Integrating the Healthcare Enterprise

5

IHE IT Infrastructure

Technical Framework Supplement

Delayed Document Assembly

10

Trial Implementation

Date: August 20, 2010

15   Author: Karen Witting

Email: iti@ihe.net

Foreword

This is a supplement to the IHE IT Infrastructure Technical Framework V7.0. Each supplement
undergoes a process of public comment and trial implementation before being incorporated into
the volumes of the Technical Frameworks.

This supplement is submitted for Trial Implementation as of August 20, 2010 and will be
available for testing at subsequent IHE Connectathons. The supplement may be amended based
on the results of testing. Following successful testing it will be incorporated into the IT
Infrastructure Technical Framework. Comments are invited and may be submitted on the IHE
forums at http://forums.rsna.org/forumdisplay.php?f=198 or by email to iti@ihe.net.

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

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

Replace Section X.X by the following:

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

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

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

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

45 **CONTENTS**

65 **Introