3.

The following shall not cause rejection of a submission:

- The submitted metadata includes Folders, and the Document Recipient cannot process the Folder-specific content. The response shall contain a PartialFolderContentNotProcessed warning and a textual description that Folder Content was not processed.

- The submitted metadata includes document relationships, and the Document Recipient cannot process the relationship-specific content. For each unsupported association, the response shall contain a warning and textual description that the relationship semantics were not processed. The specific warning depends on the relationship: PartialAppendContentNotProcessed, PartialReplaceContentNotProcessed, PartialTransformContentNotProcessed, or PartialTransformReplaceContentNotProcessed.

The received documents may be processed further according to the capabilities of the system. These capabilities are not specified by IHE.

Update Vol 2b Section 3.41.4.2.2 by the following updated section (R change)

3.41.4.2.2 Message Semantics

~~The Provide and Register Document Set-b Response message shall use SOAP 1.2 and MTOM with XOP encoding (labeled MTOM/XOP in this specification). Implementors of this transaction shall comply with all requirements described in: ITI TF-2x: Appendix V: Web Services for IHE Transactions.~~

The Provide and Register Document Set-b Response message:

- **Shall implement the Synchronous Web Services Exchange protocol stack with all requirements specified in: ITI TF-2x: Appendix V.3: Synchronous Web Services. These are based on SOAP 1.2 and MTOM with XOP encoding (labeled MTOM/XOP in this specification).**

For the Synchronous Web Services Exchange protocol stack, ~~T~~the use of MTOM/XOP is governed by the following rules:

  o The Content Sender shall generate the Provide and Register Document Set-b Response message in MTOM/XOP format.

  o The Content Receiver shall accept documents in a Provide and Register Document Set-b Response message in MTOM/XOP format.

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- **May optionally implement the WS-Addressing Asynchronous Web Services Exchange protocol stack with all requirements specified in ITI TF-2x: Appendix V.4: Asynchronous Web Services.**

  For the WS-Addressing Asynchronous Web Services Exchange protocol stack, the use of WS-Addressing is governed by the following rules:

1365
  - **The Content Sender shall generate the Provide and Register Document Set-b Request message in WS-Addressing format.**

  - **The Content Receiver shall accept documents in a Provide and Register Document Set-b Request message in WS-Addressing format.**

1370
- **May optionally implement the AS4 Asynchronous Web Services Exchange protocol stack with all requirements specified in ITI TF-2x: Appendix V.4: Asynchronous Web Services. These are based on the AS4 profile of ebMS3.0 and use SOAP 1.2 with Attachments (AS4 in this specification).**

  For the AS4 Asynchronous Web Services Exchange protocol stack, the use of AS4 is governed by the following rules:

1375
  - **The Content Sender shall generate the Provide and Register Document Set-b Request message in AS4 format.**

  - **The Content Receiver shall accept documents in a Provide and Register Document Set-b Request message in AS4 format.**

1380 The Provide and Register Document Set-b Response message shall carry the status of the requested operation. The response message may carry warning messages. If the requested operation fails, the response message shall carry at least one error message. The conditions of failure and possible warning and error messages are given in the ebRS standard and detailed in ITI TF-3: 4.2.4 Error Reporting. This transaction does not support a partial success response.

1385 XML namespace prefixes used in text and in examples below are for informational purposes only and are documented in ITI TF-2x: Appendix V, Table 2.4-1.

The requirements for the response message **with the Synchronous Web Services stack** are:
- ~~the Content-Type HTTP header shall have an action parameter with the value urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-bResponse~~

1390
- the <wsa:Action> SOAP header shall contain the value urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-bResponse

- the <soap12:Body> soap element shall contain one <rs:RegistryResponse> element

The requirements for the response message with the AS4 Asynchronous Web Services stack are:

1395
- **the <eb:Service> SOAP header shall contain the value urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-b**

- **the <eb:Action> SOAP header shall contain the value urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-bResponse**

- **The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Provider**

1400
- **The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Requester**

- **the <soap12:Body> soap element shall contain one <rs:RegistryResponse> element**

See ITI TF-3: 4.2.4.1 for examples of response messages.

1405

Update Vol 2b Section 3.41.4.2.2.1 as follows:

3.41.4.2.2.1 XDS Document Repository Message Semantics

If the XDS Document Repository receives a Synchronous Web Services request, it shall respond as defined in ITI TF-2x: Appendix V.3.

1410 If the XDS Document Repository supports the **WS-Addressing** Asynchronous Web Services Exchange Option and it receives an Asynchronous Web Services request, it shall respond as defined in ITI TF-2x: ~~Appendix V.5~~ **Appendix V.4**.

1415 *Add a new Section 3.41.4.2.2.2 to Vol 2b:*

3.41.4.2.2.2 Document Recipient Message Semantics

If the Document Recipient receives a Synchronous Web Services request, it shall respond as defined in ITI TF-2x: Appendix V.3.

If the Document Recipient supports the AS4 Asynchronous Web Services Exchange Option
1420 **and it receives an Asynchronous Web Services request, it shall respond as defined in ITI TF-2x: Appendix V.4.**

1425

Update Volume 2b Section 3.41.5.1.1 by the following updated section (R change)

3.41.5.1.1 Document Source Audit Message

	Field Name	Opt	Value Constraints
Event **AuditMessage/** **EventIdentification**	EventID	M	EV(110106, DCM, "Export")
	EventActionCode	M	"R" (Read)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-41", "IHE Transactions", "Provide and Register Document Set-b")
Source (Document Source) (1)			
Human Requestor (0..n)			
Destination (Document Repository) (1)			
Audit Source (Document Source) (1)			
Patient (1)			
SubmissionSet (1)			

1430 Where:

Source **AuditMessage/** **ActiveParticipant**	UserID	M	If **WS-Addressing** Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. **If AS4 Asynchronous Web Services Exchange is used, the content of the eb:From/eb:Party Id.** Otherwise, not specialized.
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address.

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1440

> *Update Vol 2b Section 3.41.5.1.2 by the following updated section*

3.41.5.1.2 Document Repository or Document Recipient audit message:

	Field Name	Opt	Value Constraints
Event **AuditMessage/** **EventIdentification**	EventID	M	EV(110107, DCM, "Import")
	EventActionCode	M	"C" (Create)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-41", "IHE Transactions", "Provide and Register Document Set-b")
Source (Document Source) (1)			
Destination (Document Repository or Document Recipient) (1)			
Audit Source (Document Repository or Document Recipient) (1)			
Patient (1)			
SubmissionSet (1)			

1445 Where:

Source **AuditMessage/** **ActiveParticipant**	UserID	M	If **WS-Addressing** Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. **If AS4 Asynchronous Web Services Exchange is used, the content of the eb:From/eb:Party Id.** Otherwise, not specialized.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address.

…

1450

In Vol 2b, Section 3.43, **Retrieve Document Set [ITI-43]**, *update the specific sections listed below with the changes highlighted. These changes are of three types:*

Update Vol 2b, Section 3.43 by the following updated section

3.43 Retrieve Document Set [ITI-43]

1455

This section corresponds to transaction ITI-43 of the IHE Technical Framework. The Document Consumer, Document Repository, On-Demand Document Source, and Initiating Gateway Actors use transaction ITI-43.

Integration Profiles using this Transaction
Cross-Enterprise Document Sharing-b (XDS.b)
Cross-Community Access (XCA)

1460

~~Actors that support the Asynchronous Web Services Exchange Option shall support Asynchronous Web Services Exchange on all XDS.b transactions they implement. Refer to Section ITI TF-2x: V.5 Synchronous and Asynchronous Web Services Exchange for an explanation of Asynchronous Web Services Exchange.~~

1465

Update Vol 2b Section 3.43.3 by the following updated section. MTOM and XOP as referenced standards are specific to the Web Services Stack and are covered in Appendix V. Only the references to standards specific to the "application level" payload of the transaction are kept in this section (E change)

3.43.3 Referenced Standard

1470

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

ebRIM	OASIS/ebXML Registry Information Model v3.0
ebRS	OASIS/ebXML Registry Services Specifications v3.0
~~ITI TF-3:4~~	~~Metadata in Document Sharing profiles~~
~~MTOM~~	~~SOAP Message Transmission Optimization Mechanism~~ ~~http://www.w3.org/TR/soap12-mtom/~~
~~XOP~~	~~XML-binary Optimized Packaging http://www.w3.org/TR/2005/REC-xop10-20050125/~~
See ITI TF-2x: Appendix V for other referenced standards for SOAP encoding. **See ITI TF-3: 4.2 for other referenced standards for metadata element encoding.**	

Update Vol 2b Section 3.43.4.2.2 as follows

1475 **3.43.4.2.2 Message Semantics**

The Retrieve Document Set Response Message shall carry the following information, for each of the returned documents:

A homeCommunityId. This value shall be the same as the homeCommunityId value in the Retrieve Document Set Request Message. If the homeCommunityId value is not present 1480 in the Retrieve Document Set Request Message, this shall not be present.

A required repositoryUniqueId that identifies the repository from which the document is to be retrieved. This value shall be the same as the value of the repositoryUniqueId in the original Retrieve Document Set Request Message. This value corresponds to XDSDocumentEntry.repositoryUniqueId.

1485 A required documentUniqueId that identifies the document within the repository. This value shall be the same as the documentUniqueId in the original Retrieve Document Set Request Message. This value corresponds to the XDSDocumentEntry.uniqueId.

The retrieved document as a XOP Infoset, **if the Synchronous or WS-Addressing Asynchronous stack is used, or as a MIME Attachment if the AS4 Asynchronous** 1490 **Web Services stack is used.**

The MIME type of the retrieved document

Errors or warnings in case the document(s) could not be retrieved successfully

If the documentUniqueId is associated with an On-Demand Document Entry, the Retrieve Document Set Response Message shall contain a NewDocumentUniqueId element that identifies 1495 the document that is returned in the Retrieve Document Set Response. This identifier shall be different than the DocumentUniqueId element which identifies the On-Demand Document Entry. The Retrieve Document Set Response Message may also include a NewRepositoryUniqueId element that identifies the Document Repository which holds the document returned in the Retrieve Document Set Response. If this element is not included, the document returned in the 1500 response has not been persisted for later retrieval. If the On-Demand Document Source implements the Persistence of Retrieved Documents Option, this element shall be specified. If a future Retrieve Document Set Message for the same DocumentUniqueId returns the same NewDocumentUniqueId, the content of the document shall be identical to the prior returned content. On-Demand Document Source Actors are encouraged to re-use Document uniqueIds 1505 whenever content has not changed in order to facilitate identification of new content by Document Consumers.

1510

Update Vol 2b Section 3.43.5 as follows

3.43.5 Protocol Requirements

1515 The Retrieve Document Set transaction shall ~~use SOAP12 and MTOM with XOP encoding (labeled MTOM/XOP in this specification). See ITI TF-2x: Appendix V.8 for details. Implementors of this transaction shall~~ comply with all requirements described in ITI TF-2x: Appendix V: Web Services for IHE Transactions:

The Retrieve Document Set Transaction:

1520
- **shall comply with the Synchronous Web Services Exchange protocol stack with all requirements specified in: ITI TF-2x: Appendix V.3: Synchronous Web Services. These are based on SOAP 1.2 and MTOM with XOP encoding (labeled MTOM/XOP in this specification).**

  For the Synchronous Web Services Exchange protocol stack, ~~Tt~~he Document Repository shall:

1525
  - Accept the Retrieve Document Set Request message in MTOM/XOP format.

  - Generate the Retrieve Document Set Response message in MTOM/XOP format

  For the Synchronous Web Services Exchange protocol stack, ~~Tt~~he Document Consumer shall:

  - Generate the Retrieve Document Set Request message in MTOM/XOP format.

1530
  - Accept the Retrieve Document Set Response message in MTOM/XOP format.

~~**WSDL Namespace Definitions**~~

~~ihe~~	~~urn:ihe:iti:xds-b:2007~~
~~rs~~	~~urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0~~
~~lcm~~	~~urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0~~
~~query~~	~~urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0~~

1535 Document Repository or Document Registry: These are the requirements for the Retrieve Document Set transaction presented in the order in which they would appear in the Document Repository WSDL definition:

The following types shall be imported (xsd:import) in the /definitions/types section:

- namespace="urn:ihe:iti:xds-b:2007", schema="IHEXDS.xsd"

- The /definitions/message/part/@element attribute of the Retrieve Document Set Request message shall be defined as "ihe:RetrieveDocumentSetRequest"

1540   •   The /definitions/message/part/@element attribute of the Retrieve Document Set Response message shall be defined as "ihe:RetrieveDocumentSetResponse"

Refer to Table 3.43.5.b below for additional attribute requirements

~~To support the Asynchronous Web Services Exchange Option on the Document Consumer,~~ ~~the Document Repository shall support the use of a non-anonymous response EPR in the~~
1545   **~~WS-Addressing replyTo header.~~**

Table 3.43.5-1: ~~Additional~~ Synchronous Web Services Attribute Requirements

Attribute	Value
/definitions/portType/operation@name	DocumentConsumer_RetrieveDocumentSet
/definitions/portType/operation/input/@wsaw:Action	urn:ihe:iti:2007:RetrieveDocumentSet
/definitions/portType/operation/output/@wsaw:Action	urn:ihe:iti:2007:RetrieveDocumentSetResponse
/definitions/binding/operation/wsoap12:operation/@soapActionRequired	false

These are the requirements that affect the wire format of the SOAP message. The other WSDL properties are only used within the WSDL definition and do not affect interoperability. Full
1550   sample request and response messages are in Section 3.43.5.1 Sample SOAP Messages.

For informative WSDL for the Document Repository see in ITI TF-2x: Appendix W.

• **may comply with the WS-Addressing Asynchronous Web Services Exchange protocol stack with all requirements specified in: ITI TF-2x: Appendix V.3: WS-**
1555   **Addressing Asynchronous Web Services. These are based on SOAP 1.2 and MTOM with XOP encoding as used by the Synchronous Web Services Exchange protocol stack (labeled MTOM/XOP in this specification).**

• **To support the WS-Addressing Asynchronous Web Services Exchange Option, the Document Consumer, the Document Repository, or the Initiating Gateway shall**
1560   **support the use of a non-anonymous response EPR in the WS-Addressing replyTo header.**

• **may comply with the AS4 Asynchronous Web Services Exchange protocol stack with all requirements specified in: ITI TF-2x: Appendix V.4: AS4 Asynchronous**
1565   **Web Services. These are based on the AS4 profile of ebMS3.0 and use SOAP 1.2 with Attachments (labelled AS4 in this specification).**

For the AS4 Asynchronous Web Services Exchange protocol stack, the Document Consumer shall:

o **Generate the Retrieve Document Set Request message in AS4 format.**

1570   o **Accept the Retrieve Document Set Response message in AS4 format.**

For the AS4 Asynchronous Web Services Exchange protocol stack, the Initiating Gateway shall:

o **Accept the Retrieve Document Set Request message in AS4 format.**

o **Generate the Retrieve Document Set Response message in AS4 format**

1575

The requirements for the request and response messages with the AS4 Asynchronous Web Services stack are:

o **The <eb:Service> SOAP element shall be set to the value: urn:ihe:iti:2007:RetrieveDocumentSet**

1580   o **The <eb:Action> SOAP element shall contain the value: urn:ihe:iti:2007:RetrieveDocumentSet for the request and the value: urn:ihe:iti:2007:RetrieveDocumentSetResponse for the response message**

o **The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Requester for the request message and to the value: urn:ihe:iti:2018:Provider for the response message.**

1585

o **The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Provider for the request message and to the value: urn:ihe:iti:2018:Requester for the response message**

o **The <soap12:Body> shall contain one <ihe:RetrieveDocumentSetRequest> element for the request message and the value: <ihe:RetrieveDocumentSetResponse> for the response message.**

1590

o **The <xds:RetrieveDocumentSetRequest> element shall contain:**

     ▪ **one or more <xds:DocumentRequest> element representing the Retrieve Document Set Request (see ITI TF-2b: 3.43.4.1.2 for details of expressing a Retrieve Document Set Request).**

1595

o **The <xds:RetrieveDocumentSetResponse> element shall contain:**

     ▪ **One <rs:RegistryResponse> element containing the status attribute**

     ▪ **Zero or more <xds:DocumentResponse> element representing the Retrieve Document Set Response (see ITI TF-2b: 3.43.4.2.2 for details of expressing a Retrieve Document Set Response).**

1600

         o **The document element. For each document in the <xds:DocumentResponse> element, an id attribute shall be set to allow correlation to the corresponding MIME part as explain in ITI TF-2x: Appendix V.4.6.2**

1605   **ITI TF-2x: Appendix V.4.6.2 includes an example of the SOAP Body for a Provide and Register Document Set-b Request message applicable to the AS4 Asynchronous Web Services stack**

Document Repository **or Initiating Gateway**: These are the requirements for the Retrieve
1610   Document Set transaction presented in the order in which they would appear in the Document Repository WSDL definition:

The following types shall be imported (xsd:import) in the /definitions/types section:

- o namespace="urn:ihe:iti:xds-b:2007", schema="IHEXDS.xsd"

- The /definitions/message/part/@element attribute of the Retrieve Document Set Request
1615   message shall be defined as "ihe:RetrieveDocumentSetRequest"

- The /definitions/message/part/@element attribute of the Retrieve Document Set Response message shall be defined as "ihe:RetrieveDocumentSetResponse"

To support the **WS-Addressing** Asynchronous Web Services Exchange Option on the Document Consumer, the Document Repository **or Initiating Gateway** shall support the use of a non-
1620   anonymous response EPR in the WS-Addressing replyTo header.

The <ihe:RetrieveDocumentSetRequest/> element is defined as:

One or more <ihe:DocumentRequest/> elements, each one representing an individual document that the Document Consumer wants to retrieve from the Document Repository
1625   **or Initiating Gateway**. Each <ihe:DocumentRequest/> element contains:

- o A required <ihe:RepositoryUniqueId/> element that identifies the repository from which the document is to be retrieved. This value corresponds to XDSDocumentEntry.repositoryUniqueId.

- o A required <ihe:DocumentUniqueId/> that identifies the document within the
1630   repository. This value corresponds to the XDSDocumentEntry.uniqueId.

- o An optional <ihe:HomeCommunityId/> element that corresponds to the home attribute of the Identifiable class in ebRIM.

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

1635   The <ihe:RetrieveDocumentResponse/> element is defined as:

A required /ihe:RetrieveDocumentSetResponse/rs:RegistryResponse element

An optional sequence of <ihe:DocumentResponse/> elements containing

- o A <ihe:HomeCommunityId/> element. The value of this element shall be the same as the value of the

1640 /RetrieveDocumentSetRequest/DocumentRequest/HomeCommunityId element in the Retrieve Document Set Request Message. If the <ihe:HomeCommunityId/> element is not present in the Retrieve Document Set Request Message, this value shall not be present.

- o A required <ihe:RepositoryUniqueId/> that identifies the repository from which the
1645 document is to be retrieved. The value of this element shall be the same as the value of the /RetrieveDocumentSetRequest/DocumentRequest/RepositoryUniqueId element in the original Retrieve Document Set Request Message. This value corresponds to XDSDocumentEntry.repositoryUniqueId.

- o A required <ihe:DocumentUniqueId/> that identifies the document within the
1650 repository. The value of this element shall be the same as the value of the /RetrieveDocumentSetRequest/DocumentRequest/DocumentUniqueId element in the original Retrieve Document Set Request Message. This value corresponds to XDSDocumentEntry.uniqueId.

A required <ihe:Document/> element that contains

1655 1. **For the Synchronous and the WS-Addressing Asynchronous Web Services stack,** the retrieved document using the xsi:base64Binary data type. (Note: This is the logical representation of the document in the XML. The wire format may be different; see ITI TF-2x: ~~Appendix V.8~~Appendix V. 3.6).

2. **For the AS4 Asynchronous Web Services stack. See ITI TF-2x: Appendix**
1660 **V.4.6.2**

A required <ihe:mimeType/> element that indicates the MIME type of the retrieved document

An optional <ihe:NewDocumentUniqueId/> element that identifies the document returned in the request when retrieval is of an On-Demand Document. This is
1665 required when retrieval is of an On-Demand Document.

An optional <ihe:NewRepositoryUniqueId/> element that identifies the Document Repository that will support retrieval of the document created as a result of retrieval of the On-Demand Document. This is required when the On-Demand Document Source supports the Persistence of Retrieved Documents Option.

1670 The /RetrieveDocumentSetResponse/rs:RegistryResponse/@status attributes provides the overall status of the request: It shall contain one of the following values:

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

```
urn:ihe:iti:2007:ResponseStatusType:PartialSuccess
```

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

1675 See ITI TF-3: 4.2.4 Error Reporting for the interpretation of these values.

For each document requested in a /RetrieveDocumentSetRequest/DocumentRequest element:

If a warning is reported when retrieving the document, then a
/RetrieveDocumentSetResponse/rs:RegistryResponse/rs:RegistryErrorList/
rs:RegistryError element shall be returned with:

1680
- o @severity is urn:oasis:names:tc:ebxml-regrep:ErrorSeverityType:Warning

- o @errorCode is specified

- o @codeContext contains the warning message

- o @location contains the DocumentUniqueId of the document requested

The document shall be returned in an instance of
1685 /RetrieveDocumentSetResponse/DocumentResponse/Document as a XOP Infoset. **with
the WS-Addressing Synch Web Service Stack (see ITI TF-2x: Appendix V.3) or
Mime Attachments if the Asynch Web Services stack (see ITI TF-2x: Appendix
V.4.6.2)**.. The returned document and warning are correlated via the DocumentUniqueId.

If an error is reported when retrieving a document, then a
1690 /RetrieveDocumentSetResponse/rs:RegistryResponse/rs:RegistryErrorList/
rs:RegistryError element shall be returned with:

- o @severity is urn:oasis:names:tc:ebxml-regrep:ErrorSeverityType:Error

- o @errorCode is specified

- o @codeContext contains the error message

1695
- o @location contains the DocumentUniqueId of the document requested

No corresponding RetrieveDocumentSetResponse/DocumentResponse element shall be
returned

If the document is successfully retrieved (without warning) then no
/RetrieveDocumentSetResponse/rs:RegistryResponse/rs:RegistryErrorList/
1700 rs:RegistryError element shall be present and a
/RetrieveDocumentSetResponse/DocumentResponse/Document element shall be returned
containing the document as a XOP Infoset. **with the WS-Addressing Synch Web
Service Stack (see ITI TF-2x: Appendix V.3) or Mime Attachments if the Asynch
Web Services stack (see TF-2x: Appendix V.4.6.2)**.

1705 The /RetrieveDocumentSetResponse/rs:RegistryResponse/rs:ResponseSlotList element is not
used in this transaction.

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

A full XML Schema Document for the XDS.b types is available online on the IHE FTP site, see
1710 ITI TF-2x: Appendix W.

Update Vol 2b Section 3.43.5.1 as follows

1715 3.43.5.1 Sample SOAP Messages

The samples in the following two sections show a typical request and its relative response. ~~The sample messages also show the WS-Addressing headers <Action/>, <MessageID/>, <ReplyTo/>…; these WS-Addressing headers are populated according to ITI TF-2x: Appendix V: Web Services for IHE Transactions.~~ **(See ITI TF 2x: Appendix V: Web**
1720 **Services for IHE Transactions).**

3.43.5.1.1 Sample Retrieve Document Set SOAP Request

3.43.5.1.1.1 Synchronous Web Services Exchange

```
POST /tf6/services/xdsrepositoryb HTTP/1.1
Content-Type:multipart/related;
    boundary=MIMEBoundaryurn_uuid_3448B7F8EA6E8B9DFC1289514997517;
    type="application/xop+xml";
    start="<0.urn:uuid:3448B7F8EA6E8B9DFC1289514997518@apache.org>";
    start-info="application/soap+xml"
User-Agent:Axis2
Host:ihexds.nist.gov:5000

--MIMEBoundaryurn_uuid_3448B7F8EA6E8B9DFC1289514997517
Content-Type:application/xop+xml; charset=UTF-8;
    type="application/soap+xml"
Content-Transfer-Encoding:binary
Content-ID:<0.urn:uuid:3448B7F8EA6E8B9DFC1289514997518@apache.org>

<?xml version='1.0' encoding='UTF-8'?>
<soapenv:Envelope xmlns:soapenv="http://www.w3.org/2003/05/soap-envelope">
    <soapenv:Header xmlns:wsa="http://www.w3.org/2005/08/addressing">
        <wsa:To soapenv:mustUnderstand="1"
            >http://localhost:5000/tf6/services/xdsrepositoryb</wsa:To>
        <wsa:MessageID soapenv:mustUnderstand="1"
            >urn:uuid:3448B7F8EA6E8B9DFC1289514997508</wsa:MessageID>
        <wsa:Action soapenv:mustUnderstand="1"
            >urn:ihe:iti:2007:RetrieveDocumentSet</wsa:Action>
    </soapenv:Header>
    <soapenv:Body>
        <RetrieveDocumentSetRequest xmlns="urn:ihe:iti:xds-b:2007">
            <DocumentRequest>
                <RepositoryUniqueId>1.19.6.24.109.42.1.5</RepositoryUniqueId>
                <DocumentUniqueId>1.42.20101110141555.15</DocumentUniqueId>
            </DocumentRequest>
        </RetrieveDocumentSetRequest>
    </soapenv:Body>
</soapenv:Envelope>
--MIMEBoundaryurn_uuid_3448B7F8EA6E8B9DFC1289514997517--
```

1760   This request message is in MTOM/XOP format because request/response message pairs must
        always be in the same format (MTOM/XOP vs. SIMPLE SOAP) and the response requires
        MTOM/XOP: one part for descriptive metadata and a second part for document contents.

3.43.5.1.1.2 Asynchronous Web Services Exchange

This sample covers the WS-Addressing Asynchronous.

1765

```
<s:Envelope
            xmlns:s="http://www.w3.org/2003/05/soap-envelope"
            xmlns:a="http://www.w3.org/2005/08/addressing">
        <s:Header>
            <a:Action
s:mustUnderstand="1">urn:ihe:iti:2007:RetrieveDocumentSet</a:Action>
            <a:MessageID>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:MessageID>
            <a:ReplyTo>
                <a:Address>
http://192.168.2.4:9080/XdsService/DocumentConsumerReceiver.svc</a:Address>
            </a:ReplyTo>
            <a:To
s:mustUnderstand="1">http://localhost:2647/XdsService/DocumentRepositoryReceiver.svc</
a:To>
        </s:Header>
        <s:Body>
            <RetrieveDocumentSetRequest xmlns="urn:ihe:iti:xds-b:2007">
                <DocumentRequest>
                    <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
                    <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
                </DocumentRequest>
                <DocumentRequest>
                    <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
                    <DocumentUniqueId>1.3.6.1.4...2301</DocumentUniqueId>
                </DocumentRequest>
            </RetrieveDocumentSetRequest>
        </s:Body>
</s:Envelope>
```

1795   **The sample that covers the AS4 Asynchronous Web Services is in ITI TF-2x: Appendix
        V.8.**

3.43.5.1.2 Sample Retrieve Document Set SOAP Response

3.43.5.1.2.1 Synchronous Web Services Exchange

In the following example, the HTTP header `Transfer-Encoding:chunked` and the
1800   corresponding chunk annotations were removed for readability.

```
HTTP/1.1 200 OK
Server:Apache-Coyote/1.1
Content-Type:multipart/related;
    boundary=MIMEBoundaryurn_uuid_E910375860336E2B8F1289514978310;
    type="application/xop+xml";
```

1770

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1805

```
        start="0.urn:uuid:E910375860336E2B8F1289514978311@apache.org";
        start-info="application/soap+xml";
    Date:Thu, 11 Nov 2010 22:36:15 GMT
```
1810
```
    --MIMEBoundaryurn_uuid_E910375860336E2B8F1289514978310
    Content-Type:application/xop+xml; charset=UTF-8;
        type="application/soap+xml"
    Content-Transfer-Encoding:binary
```
1815
```
    Content-ID:<0.urn:uuid:E910375860336E2B8F1289514978311@apache.org>

    <?xml version='1.0' encoding='UTF-8'?>
    <soapenv:Envelope xmlns:soapenv="http://www.w3.org/2003/05/soap-envelope"
        xmlns:wsa="http://www.w3.org/2005/08/addressing">
```
1820
```
        <soapenv:Header>
            <wsa:Action soapenv:mustUnderstand="1"
                >urn:ihe:iti:2007:RetrieveDocumentSetResponse</wsa:Action>
            <wsa:RelatesTo>urn:uuid:3448B7F8EA6E8B9DFC1289514997508</wsa:RelatesTo>
        </soapenv:Header>
```
1825
```
        <soapenv:Body>
            <xdsb:RetrieveDocumentSetResponse xmlns:xdsb="urn:ihe:iti:xds-b:2007">
                <rs:RegistryResponse xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0"
                    status="urn:oasis:names:tc:ebxml-regrep:ResponseStatusType:Success"/>
                <xdsb:DocumentResponse>
```
1830
```
                    <xdsb:RepositoryUniqueId
                        >1.19.6.24.109.42.1.5</xdsb:RepositoryUniqueId>
                    <xdsb:DocumentUniqueId
                        >1.42.20101110141555.15</xdsb:DocumentUniqueId>
                    <xdsb:mimeType>text/plain</xdsb:mimeType>
```
1835
```
                    <xdsb:Document>
                        <xop:Include
                        href="cid:1.urn:uuid:E910375860336E2B8F1289514978312@apache.org"
                            xmlns:xop="http://www.w3.org/2004/08/xop/include"/>
                    </xdsb:Document>
```
1840
```
                </xdsb:DocumentResponse>
            </xdsb:RetrieveDocumentSetResponse>
        </soapenv:Body>
    </soapenv:Envelope>
```
1845
```
    --MIMEBoundaryurn_uuid_E910375860336E2B8F1289514978310
    Content-Type:text/plain
    Content-Transfer-Encoding:binary
    Content-ID:<1.urn:uuid:E910375860336E2B8F1289514978312@apache.org>
```
1850
```
    Four score and seven years ago our fathers brought forth on this continent a new nation,
    conceived in Liberty, and dedicated to the proposition that all men are created equal.
    --MIMEBoundaryurn_uuid_E910375860336E2B8F1289514978310--
```

1855 This example shows the 'wire format' for MTOM/XOP. The Document element contains a <xop:Include> element that points to the document contents as a separate attachment.

> Note: In some systems, the 'in memory' format replaces the <xop:Include> with the Base64 encoded contents of the document. This is done so the entire message contents fits into an XML parse tree.

A second form of the response is possible, an un-optimized MTOM/XOP message. In this form the message is still formatted as a multipart but the document contents is not split out into a
1860 separate part of the multipart. Some popular Web Service toolkits generate this form for very small documents. The same response in this form looks like:

```
1865    HTTP/1.1 200 OK
        Server:Apache-Coyote/1.1
        Content-Type:multipart/related;
            boundary=MIMEBoundaryurn_uuid_E910375860336E2B8F1289514978310;
            type="application/xop+xml";
1870        start="0.urn:uuid:E910375860336E2B8F1289514978311@apache.org";
            start-info="application/soap+xml";
        Date:Thu, 11 Nov 2010 22:36:15 GMT

        --MIMEBoundaryurn_uuid_E910375860336E2B8F1289514978310
1875    Content-Type:application/xop+xml; charset=UTF-8;
            type="application/soap+xml"
        Content-Transfer-Encoding:binary
        Content-ID:<0.urn:uuid:E910375860336E2B8F1289514978311@apache.org>

1880    <?xml version='1.0' encoding='UTF-8'?>
        <soapenv:Envelope xmlns:soapenv="http://www.w3.org/2003/05/soap-envelope"
            xmlns:wsa="http://www.w3.org/2005/08/addressing">
            <soapenv:Header>
                <wsa:Action soapenv:mustUnderstand="1"
1885                >urn:ihe:iti:2007:RetrieveDocumentSetResponse</wsa:Action>
                <wsa:RelatesTo>urn:uuid:3448B7F8EA6E8B9DFC1289514997508</wsa:RelatesTo>
            </soapenv:Header>
            <soapenv:Body>
                <xdsb:RetrieveDocumentSetResponse xmlns:xdsb="urn:ihe:iti:xds-b:2007">
1890            <rs:RegistryResponse
                    xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0"
                    status="urn:oasis:names:tc:ebxml-regrep:ResponseStatusType:Success"/>
                <xdsb:DocumentResponse>
                    <xdsb:RepositoryUniqueId
1895                    >1.19.6.24.109.42.1.5</xdsb:RepositoryUniqueId>
                    <xdsb:DocumentUniqueId
                        >1.42.20101110141555.15</xdsb:DocumentUniqueId>
                    <xdsb:mimeType>text/plain</xdsb:mimeType>
                    <xdsb:Document>
1900                    Base64 encoded contents of document go here
                    </xdsb:Document>
                </xdsb:DocumentResponse>
            </xdsb:RetrieveDocumentSetResponse>
        </soapenv:Body>
1905    </soapenv:Envelope>
        --MIMEBoundaryurn_uuid_E910375860336E2B8F1289514978310--
```

3.43.5.1.2.2 Asynchronous Web Services Exchange

This sample covers the WS-Addressing Asynchronous.

```
1910    <s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
        xmlns:a="http://www.w3.org/2005/08/addressing">
            <s:Header>
                <a:Action
        s:mustUnderstand="1">urn:ihe:iti:2007:RetrieveDocumentSetResponse</a:Action>
1915            <a:MessageID>urn:uuid:D6C21225-8E7B-454E-9750-821622C099DB</a:MessageID>
                <a:RelatesTo>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:RelatesTo>
                <a:To
        s:mustUnderstand="1">http://localhost:2647/XdsService/DocumentConsumerReceiver.svc</a:To>
            </s:Header>
1920        <s:Body>
                <RetrieveDocumentSetResponse
                            xmlns="urn:ihe:iti:xds-b:2007"
                            xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
                            xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
1925                        xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
```

```
                                    xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0">
                                <rs:RegistryResponse status="urn:oasis:names:tc:ebxml-
                        regrep:ResponseStatusType:Success"/>
                                <DocumentResponse>
1930                                <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
                                    <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
                                    <mimeType>text/xml</mimeType>

                    <Document>UjBsR09EbGhjZ0dTQUxNQUFFBUUNBRU1tQ1p0dU1GUXhEUzhi</Document>
1935                            </DocumentResponse>
                                <DocumentResponse>
                                    <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
                                    <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
                                    <mimeType>text/xml</mimeType>
1940
                    <Document>UjBsR09EbGhjZ0dTQUxNQUFFBUUNBRU1tQ1p0dU1GUXhEUzhi</Document>
                                </DocumentResponse>
                            </RetrieveDocumentSetResponse>
                        </s:Body>
1945        </s:Envelope>
```

The sample that covers the AS4 Asynchronous Web Services is in ITI TF-2x: Appendix V.8.

1950 3.43.5.1.3 Sample Retrieve Document Set Response from On-Demand Document Entry

The following example shows the response to retrieval of a dynamic document entry where the responder supports later retrieval of the document created.

```
1955    <s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
        xmlns:a="http://www.w3.org/2005/08/addressing">
         <s:Header>
          <a:Action
        s:mustUnderstand="1">urn:ihe:iti:2007:RetrieveDocumentSetResponse</a:Action>
1960      <a:RelatesTo>urn:uuid:0fbfdced-6c01-4d09-a110-2201afedaa02</a:RelatesTo>
         </s:Header>
         <s:Body>
          <RetrieveDocumentSetResponse
            xmlns="urn:ihe:iti:xds-b:2007"
1965        xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
            xmlns:query="urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0"
            xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
            xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0">
           <rs:RegistryResponse status="urn:oasis:names:tc:ebxml-
1970    regrep:ResponseStatusType:Success"/>
           <DocumentResponse>
            <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
            <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
             <NewDocumentUniqueId>1.3.6.1.4...2897</NewDocumentUniqueId>
1975         <NewRepositoryUniqueId>1.3.6.1.4...1000</NewRepositoryUniqueId>
            <mimeType>text/xml</mimeType>
            <Document>UjBsR09EbGhjZ0dTQUxNQUFFBUUNBRU1tQ1p0dU1GUXhEUzhi</Document>
```

```
     </DocumentResponse>
     <DocumentResponse>
1980  <RepositoryUniqueId>1.3.6.1.4...1000</RepositoryUniqueId>
      <DocumentUniqueId>1.3.6.1.4...2300</DocumentUniqueId>
      <mimeType>text/xml</mimeType>
      <Document>UjBsR09EbGhjZ0dTQUxNQUFBUUNBRU1tQ1p0dU1GGXhEUzhi</Document>
     </DocumentResponse>
1985  </RetrieveDocumentSetResponse>
  </s:Body>
</s:Envelope>
```

Update Vol 2b Section 3.43.6 as follows

1990 **3.43.6 Security Considerations**

…

3.43.6.1.1 Document Consumer audit message:

	Field Name	Opt	Value Constraints
Event **AuditMessage/** **EventIdentification**	EventID	M	EV(110107, DCM, "Import")
	EventActionCode	M	"C" (Create)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-43", "IHE Transactions", "Retrieve Document Set")
Source (Document Repository) (1)			
Destination (Document Consumer) (1)			
Human Requestor (0..n)			
Audit Source (Document Consumer) (1)			
Patient (0..1)			
Document (1..n) *(see combining rules above)*			

Where:

	Field Name	Opt	Value Constraints
Source **AuditMessage/** **ActiveParticipant**	UserID	M	SOAP endpoint URI
	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.

	Field Name	Opt	Value Constraints
Destination **AuditMessage/** **ActiveParticipant**	UserID	M	If **WS-Addressing** Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. **If AS4 Asynchronous Web Services Exchange is used, the content of the eb:From/eb:Party Id.** Otherwise, not specialized.

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

1995   …

3.43.6.1.2 Document Repository, On-Demand Document Source, and Initiating Gateway audit message:

	Field Name	**Opt**	**Value Constraints**
Event **AuditMessage/** **EventIdentification**	EventID	M	EV(110106, DCM, "Export")
	EventActionCode	M	"R" (Read)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-43", "IHE Transactions", "Retrieve Document Set")
Source (Document Repository) (1)			
Destination (Document Consumer) (1)			
Audit Source (Document Repository) (1)			
Document (1..n) *(see combining rules above)*			

Where:

	UserID	M	SOAP endpoint URI
Source **AuditMessage/** **ActiveParticipant**	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	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.

2000

Destination AuditMessage/ ActiveParticipant	UserID	M	If **WS-Addressing** Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. **If AS4 Asynchronous Web Services Exchange is used, the content of the eb:From/eb:Party Id.** Otherwise, not specialized.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address.

…

> *In Vol 2b Section 3.55,* ==*Cross Gateway Patient Discovery [ITI-55]*==*, update the specific sections listed below with the changes highlighted. These changes are of three types:*

> *Update Vol 2b Section 3.55 and subsections as follows*

3.55 Cross Gateway Patient Discovery [ITI-55]

This section corresponds to transaction ITI-55 of the IHE ITI Technical Framework. Transaction ITI-55 is used by the Initiating Gateway and Responding Gateway Actors.

3.55.1 Scope

The Cross Gateway Patient Discovery transaction supports the ability for Initiating Gateways and Responding Gateways to discover mutually known patients. This transaction assumes an environment where patient data is well described and high quality demographic data is available.

Because the transaction supports the mutual discovery of patients it can be seen as having dual purposes.

- To support a query by the Initiating Gateway requesting a demographically matching patient from within the Responding Gateway's community.

- To support a feed to Responding Gateway announcing that the patient is known by the Initiating Gateway's community.

This dual nature of the transaction is chosen for scalability purposes, as demographic matching algorithms are expensive on a large scale and once a match is identified it is important that both the initiating and responding sides of the transaction can use the results of that successful match.

The Cross Gateway Patient Discovery transaction has several modes, useful in different environments:

- Demographic Query only mode – in this mode only the demographics of the patient are included in the request. The initiating community does not have, or does not choose to specify, a patient identifier for use by the Responding Gateway.

- Demographic Query and Feed – in this mode both the demographic and initiating community identifier are included in the request.

- Shared/national Patient Identifier Query and Feed – in this mode only a shared/national identifier is specified. Demographics are not necessary because matching can be done on the identifier alone.

This transaction can ~~be~~ use**d the** synchronous~~ly, and optionally either the~~ **AS4 asynchronous or/~~and~~ WS-Addressing** asynchronous~~ly~~ web services Exchange.

…

3.55.3 Referenced Standard

2040 HL7 Version 3 Edition 2008, Patient Administration DSTU, Patient Topic (found at http://www.hl7.org/memonly/downloads/v3edition.cfm#V32008)

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

3.55.4 Interaction Diagram

Initiating Gateway   Responding Gateway

Cross Gateway Patient Discovery Request →
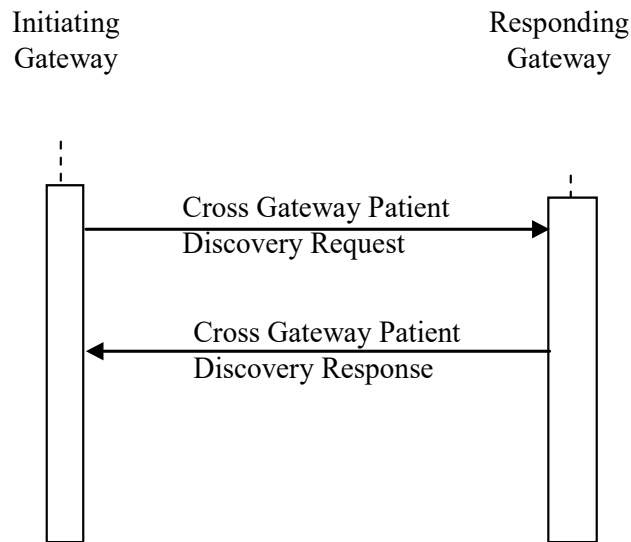
← Cross Gateway Patient Discovery Response

2045

3.55.4.1 Cross Gateway Patient Discovery Request

2050 The Cross Gateway Patient Discovery Request is implemented using the HL7 Patient Registry Query by Demographics (PRPA_MT201306UV02) message.

3.55.4.1.1 Trigger Events

The initiating community needs to determine whether a patient is known by another community. Specific possible trigger events include, but are not limited to:

2055   • The initiating community registers a new patient who has permitted sharing of healthcare data with external communities.

    • A healthcare provider within the community requests that records regarding a particular patient be accessed from a particular external community or all external communities known.

2060 **3.55.4.1.2 Message Semantics**

The components of the Patient Registry Query by Demographics message with cardinality greater than 0 (as shown below) are required, and the detailed description of the message is provided in Sections 3.55.4.1.2.1 to 3.55.4.1.2.3.

For each element which is required, the element shall be specified by the Initiating Gateway in
2065 the request and shall be used by the Responding Gateway as part of its demographic matching algorithm.

For each element which is optional the element does not need to be specified by the Initiating Gateway in the request but, if specified, shall be used by the Responding Gateway as part of its demographic matching algorithm.

2070 **The Initiating Gateway shall support the Synchronous Web Services Exchange as specified in ITI TF-2x: V.3.** ~~Use of~~ **Synchronous Web Services Exchange and may support the WS-Addressing and/or AS4 Asynchronous Web Services Exchange Options as specified in ITI TF-2x: V.3 and V4 respectively.**

The Responding Gateway ~~shall~~ **may** support **WS-Addressing Asynchronous Web Services or**
2075 **AS4** Asynchronous Web Services Exchange, **or both**, as described in ITI TF-2x: V.5, ~~Synchronous and~~ **WS-Addressing** Asynchronous Web Services Exchange. If the Initiating Gateway declares the **WS-Addressing Asynchronous Web Services or AS4** Asynchronous Web Services Exchange Option it shall also support respectively **WS-Addressing Asynchronous Web Services or AS4** Asynchronous Web Services Exchange as described in
2080 ITI TF-2x: V.5.

Use of Asynchronous Web Services Exchange is necessary when transactions scale to large numbers of communities because it allows for more efficient handling of latency and scale.

The Initiating Gateway may specify a duration value in the SOAP Header element of the request. This value suggests to the Responding Gateway a length of time that the Initiating Gateway
2085 recommends caching any correlation resulting from the interaction. The duration value is specified in the SOAP Header using the CorrelationTimeToLive element and contains a value conformant with the xs:duration type defined in http://www.w3.org/TR/xmlschema-2/#duration. If no CorrelationTimeToLive element is specified in the SOAP Header the Responding Gateway shall interpret this as a recommendation against caching, unless a mutually agreed policy states
2090 otherwise.

An example of specifying the CorrelationTimeToLive element follows, which recommends caching of 7 days.

```
<xcpd:CorrelationTimeToLive>P0Y0M7D</xcpd:CorrelationTimeToLive>
```

2095

Update Vol 2b Section 3.55.4.2 and subsection as follows.

3.55.4.2 Cross Gateway Patient Discovery Response

The Cross Gateway Patient Discovery Response is implemented using the HL7 Patient Registry Find Candidates Response PRPA_MT201310UV02) message.

2100 **3.55.4.2.1 Trigger Events**

The Patient Registry Find Candidates Response message (PRPA_MT201310UV02) is sent by the Responding Gateway in response to the query (PRPA_MT201306UV02) message previously received.

3.55.4.2.2 Message Semantics

2105 The components of the message with cardinality greater than 0 (as shown below) are required, and the detailed description of the message is provided in Sections 3.55.4.2.2.1 to 3.55.4.2.2.7. All other attributes of the message are optional.

For each element that is required this means that it shall be provided by Responding Gateway, unless not available, and shall be accepted by requestor but requestor is not required to process
2110 the value in any way, only accept it without any error.

The Responding Gateway shall support the Synchronous Web Services Exchange as specified in ITI TF-2x: V.3. Use of Synchronous Web Services Exchange and may support the WS-Addressing or AS4 Asynchronous Web Services Exchange Option as specified in ITI TF-2x: V.4.

2115 The Responding Gateway ~~shall~~ **may** support **WS-Addressing Asynchronous Web Services or AS4** Asynchronous Web Services Exchange as described in ITI TF-2x: V.5, **WS-Addressing Asynchronous Web Services or AS4** Asynchronous Web Services Exchange. If the Initiating Gateway declares the **WS-Addressing Asynchronous Web Services or AS4** Asynchronous Web Services Exchange Option it shall also support **respectively WS-Addressing**
2120 **Asynchronous Web Services or AS4** Asynchronous Web Services Exchange as described in ITI TF-2x: V.5.

Use of Asynchronous Web Services Exchange is necessary when transactions scale to large numbers of communities because it allows for more efficient handling of latency and scale.

The Responding Gateway may specify a duration value in the SOAP Header element of the
2125 response. This value suggests to the Initiating Gateway a length of time that the Responding Gateway recommends caching any correlation resulting from the interaction. The duration value is specified in the SOAP Header using the CorrelationTimeToLive element and contains a value conformant with the xs:duration type defined in http://www.w3.org/TR/xmlschema-2/#duration.

_____

2130 If no CorrelationTimeToLive element is specified in the SOAP Header the Initiating Gateway shall interpret this as a recommendation against caching, unless a mutually agreed policy states otherwise.

An example of specifying the CorrelationTimeToLive element follows, which recommends caching of 7 days.

```
<xcpd:CorrelationTimeToLive>P0Y0M7D</xcpd:CorrelationTimeToLive>
```

2135

Update Vol 2b Section 3.55.5 as follows.

3.55.5 Security Considerations

…

2140 #### 3.55.5.1.1 Initiating Gateway audit message:

	Field Name	Opt	Value Constraints
Event AuditMessage/ EventIdentification	EventID	M	EV(110112, DCM, "Query")
	EventActionCode	M	"E" (Execute)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-55", "IHE Transactions", "Cross Gateway Patient Discovery")
Source (Initiating Gateway) (1)			
Human Requestor (0..n)			
Destination (Responding Gateway) (1)			
Audit Source (Initiating Gateway) (1)			
Patient (0) No patient identifiers are included in this audit message.			
Query Parameters (1)			

Where:

	Field Name	Opt	Value Constraints
Source AuditMessage/ ActiveParticipant	UserID	M	If **WS-Addressing** Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. **If AS4 Asynchronous Web Services Exchange is used, the content of the eb:From/eb:Party Id.** Otherwise, not specialized.
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address.

…

_____

3.55.5.1.2 Responding Gateway audit message:

	Field Name	Opt	Value Constraints
Event AuditMessage/ EventIdentification	EventID	M	EV(110112, DCM, "Query")
	EventActionCode	M	"E" (Execute)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-55", "IHE Transactions", "Cross Gateway Patient Discovery")
Source (Initiating Gateway) (1)			
Destination (Responding Gateway) (1)			
Audit Source (Responding Gateway) (1)			
Patient (0..n) one for each patient whose demographic information was returned in the response.			
Query Parameters (1)			

2145 Where:

Source AuditMessage/ ActiveParticipant	UserID	M	If **WS-Addressing** Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. **If AS4 Asynchronous Web Services Exchange is used, the content of the eb:From/eb:Party Id.** Otherwise, not specialized.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address.

…

Update Vol 2b Section 3.55.6 as follows.

3.55.6 Protocol Requirements

2150 The Cross Gateway Patient Discovery request and response will be transmitted using
Synchronous or Asynchronous Web Services Exchange, according to the requirements specified
in ITI TF-2x: Appendix V. ~~If the Deferred Response Option is being used the request and
response will be transmitted as described in Section 3.55.6.2.~~

The following WSDL naming conventions shall apply:
2155   query message   -> "PRPA_IN201305UV02_Message"

The following WSDL snippet describes the type for this message:

2160

```
        …
 <types>
<xsd:schema elementFormDefault="qualified" targetNamespace="urn:hl7-org:v3"
xmlns:hl7="urn:hl7-org:v3">
<!-- Include the message schema -->
<xsd:import namespace="urn:hl7-org:v3"
schemaLocation="../schema/HL7V3/NE2008/multicacheschemas/PRPA_IN201305UV02.xsd"/>
<xsd:element name="PRPA_IN201305UV02"/>
</xsd:schema>
  </types>
…
The message is described by the following snippet:
      …
  <message name="PRPA_IN201305UV02_Message">
<part element="hl7:PRPA_IN201305UV02" name="Body"/>
  </message>
      …
```

2165

2170

2175

This section contains the SOAP mapping to the Synchronous and WS-Addressing Asynchronous Web Services Port Type and Binding Definitions (Section 3.55.6.1), the Deferred Response Option (Section 3.55.6.2), and the SOAP Requirements for AS4 Asynchronous Web Services (Section 3.55.6.3).

2180

3.55.6.1 Web Services Port Type and Binding Definitions

Responding Gateway:

IHE-WSP201) The attribute /wsdl:definitions/@name SHALL be "RespondingGateway".

2185 The following WSDL naming conventions shall apply:

```
        wsdl:definitions/@name="RespondingGateway":
        ITI-55 query                -> "PRPA_IN201305UV02_Message"
        ITI-55 response             -> "PRPA_IN201306UV02_Message"
        accept acknowledgement      -> "MCCI_IN000002UV01_Message"
        portType                    -> "RespondingGateway_PortType"
        ITI-55 operation            -> "RespondingGateway_PRPA_IN201305UV02"
        ITI-55 Deferred Response operation ->
                            "RespondingGateway_Deferred_PRPA_IN201305UV02"
        SOAP 1.2 binding            -> "RespondingGateway_Binding_Soap12"
        SOAP 1.2 port               -> "RespondingGateway_Port_Soap12"
```

2190

2195

Initiating Gateway:

IHE-WSP201) The attribute /wsdl:definitions/@name SHALL be "InitiatingGateway".

The following WSDL naming conventions shall apply:

```
2200        wsdl:definitions/@name="InitiatingGateway":
            ITI-55 response              -> "PRPA_IN201306UV02_Message"
            accept acknowledgement       -> "MCCI_IN000002UV01_Message"
            portType                     -> "InitiatingGateway_PortType"
            ITI-55 Deferred Response operation ->
2205                          "InitiatingGateway_Deferred_PRPA_IN201306UV02"
            SOAP 1.2 binding             -> "InitiatingGateway_Binding_Soap12"
            SOAP 1.2 port                -> "InitiatingGateway_Port_Soap12"
```

The following WSDL snippets specify the Cross Gateway Patient Discovery Query Port Type
2210 and Binding definitions, according to the requirements specified in ITI TF-2x: Appendix V.**3
Synchronous and WS-Addressing Web Services Exchange.**

3.55.6.1.1 Port Type

Responding Gateway:

2215
```
   <portType name="RespondingGateway_PortType">
        <operation name="RespondingGateway_PRPA_IN201305UV02">
<input message="tns:PRPA_IN201305UV02_Message" wsaw:Action="urn:hl7-
org:v3:PRPA_IN201305UV02:CrossGatewayPatientDiscovery"/>
<output message="tns:PRPA_IN201306UV02_Message" wsaw:Action="urn:hl7-
2220 org:v3:PRPA_IN201306UV02:CrossGatewayPatientDiscovery"/>
</operation>
<operation name="RespondingGateway_Deferred_PRPA_IN201305UV02">
<input message="tns:PRPA_IN201305UV02_Message" wsaw:Action="urn:hl7-
org:v3:PRPA_IN201305UV02:Deferred:CrossGatewayPatientDiscovery"/>
2225 <output message="tns:MCCI_IN000002UV01_Message" wsaw:Action="urn:hl7-org:v3:MCCI_IN000002UV01"/>
</operation>
</portType>
```

Initiating Gateway:

2230
```
<portType name="InitiatingGatewayDeferredResponse_PortType">
        <operation name="InitiatingGateway_Deferred_PRPA_IN201306UV02">
              <input message="tns:PRPA_IN201306UV02_Message" wsaw:Action="urn:hl7-
org:v3:PRPA_IN201306UV02:Deferred:CrossGatewayPatientDiscovery"/>
              <output message="tns:MCCI_IN000002UV01_Message" wsaw:Action="urn:hl7-
2235 org:v3:MCCI_IN000002UV01"/>
        </operation>
</portType>
```

3.55.6.1.2 Bindings

2240   SOAP 1.2 binding:

Responding Gateway:

```
…
  <binding name="RespondingGateway_Binding_Soap12" type="RespondingGateway_PortType">
    <wsoap12:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>
    <operation name="RespondingGateway_PRPA_IN201305UV02">
      <wsoap12:operation soapActionRequired="false"/>
       <input>
        <wsoap12:body use="literal"/>
      </input>
      <output>
        <wsoap12:body use="literal"/>
      </output>
    </operation>
    <operation name="RespondingGateway_Deferred_PRPA_IN201305UV02">
        <wsoap12:operation soapActionRequired="false"/>
        <input>
        <wsoap12:body use="literal"/>
        </input>
        <output>
        <wsoap12:body use="literal"/>
        </output>
     </operation>
   </binding>
…
```

Initiating Gateway:

```
…
  <binding name="InitiatingGatewayDeferredResponse_Binding"
type="tns:InitiatingGatewayDeferredResponse_PortType">
        <soap12:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>
        <operation name="InitiatingGateway_Deferred_PRPA_IN201306UV02">
                <soap12:operation soapActionRequired="false"/>
                <input>
                        <soap12:body use="literal"/>
                </input>
                <output>
                        <soap12:body use="literal"/>
                </output>
        <operation>
</binding>
…
```

Informative WSDL for the Responding Gateway is available online on the IHE FTP site, see ITI TF-2x: Appendix W.

2290 | *Create a new Vol 2b Section 3.55.6.3 as follows.* |

3.55.6.3 SOAP Requirements for AS4 Asynchronous Web Services

The Cross Gateway Patient Discovery request and response may be transmitted using AS4 Asynchronous Web Services Exchange, according to the requirements specified in ITI TF-2x: Appendix V.4. If the Deferred Response Option is being used the request and response will be
2295   transmitted as described in Section 3.55.6.2.

These are the requirements for the Cross Gateway Patient Discovery Request transaction when supported by AS4 Asynchronous Web Services:

- The <eb:Service> SOAP element shall be set to the value: CrossGatewayPatientDiscovery

2300
- The <eb:Action> SOAP element shall contain the value: urn:hl7-org:v3:PRPA_IN201305UV02:CrossGatewayPatientDiscovery

- The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Requester

- The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Provider

- The <soap12:Body> shall contain one <**hl7:PRPA_IN201305UV02**_Message> element

2305   These are the requirements for the Cross Gateway Patient Discovery Response transaction when supported by AS4 Asynchronous Web Services:

- The <eb:Service> SOAP element shall be set to the value: CrossGatewayPatientDiscovery

- The <eb:Action> SOAP element shall contain the value: urn:hl7-
2310   org:v3:PRPA_IN201306UV02:CrossGatewayPatientDiscovery

- The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Provider

- The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Requester

- The <soap12:Body> shall contain one <**hl7:PRPA_IN201306UV02**_Message> element

2315

> *In Section 3.80, **Cross-Gateway Document Provide [ITI-80]**, update the specific sections listed below with the changes highlighted.*

2320

> *Update the existing 3.80.5 content and existing subsections 3.80.5.1, 3.80.5.1.1 and 3.80.5.1.2, content unchanged, by renumbering 30.80.5 into a new section 3.80.5.1. and renumbering the lower level sections as 3.80.5.1.1, 3.80.5.1.1.1 and 3.80.5.1.1.2*

3.80.5 Protocol Requirements

2325 **### 3.80.5.1 Protocol Requirements for Synchronous Web Services**

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

For Synchronous Communications, ~~Tt~~the Cross-Gateway Document Provide transaction shall use SOAP12 and MTOM with XOP encoding (labeled MTOM/XOP in this specification). See
2330 ITI TF-2x: Appendix V for details.

Implementers of this transaction shall comply with all requirements described in ITI TF-2x: Appendix V.3: Web Services for IHE Transactions.

XML namespace prefixes used in text and examples below are for informational purposes only and are documented in ITI TF-2x: Appendix V, Table 2.4-1.

2335 A full XML Schema Document for the XDS types is available online on the IHE FTP site, see ITI TF-2x: Appendix W.

Responding Gateway: These are the requirements for the Cross-Gateway Document Provide transaction presented in the order in which they would appear in the Responding Gateway
2340 WSDL definition:

- The following types shall be imported (xsd:import) in the /definitions/types section:
  - namespace="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0", schema="rs.xsd"
  - namespace="urn:ihe:iti:xds-b:2007", schema="IHEXDS.xsd"
- The /definitions/message/part/@element attribute of the Cross-Gateway Document
2345 Provide Request message shall be defined as "xds:ProvideAndRegisterDocumentSetRequest"
- The /definitions/message/part/@element attribute of the Cross-Gateway Document Provide Response message shall be defined as "rs:RegistryResponse"
- Refer to Table 3.80.5-1 below for additional attribute requirements

2350 These are the requirements that affect the wire format of the SOAP message. The other WSDL properties are only used within the WSDL definition and do not affect interoperability. Full sample request and response messages are in ITI TF-2c: 3.80.5.1 Sample SOAP Messages. For informative WSDL for the Responding Gateway see ITI TF-2x: Appendix W. The <xds:ProvideAndRegisterDocumentSetRequest /> element is defined as:

2355 - One <lcm:SubmitObjectsRequest/> element that contains the submission set metadata

- Zero or more <xds:Document/> elements that contain document content being submitted to the Responding Gateway. The <xds:Document/> element also includes the document id attribute (xds:Document/@id) of type xsd:anyURI to match the document ExtrinsicObject id in the metadata and providing the necessary linkage

2360 The use of MTOM/XOP is governed by the following rules:

- The Responding Gateway shall accept documents in a Cross Gateway Document Provide transaction in MTOM/XOP format. The response message shall use MTOM/XOP format.

- The Initiating Gateway shall generate Cross Gateway Document Provide transactions in MTOM/XOP format. It shall accept the response message in MTOM/XOP format.

2365 **Table 3.80.5-1: Additional Attribute Requirements**

Attribute	Value
/definitions/portType/operation @name	RespondingGateway_CrossGatewayDocumentProvide
/definitions/portType/operation/input/@wsaw:Action	urn:ihe:iti:2015:CrossGatewayDocumentProvide
/definitions/portType/operation/output/@wsaw:Action	urn:ihe:iti:2015:CrossGatewayDocumentProvideResponse
/definitions/binding/operation/wsoap12:operation/@soapActionRequired /definitions/binding/operation/soap12:operation/@soapAction	falseurn:ihe:iti:2015:CrossGatewayDocumentProvide

3.80.5.1.1 Sample SOAP Messages

The samples in the following two sections show a typical SOAP request and its relative SOAP response. The sample messages also show the WS-Addressing headers <Action/>, MessageID/>,
2370 <ReplyTo/>...; these WS-Addressing headers are populated according to the ITI TF-2x: Appendix V: Web Services for IHE Transactions. The body of the SOAP message is omitted for brevity; in a real scenario the empty element will be populated with the appropriate metadata.

Samples presented in this section are also available online on the IHE FTP site, see ITI TF-2x: Appendix W.

2375

3.80.5.1.1.1 Sample Cross Gateway Document Provide SOAP Request

```
     <soap12:Envelope
2380   xmlns:soap12="http://www.w3.org/2003/05/soap-envelope"
       xmlns:wsa="http://www.w3.org/2005/08/addressing"
       xmlns:xdr="urn:ihe:iti:xdr:2014"
       xmlns:xds="urn:ihe:iti:xds-b:2007"
       xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0"
2385   xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0"
       xmlns:rim=" urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0">
       <soap12:Header>
         <!--Other SOAP Header elements go here-->
         <wsa:Action soap12:mustUnderstand="true">
2390   urn:ihe:iti:2015:CrossGatewayDocumentProvide</wsa:Action>
         <xdr:homeCommunityBlock>
     <xdr:homeCommunityId>urn:oid:1.2.3.4.5.6.2333.23</xdr:homeCommunityId>
         </xdr:homeCommunityBlock>
       </soap12:Header>
2395   <soap12:Body>
         <xds:ProvideAndRegisterDocumentSetRequest>
           <lcm:SubmitObjectsRequest>
             <rs:RequestSlotList>
               <rim:Slot name="homeCommunityId">
2400             <rim:ValueList>
                   <rim:Value>urn:oid:1.2.3.4.5.6.2333.23</rim:Value>
                 </rim:ValueList>
               </rim:Slot>
             </rs:RequestSlotList>
2405         <rim:RegistryObjectList>
               <!-- Registry Metadata goes here -->
             </rim:RegistryObjectList>
           </lcm:SubmitObjectsRequest>
           <xds:Document id="Document01">
2410   <!-- Document binary goes here -->
           </xds:Document>
         </xds:ProvideAndRegisterDocumentSetRequest>
       </soap12:Body>
     </soap12:Envelope>
2415
```

3.80.5.1.1.2 Sample Cross Gateway Document Provide SOAP Response

```
     <?xml version="1.0" encoding="UTF-8"?>
     <soap12:Envelope
       xmlns:soap12="http://www.w3.org/2003/05/soap-envelope"
2420   xmlns:wsa="http://www.w3.org/2005/08/addressing"
       xmlns:rs="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0">
      <soap12:Header>
        <!--Other SOAP Header elements go here-->
        <wsa:Action soap12:mustUnderstand="true">
2425     urn:ihe:iti:2015:CrossGatewayDocumentProvideResponse
        </wsa:Action>
```

```
   </soap12:Header>
 <soap12:Body>
 <rs:RegistryResponse status="urn:oasis:names:tc:ebxml-
regrep:ResponseStatusType:Success"/>
 </soap12:Body>
</soap12:Envelope>
```

2430

Create a new Section 3.80.5.2 as follows.

2435 **3.80.5.2 Protocol Requirements for AS4 Asynchronous Web Services Exchange**

When the AS4 Asynchronous Web Services Exchange Option has been selected, the AS4 protocol stack is governed by the following rules:

- The Content Sender shall generate the Provide and Register Document Set-b Request message in AS4 format.

2440
- The Content Receiver shall accept documents in a Provide and Register Document Set-b Request message in AS4 format.

The AS4 Asynchronous Web Services Exchange protocol stack shall support the requirements specified in: ITI TF-2x: Appendix V.4: Asynchronous Web Services. These are based on the AS4 profile of ebMS3.0 and use SOAP 1.2 with Attachments (AS4 in this specification).

2445 The Provide and Register Document Set-b request message shall contain a Submission Request, as defined in ITI TF-3: 4.1.4, and may contain documents. See ITI TF-3: 4.2.1.4 for a description of the ebRS/ebRIM representation of a Submission Request. The metadata requirements for this Submission Request are defined in ITI TF-3: 4.3.1. The Submission Request shall contain exactly one DocumentEntry object for each Document contained in the request message, and 2450 vice versa.

All DocumentEntry objects in this Submission Request shall be Stable DocumentEntry objects and, therefore, will not be On-Demand DocumentEntry objects. Associations included in the Submission Request may reference On-Demand DocumentEntry objects that have been registered previously.

2455 The sections in ITI TF-3: 4.1 specify the mapping of XDS concepts to ebRS and ebRIM semantics and document metadata.

The requirements for the request message with the AS4 Asynchronous Web Services stack are:

- The <eb:Service> SOAP element shall be set to the value:
  urn:ihe:iti:2015:CrossGatewayDocumentProvide

2460
- The <eb:Action> SOAP element shall contain the value:
  urn:ihe:iti:2015:CrossGatewayDocumentProvide

- The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Requester

- The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Provider

---

- The <soap12:Body> shall contain one <xds:ProvideAndRegisterDocumentSetRequest> element

2465

- The <xds:ProvideAndRegisterDocumentSetRequest> element shall contain:

- one <lcm:SubmitObjectsRequest> element representing the Submission Request (see ITI TF-3: 4.2.1.4 for details of expressing a Submission Request).

- For each <rim:ExtrinsicObject> contained in the <xds:SubmitObjectsRequest> element, an @id attribute shall be set in order to allow correlation to the corresponding MIME part as explain in ITI TF:2x Appendix V.4.6.2

2470

ITI TF:2x Appendix V.4.6.X includes an example of the SOAP Body for a Provide and Register Document Set-b Request message applicable to the AS4 Asynchronous Web Services stack.

The Provide and Register Document Set-b Response message shall carry the status of the requested operation. The response message may carry warning messages. If the requested operation fails, the response message shall carry at least one error message. The conditions of failure and possible warning and error messages are given in the ebRS standard and detailed in ITI TF-3: 4.2.4 Error Reporting. This transaction does not support a partial success response.

2475

XML namespace prefixes used in text and in examples below are for informational purposes only and are documented in ITI TF-2x: Appendix V, Table 2.4-1.

2480

The requirements for the response message with the AS4 Asynchronous Web Services stack are:

- The <eb:Service> SOAP element shall be set to the value: urn:ihe:iti:2015:CrossGatewayDocumentProvide

- The <eb:Action> SOAP element shall contain the value: urn:ihe:iti:2015:CrossGatewayDocumentProvideResponse

2485

- The <eb:From/eb:Role> element shall be set to the value: urn:ihe:iti:2018:Provider

- The <eb:To/eb:Role> element shall be set to the value : urn:ihe:iti:2018:Requester

- the <soap12:Body> soap element shall contain one <rs:RegistryResponse> element

2490 | *Update Section 3.80.7 with the following updates:.*

3.80.7.1 Initiating Gateway audit message:

	Field Name	Opt	Value Constraints
Event AuditMessage/ EventIdentification	EventID	M	EV(110106, DCM, "Export")
	EventActionCode	M	"R" (Read)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-80", "IHE Transactions", "CrossGatewayDocumentProvide")

Source (Document Source) (1)
Human Requestor (0..n)
Destination (Document Repository) (1)
Audit Source (Document Source) (1)
Patient (1)
SubmissionSet (1)

Where:

Source **AuditMessage/ ActiveParticipant**	UserID	M	If **WS-Addressing** Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. **If AS4 Asynchronous Web Services Exchange is used, the content of the eb:From/eb:Party Id.** Otherwise, not specialized.
	AlternativeUserID	M	The process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address

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

Destination **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
	HomeCommunityID	M	The homeCommunityId of the destination intended recipient

2495

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

Patient	ParticipantObjectTypeCode	M	"1" (Person)
	ParticipantObjectTypeCodeRole	M	"1" (Patient)
(AuditMessage/ ParticipantObjectIdentification)	*ParticipantObjectDataLifeCycle*	U	*not specialized*
	ParticipantObjectIDTypeCode	*M*	*not specialized*
	ParticipantObjectSensitivity	U	*not specialized*
	ParticipantObjectID	M	The patient ID in HL7 CX format.
	ParticipantObjectName	U	*not specialized*
	ParticipantObjectQuery	U	*not specialized*
	ParticipantObjectDetail	U	*not specialized*

2500

Submission Set	ParticipantObjectTypeCode	M	"2" (System)
	ParticipantObjectTypeCodeRole	M	"20" (job)
(AuditMessage/ ParticipantObjectIdentification)	*ParticipantObjectDataLifeCycle*	U	*not specialized*
	ParticipantObjectIDTypeCode	M	EV("urn:uuid:a54d6aa5-d40d-43f9-88c5-b4633d873bdd", "IHE XDS Metadata", "submission set classificationNode")
	ParticipantObjectSensitivity	U	*not specialized*
	ParticipantObjectID	M	The submissionSet unique ID
	ParticipantObjectName	U	*not specialized*
	ParticipantObjectQuery	U	*not specialized*
	ParticipantObjectDetail	U	*not specialized*

3.80.7.2 Responding Gateway audit message:

	Field Name	**Opt**	**Value Constraints**
Event AuditMessage/ EventIdentification	EventID	M	EV(110107, DCM, "Import")
	EventActionCode	M	"C" (Create)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("ITI-80", "IHE Transactions", "CrossGatewayDocumentProvide")
Source (Document Source) (1)			
Destination (Document Repository or Document Recipient) (1)			
Audit Source (Document Repository or Document Recipient) (1)			
Patient (1)			

SubmissionSet (1)

Where:

Source AuditMessage/ ActiveParticipant	UserID	M	If **WS-Addressing** Asynchronous Web Services Exchange is being used, the content of the <wsa:ReplyTo/> element. **If AS4 Asynchronous Web Services Exchange is used, the content of the eb:From/eb:Party Id.** Otherwise, not specialized.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	The machine name or IP address

2505

Destination AuditMessage/ ActiveParticipant	UserID	M	SOAP endpoint URI
	AlternativeUserID	M	The process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	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
	HomeCommunityID	M	The homeCommunityId of the destination intended recipient

Audit Source AuditMessage/AuditSo urceIdentification	*AuditSourceID*	*U*	*not specialized*
	AuditEnterpriseSiteId	*U*	*not specialized*
	AuditSourceTypeCode	*U*	*not specialized*

Patient (AuditMessage/ ParticipantObjectIde ntification)	ParticipantObjectTypeCode	M	"1" (Person)
	ParticipantObjectTypeCodeRole	M	"1" (Patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	*M*	*not specialized*
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The patient ID in HL7 CX format.
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	*U*	*not specialized*

2510

Submission Set (AuditMessage/ ParticipantObjectIdentification)	ParticipantObjectTypeCode	M	"2" (System)
	ParticipantObjectTypeCodeRole	M	"20" (job)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	M	EV("urn:uuid:a54d6aa5-d40d-43f9-88c5-b4633d873bdd", "IHE XDS Metadata", "submission set classificationNode")
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	The submissionSet unique ID
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	*U*	*not specialized*

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2515 *Appendix V: Web Services for IHE Transactions is updated by this supplement. Because Appendix V is being redocumented by ITI-CP-1122 in order to simplify its structure and make its update by this supplement simpler, CP 1122 will be the basis upon which this supplement makes changes. It is assumed that CP 1122 will be approved and applied to the ITI Technical Framework before this Supplement reaches final text.*

2520 *Because the redocumented Appendix V is technically unchanged, the reader of this Supplement is not compelled to review CP 1122.*

Update CP 1122 Section V.2.4.2 Name Spaces, as follows:

V.2.4 XML Namespaces

2525 Table V.2.4-1 lists XML namespaces that are used in this appendix. The choice of any namespace prefix is arbitrary and not semantically significant.

Table V.2.4-1: XML Namespaces and Prefixes

Prefix	Namespace	Specification
wsdl (or default)	http://schemas.xmlsoap.org/wsdl/	WSDL 1.1 binding for SOAP 1.2
wsoap12 or wsoap	http://schemas.xmlsoap.org/wsdl/soap12/	WSDL 1.1 binding for SOAP 1.2
wsaw	http://www.w3.org/2006/05/addressing/wsdl	WSA 1.0 - WSDL Binding
wsa	http://www.w3.org/2005/08/addressing	WSA 1.0 - Core
wsam	http://www.w3.org/2007/05/addressing/metadata	WSA 1.0 - Metadata
soap12	http://www.w3.org/2003/05/soap-envelope	SOAP 1.2
soap	Either soap11 or soap12 depending on context	
Hl7	urn:hl7-org:v3	HL7 V3 XML ITS
xsd	http://www.w3.org/2001/XMLSchema	XML Schema
xsi	http://www.w3.org/2001/XMLSchema-instance	XML Schema
lcm	urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0	
rim	urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0	
rs	urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0	
query	urn:oasis:names:tc:ebxml-regrep:xsd:query:3.0	
xds	urn:ihe:iti:xds-b:2007	
xop	http://www.w3.org/2004/08/xop/include	
eb	**http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/**	`ebms_core-3.0`

V.4 Asynchronous AS4 Web Services

V.4.1 Overview

Asynchronous use of Web Services in IHE is based on the OASIS AS4 standard [AS4]. AS4 is itself a profile of the OASIS ebMS3 standard [EBMS3CORE], a messaging protocol standard based on Web Services.

AS4 for Asynchronous Web Services Exchange provides added value for reliability and security as presented in Section V.5.

The use of AS4 for IHE Web Services shall conform to the Common Profiling specified in Section V.2 and uses standards referenced in Section V.2.2.

A component that implements ebMS3 messaging is referred to as an AS4 Message Service Handler (MSH) in the ebMS3 specification [ebMS3]. IHE profile actors may implement the functionality of an AS4 MSH natively or use an off-the-shelf component or module to implement the AS4 MSH functionality.

AS4 for IHE Web Services is based on the AS4 profile of ebMS3. It is not related to, and not interoperable with, the HL7 transport specification for ebMS3 [HL7EBMS3]. However, the IHE AS4 Asynchronous Usage Profile adopts one of the HL7 naming conventions (see Section V.4.6).

The OASIS ebXML Messaging Services Technical Committee that maintains the AS4, ebMS 3.0 Core and other related specifications, is tracking and resolving issues in the specifications [EBERRATA]. These resolutions will eventually be published as a consolidated Specification Errata but should already be taken into account by implementers, to avoid functional or interoperability issues.

V.4.2 Referenced Standards

[AP] WS-I Attachments Profile Version 1.0. Final Material. 2006-04-20. http://www.ws-i.org/Profiles/AttachmentsProfile-1.0.html

[AS4] AS4 Profile of ebMS 3.0 Version 1.0. OASIS Standard, 23 January 2013. http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/profiles/AS4-profile/v1.0/

[EBMS3CORE] OASIS ebXML Messaging Services Version 3.0: Part 1, Core Features. OASIS Standard. 1 October 2007. http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/core/os/

[EBMSERRATA] OASIS ebXML Messaging TC Issue Tracker https://tools.oasis-open.org/issues/browse/EBXMLMSG

[HL7EBMS3] ANSI/HL7 V3 ebXML, R1-2008 (R2013) HL7 Version 3 Standard: Transport Specification – ebXML, Release 1 7/3/2008 (reaffirmed 6/7/2013)

[RFC1952] GZIP file format specification version 4.3. IETF RFC. May 1996,
2565   http://tools.ietf.org/html/rfc1952

[RFC2392] Levinson, E., "Content-ID and Message-ID Uniform Resource Locators", RFC 2392, DOI 10.17487/RFC2392, August 1998, https://www.rfc-editor.org/info/rfc2392.

[RFC5322] Resnick, P., Ed., "Internet Message Format", RFC 5322, DOI 10.17487/RFC5322, October 2008, https://www.rfc-editor.org/info/rfc5322.

2570   [SOAPATTACH] SOAP Messages with Attachments, W3C Note. 11 December 2000. http://www.w3.org/TR/SOAP-attachments.

[WSSSWA] OASIS Web Services Security: Web Services Security SOAP Message with Attachments (SwA) Profile Version 1.1.1. OASIS Standard, May 2012. http://docs.oasis-open.org/wss-m/wss/v1.1.1/wss-SwAProfile-v1.1.1.doc

2575   **V.4.3 Configuring Asynchronous AS4 Web Services**

AS4 uses the ebMS3 mechanism of Processing Modes (or P-Modes) for configuration. A P-Mode is a structured set of parameters that determine how messages are exchanged. Aspects covered by the P-Mode include security, reliability, transmission mode, error handling and the use of AS4 advanced features. A P-Mode may be viewed and used as an agreement between two 2580   parties as to how messages must be processed, and as declarative configuration data for a Sending MSH, as well as for a Receiving MSH.

The AS4 standard pre-defines three so-called Conformance Profiles. A Conformance Profile defines a specific functional subset of the version 3.0 ebXML Messaging, Core Specification and corresponds to a class of conformant software applications. For each Conformance Profile, the 2585   AS4 standard specifies which processing parameters it supports, possibly constraining its value sets, and therefore (indirectly) the feature set it supports. (Note that the provision of pre-defined Conformance Profiles does not preclude third parties from defining custom Conformance Profiles). The Conformance profiles defined by AS4 selected for use in IHE Transactions when exchanged when an AS4 ebHandler or Light Client interacts with an AS4 ebHandler Server are:

2590   • The AS4 ebHandler Conformance Profile provides (among others) full support for sender and receiver mode, client and server mode AS4 messaging, supports WS-Security using X.509 tokens and supports the AS4 Advanced Features. It is the most capable and most widely implemented of the AS4 Conformance Profiles. It provides more capabilities and flexibility than the other two predefined Conformance Profiles.

2595   • The Light Client Conformance Profile is targeted to client implementations. It interoperates with AS4 servers that conform to the above ebHandler Conformance Profile.

   • The Minimal Client Profile is not supported by this appendix.

V.4.4 Feature Set

2600 AS4 is a profile of ebMS3 and therefore supports a subset of its feature set. This section gives a high-level overview of some of these features, providing considerations for use to implement IHE Transactions and streamlining some options. These features and corresponding P-Mode parameters are referenced by Conformance Profiles and require functionality in software implementations. This Appendix constrains some of the AS4 options for consistency and

2605 highlights specific capabilities. Full details are provided in the relevant underlying specifications [EBMS3CORE, AS4]. Section V.4.6 complements this section by discussing parameters that are more related to deployment environments.

V.4.4.1 Message Exchange Patterns

AS4 uses the ebMS3 concepts of Message Exchange Patterns (MEPs) and MEP Bindings.

2610 • In a One Way exchange, the Sender sends a User Message to the Receiver without there being an expectation that a business response is to be returned. This message is typically a notification.

• In a Two Way exchange, the exchange consists of two legs. In the first leg, the sender sends a User Message to the Receiver, and there is an expectation that the Receiver in

2615 turn will send a correlated message back in a second leg. The first leg message is typically a request and the second leg message is the response to the request.

There is a conceptual difference between Sender and Initiator. In an ebMS3 One Way MEP, the Sender is the Initiator in a so-called Push exchange. If the exchange is initiated by the Receiver, the Sender is the Responder. This is the case in a Pull exchange.

2620 AS4 supports MEP Bindings to the HTTP transport protocol.

• In a One Way Push binding, the Sender is the Initiator and uses HTTP as a client. The Receiver is the Responder and uses HTTP as the server.

• In a One Way Pull binding, the Sender is the Responder and uses HTTP as a server. The Receiver is the Initiator and uses HTTP as the client.

2625 The Pull binding involves the Initiator sending a predefined "Pull Request" signal to the Responder that provides authorization information and an indication of the expected (subset of) user messages. The "pulled" user message is returned on the HTTP back-channel. In AS4, the concepts of client/server, initiator/responder and sender/receiver are decoupled.

While the OASIS AS4 Standard [AS4] does not mandate support for any MEP other than the

2630 One Way MEP, support for the Two Way MEP is required for use with IHE transactions and use a specific SOAP Header value named eb:RefToMessageId to correlate the request and the response.

In a Two Way MEP, the selection of Push or Pull bindings can be decided separately for each of the two legs. A Two Way "Push-and-Push" binding is a combination of two Push exchanges,

2635 each using their own HTTP connections. Sender and Receiver alternate in their roles as Initiator/Responder and Client/Server.
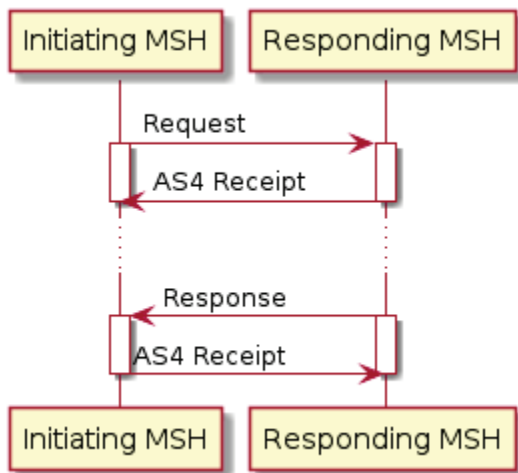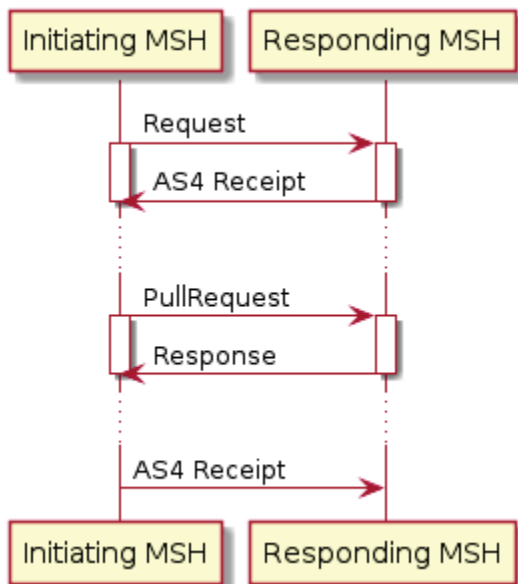
This exchange has the following characteristics:

- Both parties in the exchange need to support both client and server HTTP functionality.
- At network level, both parties need to allow incoming connections from their counterparty (and from any other counterparty).
- There is no (or only limited) delay between submission of the message to the Sender and its delivery by the Consumer. As soon as the request is processed, the back-end application can submit a response to its MSH which will initiate transmission.

A Two Way MEP can also be bound to a "Push-and-Pull" binding. This is a combination of a Push exchange (from Sender/Initiator to Receiver/Responder) followed by a Pull exchange (from the Sender/Responder to the Receiver/Initiator).

This exchange has the following characteristics:

2650
- One party in the exchange only needs to support client functionality, to initiate sending of the first (pushed) message and to initiate pulling of the second message.

- The other party needs to support server functionality, first to receive the first (pushed) message and then to process a pull request and (subject to authorization, response message availability) return a submitted response.

2655
- At network level, only one party needs to allow incoming connections from its counterparty.

- There is a delay between submission of the message to the Sender and its delivery by the Consumer. As soon as the request is processed, the back-end application can submit a response to its MSH, but the transmission will only happen with the next Pull request.
2660 Note, however, that the Pull Requests for the second leg can be timed to follow the first leg Push, proportional to the expected request processing time.

Similar to the Push-and-Pull binding, a Pull-and-Push binding is defined. It is the reverse of the Push-and-Pull binding and allows a client-only MSH to pull requests and push back responses.

Specific user communities deploying Asynchronous AS4 Web Services for IHE Transactions
2665 may constrain the use of AS4 Message Exchange Patterns and their Channel Bindings.

V.4.4.2 Message Structure

An AS4 message uses the SOAP 1.2 [SOAP12-PART1, SOAP12-PART2] envelope structure in which an *eb:Messaging* header block is present in the SOAP Header. This block provides rich metadata on the message and its payloads. If a single XML payload is exchanged in the message,
2670 it may use the SOAP Body or be carried in a separate MIME part in a SOAP 1.2 Messages with Attachments [SOAPATTACH] envelope. If the payload is not XML, or if there are additional payloads, additional MIME attachments may be used.
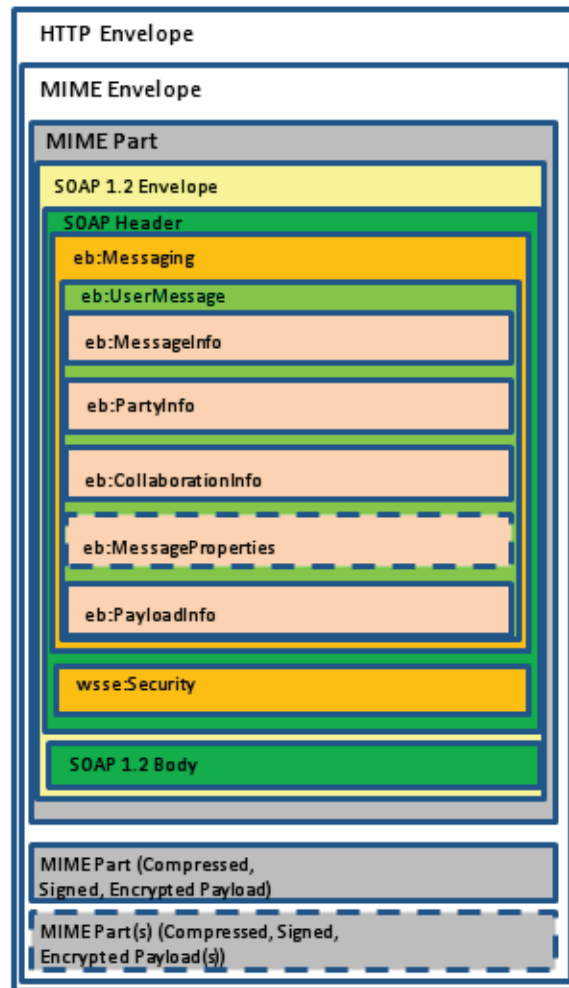
V.4.4.3 Test Service

2675   Section 5.2.2 of [EBMS3] defines a server test feature that allows a party to "Ping" a communication partner. The feature is based on messages in which the *eb:UserMessage/eb:CollaborationInfo/eb:Service* is set to http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/service an *eb:UserMessage/eb:CollaborationInfo/eb:Action* is set to http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/test.

2680   Implementations of Asynchronous AS4 Web Services for IHE shall implement this feature. It allows communication partners to perform a basic test of the run-time communication configuration (including security at network, transport and message layer, and reliability) in any environment, including the production environment. A conformant implementation shall allow configuration of processing modes for exchanges involving these values for service and action,

2685   such that messages with these values are not delivered to any Consumer business application. This (product) feature is activated and configured by deploying P-Modes (see Section V.4.6.4).

Note that the Test Service is a run-time test service supporting deployments. It is not a service to support testing conformance or interoperability of an AS4 software product.

V.4.4.4 Error Handling

2690   When used in conjunction with the Push channel binding, ebMS3 errors on pushed messages shall be returned synchronously using the HTTP backchannel. This is done by setting the PMode[].Errorhandling.Report.AsResponse P-Mode parameter to a true value.

When used in conjunction with the Pull channel binding, ebMS3 errors on pulled messages shall be posted using a separate outbound connection. The URI address of the MSH from which
2695   messages are pulled shall also serve as address for errors.

V.4.4.5 Receipt Handling

When used in conjunction with the Push channel binding, ebMS3 receipts on pushed messages shall be returned synchronously using the HTTP backchannel. This is done by setting the PMode[1].Security.SendReceipt.ReplyPattern P-Mode parameter to the "response" value.

2700   When used in conjunction with the Pull channel binding, ebMS3 receipts on pulled messages shall be posted using a separate outbound connection. The URI address of the MSH from which messages are pulled shall also serve as address for receipts.

V.4.4.6 Message Layer Security

Implementations of Asynchronous AS4 Web Services that use of WS-Security to secure AS4
2705   message exchanges shall support, in addition to the general requirements laid out in section V.2.3, the OASIS Web Services Security SOAP Message with Attachments (SwA) Profile Version 1.1.1 [WSSSWA] specification, as specified for use in the ebMS3 and AS4 specifications [EBMS3CORE, AS4]. Support for these specifications is available in AS4 implementations that conform to the AS4 ebHandler and AS4 Light Client Conformance
2710   Clauses.

Signing and encryption are configured using P-Modes. The use of message layer signing is configured using the PMode[].Security. X509.Signature parameter set. The use of message layer encryption is configured using the PMode[].Security. X509.Encryption parameter set.

V.4.4.7 Pull Handling

2715   If Pull is used, and if the WS-Security module of the AS4 client and server support the use of X.509 tokens [WSSX509], Pull requests shall be authorized using the AS4 Authorization Option 2 as specified in section 2.1.1 of the AS4 specification [AS4].

Implementations may restrict the ability to authorize Pull requests to authorization at the MPC (Message Partition Channel) level, rather than per individual P-Mode level. For more
2720   information on MPC, see section 3.4 of [ebMS3].

V.4.5 Use of AS4 Additional Features

AS4 provides some additional features that are not in ebMS3 and not in other Web Services standards. The two most useful ones are the Compression and Reception Awareness features. Both these features are available in implementations that conform to the AS4 ebHandler and AS4 Light Client Conformance Clauses.

V.4.5.1 Compression

The AS4 Compression feature provides message layer (de)compression of application payloads. AS4 messages containing compressed application payloads are built in conformance with the SOAP with Attachments (SwA) [SOAPATTACH] specification for use with SOAP 1.2 as specified in [EBMS3CORE].

The use of AS4 compression is configured using the P-Mode parameter PMode[].Payload-Service.CompressionType with the value "application/gzip". This indicates that the GZIP [RFC1952] compression algorithm may be used by the sender to compress payloads and that GZIP decompression must be applied by the receiver prior to delivery. Each compressed payload is carried in a separate MIME message part. Compression must be applied before payloads are attached to the SOAP Message.

The benefit of AS4 compression is that it speeds up message layer security processing (as there is less data to be signed/validated and encrypted/decrypted) and transmission of data over networks (as the message is smaller).

V.4.5.2 Reception Awareness

The AS4 Reception Awareness feature uses the ebMS3 Receipt signal message [EBMS3CORE]. It provides at-least-once delivery using a built-in Retry mechanism that helps to overcome temporary network or message processing issues and at-most-once delivery based on detection of message duplicates. Reception Awareness is a simple, effective reliable messaging protocol for Web Services with no known interoperability issues.

The use of AS4 Reception Awareness is configured using the PMode[].ReceptionAwareness P-Mode parameters.

V.4.6 Usage Profile for IHE Transactions

Some AS4 configuration aspects relate less to how AS4 functionality is implemented in software (as covered in Section V.4.4 and V.4.5) but rather to aspects related to deployment of an AS4 MSH within a particular organization and/or within a particular community.

V.4.6.1 Message Structure

AS4 supports including multiple payloads in a single message. AS4 supports exchanging *application/xml* payloads in either the SOAP Body or as a MIME attachment. AS4 products typically allow this choice to be made per individual message. If compression is used (see Section V.4.5.1), it only operates on MIME parts.

For current IHE Transactions, the following constraints apply:

- For transactions that have both a request/response (ebRS request, HL7 V3 message) and documents attached:

  - the request/response shall be placed in the SOAP Body

  - the SOAP envelope shall be placed in the start MIME Part

  - the attached documents shall be separate MIME parts

- For transactions that have only a request/response (ebRS request, HL7 V3 message) and no documents attached,

  - the request/response shall be placed in the SOAP Body

  - the SOAP envelope shall be placed in the start MIME Part

This approach ensures that there is only one way to encode and AS4 message payload with IHE transactions and the payload elements that benefit from best compression are the attached documents (not the request/response XML because they are typically of limited size).

V.4.6.2 Document Content Support

IHE transactions that involve the inclusion of document metadata along with document content, when conveyed as attachments using the AS4 Asynchronous Web Services, are:

- Cross Gateway Retrieve [ITI-39]

- Provide And Register DocumentSet-b [ITI-41]

- Retrieve Document Set [ITI-43]

- Cross-Gateway Provide [ITI-80]

The following profiling shall apply to document content encoding:

- The document repository XML document shall be referenced by the first *eb:PartInfo* element in the *eb:PayloadInfo* element in the AS4 header.

- Content of documents that are submitted or retrieved shall be not be carried as *xdsb:Document* elements in the XML document element but shall instead be carried in separate AS4 MIME payload parts.

- Submitted or retrieved documents shall be exchanged in their native (possibly binary) data format. No Base64 encoding shall be applied.

- As any message part, payload parts carrying submitted or retrieved documents shall be identified using a MIME Content Identifier. For each document payload part, a separate *eb:PartInfo* shall be added to list of children of the *eb:PayloadInfo*.

- For each payload part carrying submitted or retrieved documents a part property with
  2790   name *id* shall be added to the *eb:PartInfo* for that part. The value of that part property
  shall be set as follows:

    - For [ITI-41] or [ITI-43] transactions to the value of the *id* attribute of the
      rim:ExtrinsicObject in the *rim:RegistryObjectList*.

    - For [ITI-80] or [ITI-39] transactions to the concatenation of the value conveyed
      2795   in the *xdsb:DocumentUniqueId* element and (if present) the value conveyed in
      the *xdsb:HomeCommunityId* element using the "|" character separator.

As an example, the following fragment of the *eb:Messaging* header of an AS4 message indicates
the message contains three message parts, carried in separate MIME parts.

```
2800  <eb:PayloadInfo xmlns:eb="http://docs.oasis-open.org/ebxml-
      msg/ebms/v3.0/ns/core/200704/">
          <eb:PartInfo />
          <eb:PartInfo href="cid:0e3f6331-b5a8-4758-8cfd-
      c562d2ea1c86@requester.com" >
2805          <!-- the first document in the package -->
              <eb:PartProperties>
                  <eb:Property name="id">Document01</eb:Property>
              </eb:PartProperties>
          </eb:PartInfo>
2810      <eb:PartInfo href="cid:9cf5c59a-068c-4c4d-a3ed-
      a24becee643f@requester.com" >
              <!-- the second document in the package -->
              <eb:PartProperties>
                  <eb:Property name="id">Document02</eb:Property>
2815          </eb:PartProperties>
          </eb:PartInfo>
      </eb:PayloadInfo>
```

The first part is an *xdsb:ProvideAndRegisterDocumentSetRequest* document. It is a submission
2820   of two documents with identifiers *Document01* and *Document02*, respectively, and metadata
about those documents. In ebMS3, absence of an *href* attribute indicates that the XML content of
the part is placed as a child element in the SOAP *Body*.

```
2825  <xdsb:ProvideAndRegisterDocumentSetRequest xmlns:xdsb="urn:ihe:iti:xds-
      b:2007"
          xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
          xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0">
          <lcm:SubmitObjectsRequest>
              <rim:RegistryObjectList>
2830              <rim:RegistryPackage id="SubmissionSet01">
                      <!-- details omitted -->
                  </rim:RegistryPackage>
                  <rim:ExtrinsicObject id="Document01">
                      <!-- details omitted -->
```

```
2835            </rim:ExtrinsicObject>
                <rim:Association id="assoc1"
                    associationType="urn:oasis:names:tc:ebxml-
          regrep:AssociationType:HasMember"
                    sourceObject="SubmissionSet01"
2840                targetObject="Document01">
                    <rim:Slot name="SubmissionSetStatus">
                        <rim:ValueList>
                            <rim:Value>Original</rim:Value>
                        </rim:ValueList>
2845                </rim:Slot>
                </rim:Association>
                <rim:ExtrinsicObject id="Document02">
                    <!-- details omitted -->
                </rim:ExtrinsicObject>
2850            <rim:Association id="assoc2"
                    associationType="urn:oasis:names:tc:ebxml-
          regrep:AssociationType:HasMember"
                    sourceObject="SubmissionSet01"
                    targetObject="Document02">
2855                <rim:Slot name="SubmissionSetStatus">
                        <rim:ValueList>
                            <rim:Value>Original</rim:Value>
                        </rim:ValueList>
                    </rim:Slot>
2860            </rim:Association>
            </rim:RegistryObjectList>
        </lcm:SubmitObjectsRequest>
        <!-- The xdsb:Document elements are omitted here. They are referenced
        from the AS4 envelope's PayloadInfo -->
2865 </xdsb:ProvideAndRegisterDocumentSetRequest>
```

Note that there are no *xdsb:Document* elements in this document. Instead, these documents are carried in separate MIME parts with content identifiers *0e3f6331-b5a8-4758-8cfd-c562d2ea1c86@requester.com* and *9cf5c59a-068c-4c4d-a3ed-a24becee643f@requester.com*, respectively. These identifiers are used as values of the *href* attribute on the second and third *eb:PartInfo* elements in the *eb:PayloadInfo* container.

The payload part property *id* is specified for the two *eb:PartInfo* elements corresponding to these payload parts. The values are set to the *id* attributes of the related *rim:ExtrinsicObject* elements.

V.4.6.3 Party Identification

In AS4 messages, the *eb:From/eb:PartyId* and *eb:To eb:PartyId* elements are used to identify sender and receiver parties. If the value of these elements is not a URI, a *type* attribute is required to indicate the namespace or domain code list from which the identifier value is drawn.

No specific party identification namespace is mandated as this is typically a local implementation issue. Following [HL7EBMS3], if the party identifier is an HL7 instance identifier, the type attribute shall be set to the "urn:hl7ii" value.

V.4.6.4 Message Identification and Correlation

The value of the *eb:MessageId* and *eb:RefToMessageId* elements shall use the Internet message identifier syntax [RFC5322] without enclosing angle brackets [EBMS3CORE]. In Two Way message exchanges, the value of the *eb:RefToMessageId* in the response leg user message shall be set to the value of the *eb:MessageId* header in the request leg user message.

2885

The value of the *eb:ConversationId* in request and response user messages shall be the same. Any conventions for values of *eb:ConversationId* are out of scope of this specification. The only constraint of the ebMS3 schema is that the value be of XML schema token type.

V.4.6.5 Test Service

2890 Using the Test Service feature described in section V.4.4.3, deployments of the Asynchronous AS4 Web Services shall deploy, for each combination of values for the three parameters PMode.Initiator.Party, PMode.Responder.Party, PMode.Agreement defined in some deployed P-Mode, a P-Mode that has these values for these three parameters and uses the test service and action. For these three parameters, for each configured leg, for parameters other than

2895 PMode[].BusinessInfo.Service and PMode[].BusinessInfo.Action, this test service configuration shall have the same parameters as the non-test service. This includes the values of the PMode[].Security.X509 parameters, if used.

V.4.6.6 Service, Action and Role

AS4 has mandatory headers to express the *eb:Service*, *eb:Action* and sender and receiver *eb:Role*

2900 headers for a message.

V.4.6.6.1 Service

The ebMS3 specification [EBMS3] defines the *eb:Service* element as: "This REQUIRED element occurs once. It is a string identifying the service that acts on the message and it is specified by the designer of the service." The header is of XML schema type non-empty-string

2905 and specific values can be set for specific P-Modes and differentiate various types of messages.

For IHE Transactions, the value of the *eb:Service* header shall be set to a value specified in the transaction.

The AS4 test message shall use the value http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/service value for *eb:Service*.

2910 An AS4 message service handler can be configured to use a value for *eb:Service* using the *PMode[].BusinessInfo.Service* P-Mode parameter.

V.4.6.6.2 Action

In [EBMS3], *eb:Action* is defined as: "This REQUIRED element occurs once. It is a string identifying the action the User Message is intended to invoke on a particular service and it is

2915 specified by the designer of the service."

For IHE Transactions, the value of the *eb:Action* shall be set to a value defined in the specification of the transaction.

The AS4 test message shall use the http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/test value for *eb:Action*.

2920 An AS4 message service handler can be configured to use a value for *eb:Action* using the *PMode[].BusinessInfo.Action* P-Mode parameter.

V.4.6.6.3 Role

For each message exchange, [EBMS3] requires setting the values PMode.Initiator.Role and PMode.Responder.Role, which are used to set the *eb:From/eb:Role* and *eb:To/eb:Role* headers.

2925 For IHE transactions, the values to use for these headers are specified in the specification of these transactions.

For the AS4 test service, the default initiator and responder roles defined in section 5.2.5 of the OASIS AS4 specification [AS4] shall be used.

V.4.6.7 Message Partition Channel

2930 The ebMS3 optional message attribute *mpc* is used to indicate that a message is part of a specific Message Partition Channel. Its value is set using the PMode[].BusinessInfo.MPC parameter.

When used with Push exchanges, the MPC feature has no added value. The attribute shall therefore be absent, or (equivalently) present with the *http://docs.oasis-open.org/ebxmlmsg/ebms/v3.0/ns/core/200704/defaultMPC* value.

2935 When used with Pull exchanges, the MPC shall be set to a specific non-default value. For each counterparty a distinct MPC shall be used.

V.4.7 P-Mode Parameters

The following Table 4.7-1 summarizes AS4 P-Mode parameters and indicates, for each, if its use is constrained by this Appendix.

2940

Table V.4.7-1: Constraints to AS4 P-Mode parameters

Processing Mode Parameter	Value Profiling
PMode.ID	Not Constrained
PMode.Agreement	Not Constrained
PMode.MEP	Support required for the following values: http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/oneWay http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/twoWay
PMode.MEPBinding	Support required for one or more of the following values: http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/push http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/pushAndPush http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/pushAndPull http://docs.oasis-open.org/ebxml-msg/ebms/v3.0/ns/core/200704/pullAndPush
PMode.Initiator.Party	Party identifier of the party that initiates the MEP
PMode.Initiator.Role	Role of the party that initiated the MEP
PMode.Initiator.Authorization.username	Not used
PMode.Initiator.Authorization.password	Not used
PMode.Responder.Party	Party identifier of the party that responds in the MEP
PMode.Responder.Role	Role of the party that responds in the MEP
PMode.Responder.Authorization. username	Not used
PMode.Responder.Authorization. password	Not used
PMode[].Protocol.Address	Required, https URI of the responder
PMode[].Protocol.SOAPVersion	1.2
PMode[].BusinessInfo.Service	See Section V.4.6.5.1

Processing Mode Parameter	Value Profiling
PMode[].BusinessInfo.Action	See Section V.4.6.5.2
PMode[].BusinessInfo.Properties	Support Required; no profiling for specific values
PMode[].BusinessInfo.MPC	When used with Push, only default MPC is used
	When used with Pull, one MPC per counterparty.
PMode[].BusinessInfo.PayloadProfile	Not Constrained
PMode[].Errorhandling.Report. SenderErrorsTo	Not used.
PMode[].Errorhandling.Report. ReceiverErrorsTo	Not used if the MEP Binding is Push
	If the MEP Binding is Pull, this parameter is set to the same URI as PMode[].Protocol.Address.
PMode[].Errorhandling.Report. AsResponse	If the MEP Binding is Push, set to True.
	If the MEP Binding is Pull, set to the same URI as PMode[].Protocol.Address
PMode[].Errorhandling.Report. ProcessErrorNotifyConsumer	True (Recommended)
PMode[].ErrorHandling.Report. ProcessErrorNotifyProducer	True (Recommended)
PMode[].Errorhandling. DeliveryFailuresNotifyProducer	True (Recommended)
PMode[].ErrorHandling.Report. MissingReceiptNotifyProducer	True (used with ReceptionAwareness)
PMode[].Reliability	Not used
PMode[].Security.WSSversion	1.1.1
PMode[].Security.X509.Sign	Optional
PMode[].Security. X509.Signature.Certificate	X.509 signing certificate of Sender
PMode[].Security. X509.Signature.HashFunction	Not Constrained
PMode[].Security.X509.Signature. Algorithm	Not Constrained
PMode[].Security.X509.Encryption. Encrypt	Optional

Processing Mode Parameter	Value Profiling
PMode[].Security.X509.Encryption. Certificate	Not Constrained
PMode[].Security.X509.Encryption. Algorithm	X.509 Encryption certificate of receiver
PMode[].Security.X509.Encryption. MinimalStrength	Not Constrained
PMode[].Security.UsernameToken. username	Not Constrained
PMode[].Security.UsernameToken. password	Not Constrained
PMode[].Security.UsernameToken. Digest	Not Constrained
PMode[].Security.UsernameToken. Nonce	Not Constrained
PMode[].Security.UsernameToken. Created	Not Constrained
PMode[].Security.PModeAuthorize	False
PMode[].Security.SendReceipt	Optional
PMode[].Security.SendReceipt. NonRepudiation	Optional
PMode[].Security.SendReceipt. ReplyPattern	For Push, set to the value "response". For Pull, set to the value "callback".
PMode[].PayloadService. CompressionType	Optional; if used, fixed value "application/gzip"
PMode[].ReceptionAwareness	Optional
PMode[].ReceptionAwareness.Retry	Not Constrained
PMode[].ReceptionAwareness.Retry. Parameters	Not Constrained
PMode[].ReceptionAwareness. DuplicateDetection	Optional
PMode[].ReceptionAwareness. DetectDuplicates.Parameters	Not Constrained
PMode[].BusinessInfo.subMPCext	Not Used

V.4.8 Sample SOAP Messages

The samples in this section show the building blocks typically how SOAP requests and their relative SOAP responses are built.

Namespace declarations (see Table V.2.4-1) are omitted for brevity.

V.4.8.1 Sample SOAP AS4 Asynchronous Request

This is a sample of Provide and Register Document Set-b [ITI-41] Transaction Request. For brevity, and to focus on the AS4 specific aspects, it assumes the exchange does not involve use of WS-Security.

Other transactions will differ in their elements values that are transaction specific:

- the <eb:Service> SOAP header

- the <eb:Action> SOAP header

- The <eb:From/eb:Role> element

- The <eb:To/eb:Role> element

- the <soap12:Body> soap element

```
Content-Type:multipart/related; type="application/soap+xml";
      boundary="b6e68776-47ea2784152c-de60-4b15-b324-b399052af5f1";
      start="<cf5e08c5-5b11-4cef-bc59-6f5ac572722d@requester.ro>"; start-
info="application/soap+xml"
Content-Length:8462

--b6e68776-47ea2784152c-de60-4b15-b324-b399052af5f1
Content-Type:application/soap+xml; charset=UTF-8
Content-Transfer-Encoding:binary
Content-ID:<cf5e08c5-5b11-4cef-bc59-6f5ac572722d@requester.ro>

<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://www.w3.org/2003/05/soap-envelope">
    <env:Header>
        <eb:Messaging xmlns:eb="http://docs.oasis-open.org/ebxml-
msg/ebms/v3.0/ns/core/200704/"
            env:mustUnderstand="true" >
          <eb:UserMessage>
              <eb:MessageInfo>
                  <eb:Timestamp>2018-03-23T15:07:36.000Z</eb:Timestamp>
                  <eb:MessageId>8196c8e2-820f-4aec-a1ca-
288a4d1d4020@requester.ro</eb:MessageId>
              </eb:MessageInfo>
              <eb:PartyInfo>
                  <eb:From>
```

```
                              <eb:PartyId
eb:type="urn:hl7ii">2.1.34567.43:2</eb:PartyId>
2985                          <eb:Role>urn:ihe:iti:2018:Requester</eb:Role>
                         </eb:From>
                         <eb:To>
                              <eb:PartyId
eb:type="urn:hl7ii">1.2.3.4:5</eb:PartyId>
2990                          <eb:Role>urn:ihe:iti:2018:Provider</eb:Role>
                         </eb:To>
                    </eb:PartyInfo>
                    <eb:CollaborationInfo>

2995    <eb:Service>urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-b</eb:Service>

        <eb:Action>urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-b</eb:Action>
                         <eb:ConversationId>E5D7CFEE-E6A9-4855-A67E-
        6C24403E35E6</eb:ConversationId>
3000                 </eb:CollaborationInfo>
                    <eb:PayloadInfo>
                         <eb:PartInfo>
                              <!-- The first part is the XML XDS-b
                                   ProvideAndRegisterDocumentSetRequest document.
3005                               Absence of an @href indicates the content is in
                                   the SOAP Body.
                              -->
                         </eb:PartInfo>
                         <eb:PartInfo href="cid:0e3f6331-b5a8-4758-8cfd-
3010    c562d2ea1c86@requester.ro" >
                              <!-- the first document in the package (PDF) -->
                              <eb:PartProperties>
                                   <eb:Property name="id">Document01</eb:Property>
                              </eb:PartProperties>
3015                     </eb:PartInfo>
                         <eb:PartInfo href="cid:9cf5c59a-068c-4c4d-a3ed-
        a24becee643f@requester.ro" >
                              <!-- the second document in the package (JPEG) -->
                              <eb:PartProperties>
3020                              <eb:Property name="id">Document02</eb:Property>
                              </eb:PartProperties>
                         </eb:PartInfo>
                    </eb:PayloadInfo>
                </eb:UserMessage>
3025        </eb:Messaging>
        </env:Header>
        <env:Body>
            <xdsb:ProvideAndRegisterDocumentSetRequest
        xmlns:xdsb="urn:ihe:iti:xds-b:2007"
3030            xmlns:rim="urn:oasis:names:tc:ebxml-regrep:xsd:rim:3.0"
                xmlns:lcm="urn:oasis:names:tc:ebxml-regrep:xsd:lcm:3.0">
                <lcm:SubmitObjectsRequest>
                    <rim:RegistryObjectList>
                         <rim:RegistryPackage id="SubmissionSet01">
3035                         <!-- details omitted -->
```

```
                                </rim:RegistryPackage>
                                <rim:ExtrinsicObject id="Document01">
                                    <!-- details omitted -->
                                </rim:ExtrinsicObject>
3040                            <rim:Association id="assoc1"
                                    associationType="urn:oasis:names:tc:ebxml-
        regrep:AssociationType:HasMember"
                                    sourceObject="SubmissionSet01"
                                    targetObject="Document01">
3045                                <rim:Slot name="SubmissionSetStatus">
                                        <rim:ValueList>
                                            <rim:Value>Original</rim:Value>
                                        </rim:ValueList>
                                    </rim:Slot>
3050                            </rim:Association>
                                <rim:ExtrinsicObject id="Document02">
                                    <!-- details omitted -->
                                </rim:ExtrinsicObject>
                                <rim:Association id="assoc2"
3055                                associationType="urn:oasis:names:tc:ebxml-
        regrep:AssociationType:HasMember"
                                    sourceObject="SubmissionSet01"
                                    targetObject="Document02">
                                    <rim:Slot name="SubmissionSetStatus">
3060                                    <rim:ValueList>
                                            <rim:Value>Original</rim:Value>
                                        </rim:ValueList>
                                    </rim:Slot>
                                </rim:Association>
3065                        </rim:RegistryObjectList>
                    </lcm:SubmitObjectsRequest>
                    <!-- The xdsb:Document elements are omitted here.
                        They are referenced from the AS4 envelope's PayloadInfo -->
                </xdsb:ProvideAndRegisterDocumentSetRequest>
3070        </env:Body>
</env:Envelope>
--b6e68776-47ea2784152c-de60-4b15-b324-b399052af5f1
Content-Type:application/pdf
Content-Transfer-Encoding:binary
3075    Content-ID:<0e3f6331-b5a8-4758-8cfd-c562d2ea1c86@requester.ro>

âÇ•œÙ
„oFðGÌ|Ò—NÑ ÜóB:á"&' ›¾l»À'™TÜŸõŠ'4¥™tFd³L
--b6e68776-47ea2784152c-de60-4b15-b324-b399052af5f1
3080    Content-Type:image/jpeg
Content-Transfer-Encoding:binary
Content-ID:<9cf5c59a-068c-4c4d-a3ed-a24becee643f@requester.ro>

âÇ•œÙ
3085    „oFðGÌ|Ò—NÑ ÜóB:á"&' ›¾l»À'™TÜŸõŠ'4¥™tFd³L
--b6e68776-47ea2784152c-de60-4b15-b324-b399052af5f1—
```

V.4.8.2 Sample SOAP AS4 Asynchronous Response

3090 This is a sample of Provide and Register Document Set-b [ITI-41] Transaction Response. As in the previous example, for brevity and to focus on the AS4 specific aspects, it assumes the exchange does not involve use of WS-Security.

Other transaction will differ in their elements values that are transaction specific:

- the <eb:Service> SOAP header

- the <eb:Action> SOAP header

3095 - The <eb:From/eb:Role> element

- The <eb:To/eb:Role> element

- the <soap12:Body> soap element

```
Content-Type:multipart/related; type="application/soap+xml";
       boundary="ecca3c97-ebc7-4f1b-838c-83c0d18ee40c";
       start="<c3818f2b-7f09-495a-9245-84542438d166@responder.nl>"; start-
info="application/soap+xml"
Content-Length:8462

--ecca3c97-ebc7-4f1b-838c-83c0d18ee40c
Content-Type:application/soap+xml; charset=UTF-8resp
Content-Transfer-Encoding:binary
Content-ID:<c3818f2b-7f09-495a-9245-84542438d166@responder.nl>

<?xml version="1.0" encoding="UTF-8"?>
<env:Envelope xmlns:env="http://www.w3.org/2003/05/soap-envelope">
    <env:Header>
        <eb:Messaging xmlns:eb="http://docs.oasis-open.org/ebxml-
msg/ebms/v3.0/ns/core/200704/"
            env:mustUnderstand="true" >
            <eb:UserMessage>
                <eb:MessageInfo>
                    <eb:Timestamp>2018-03-23T15:11:21.000Z</eb:Timestamp>
                    <eb:MessageId>4d7081ed-1c7e-437d-9202-
fe109643e2b6@responder.nl</eb:MessageId>
                    <eb:RefToMessageId>8196c8e2-820f-4aec-a1ca-
288a4d1d4020@requester.ro</eb:RefToMessageId>
                </eb:MessageInfo>
                <eb:PartyInfo>
                    <eb:From>
                        <eb:PartyId
eb:type="urn:hl7ii">1.2.3.4:5</eb:PartyId>
                        <eb:Role>urn:ihe:iti:2018:Provider</eb:Role>
                    </eb:From>
                    <eb:To>
                        <eb:PartyId
eb:type="urn:hl7ii">2.1.34567.43:2</eb:PartyId>
                        <eb:Role>urn:ihe:iti:2018:Requester</eb:Role>
```

```
3135                     </eb:To>
                      </eb:PartyInfo>
                      <eb:CollaborationInfo>
<eb:Service>urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-b</eb:Service>

<eb:Action>urn:ihe:iti:2007:ProvideAndRegisterDocumentSet-
3140    bResponse</eb:Action>
                          <eb:ConversationId>E5D7CFEE-E6A9-4855-A67E-
6C24403E35E6</eb:ConversationId>
                      </eb:CollaborationInfo>
                      <eb:PayloadInfo>
3145                      <eb:PartInfo />
                      </eb:PayloadInfo>
                </eb:UserMessage>
          </eb:Messaging>
        </env:Header>
3150    <env:Body>
            <RegistryResponse xmlns="urn:oasis:names:tc:ebxml-regrep:xsd:rs:3.0"
                status="urn:oasis:names:tc:ebxml-
regrep:ResponseStatusType:Success">
            </RegistryResponse>
3155    </env:Body>
</env:Envelope>
--ecca3c97-ebc7-4f1b-838c-83c0d18ee40c--
```

3160   *In ITI-CP-1122, replace Section V.5 by the following*

V.5 Added value of using AS4 for Asynchronous Web Services Exchanges

AS4 provides specifications to be implemented for reliability and security of message exchanges and in particular, for asynchronous WS exchanges. The AS4 scope covers the following
3165   functions for reliability and security:

- Reliability:
  - Reception awareness,
  - Duplicate detection,
- Security:
3170   - Non repudiation of origin,
  - Non repudiation of receipt,
  - Data confidentiality.

The aim of this summary is to provide for the security and reliability functions, a summary of the interest and added value to use AS4. This result is based on the gap analysis between the:

3175

- AS4 and the current synchronous IHE WS mechanisms,

- AS4 and the current synchronous IHE WS behavior.

V.5.1 Reliability functions: Reception awareness and duplicate detection

A receipt acknowledgement is sent from the Message Service Handler (MSH) receiver to the MSH sender.

3180

Table V.5.1-1: Interest and Added Value to use AS4 for Reliability Functions

AS4 mechanism	AS4 behavior	Synchronous IHE WS mechanism	Synchronous IHE WS behavior and WS-Addressing Asynchronous based
** Receipt (positive): Case 1: Receiving MSH is able to parse Case 2: The delivery operation toward the message consumer is done (receiving MSH is able to parse) ** Error: An error is encountered during the parsing of the incoming message (a code list is set up for defining errors)	** **Reception awareness (sending MSH)** - Mandatory: Sending MSH must support reception awareness: No receipt within a time interval. Report from MSH to Business application. Parameters: Time interval - Recommended: Message retry (same ebMS message ID and same hash value included in signature than those in the original user message). Parameters : Time interval and count ** **Duplicate detection (Receiving MSH)** - Mandatory: Receiving MSH must support duplicate detection in checking that the ebMS message ID is unique - Recommended: Elimination of duplicate messages or if not, it is mandatory to notify the business application. Parameters: Time interval and maximum of logs, set-up for history of received message ID	N/A	** No duplicate detection because every sending corresponds to a new transaction, therefore a new message ** No receipt acknowledgement but a treatment acknowledgement

Interest or added value of Asynchronous AS4

- Useful for Cross-Community transactions for insuring the end-to-end reliability.

- Useful for any other IHE transaction, if the network or the receiver is not reliable (risk of message loss).

3185 ### V.5.2 Security, non repudiation of origin

The receiver is 100% sure that the message originates from the sender and was unmodified during the exchange.

Table V.5.2-1: Interest and Added Value to use AS4 for Security - Non Repudiation of Origin

AS4 mechanism	AS4 behavior	Synchronous IHE WS mechanism	Synchronous IHE WS and WS-Addressing Asynchronous based behavior
WS-Security signing on user message (asymmetric key, public key can be included in the message as a Binary Security Token) Parts to be signed: ** ebMS Messaging Header ** SOAP body ** All SOAP attachments	**Receiving MSH checks hash value** If the hash value does not correspond, an ebMS error is sent to the sending MSH (according to agreed P-Mode)	** TLS	** Trust on mandatory TLS ** WS-Security identified by ATNA but not further profiled

3190

Interest or added value of Asynchronous AS4

- Useful for Cross-Community transactions for insuring the end-to end non repudiation, if the gateways do not add anything in the payload.

3195
- Useful for any other IHE transaction, if the link between the business application and the message handler is not sure.

V.5.3 Security, non repudiation of receipt

The sender is 100% sure that the receiver has received the message, without being modified during the message exchange.

Table V.5.3-1: Interest and Added Value to use AS4 for Security - Non Repudiation of Receipt

3200

AS4 mechanism	AS4 behavior	Synchronous IHE WS mechanism	Synchronous IHE WS and WS-Addressing Asynchronous based behavior
WS-Security signing on receipts The exchanged receipts are signed by the receiving MSH, which authenticates the originator of the receipt. The signature of receipts must be applied on the ebMS Messaging Header. <u>Mandatory</u>: In addition, non-repudiation information: Hashes of: ** User message ** SOAP body ** SOAP attachments	Sending MSH checks the non-repudiation information	N/A	** Does not exist: it is based on a mutual trust sender-receiver

Interest or added value of Asynchronous AS4

There is an interest in questioning the fact that a system of an affinity domain is trustworthy.

V.5.4 Security, data confidentiality

3205   **Table V.5.4-1: Interest and Added Value to use AS4 for Security – Data Confidentiality**

AS4 mechanism	AS4 behavior	Synchronous IHE WS mechanism	Synchronous IHE WS and WS-Addressing Asynchronous based behavior
WS-Security Encryption: (asymmetric key, public key can be included in the message as a Binary Security Token) ** SOAP Body ** SOAP attachments	Receiving MSH decrypts the message. If it is not able to decrypt, an error message is generated, according to agreed P-Mode	** TLS	** Trust on mandatory TLS ** WS-Security identified by ATNA but not further profiled

Interest or added value of Asynchronous AS4

- Useful for Cross-Community transactions for insuring the end-to-end confidentiality, if the gateways do not add anything in the payload.

3210
- Useful for any other IHE transaction, if the link between the business application and the message handler is not sure.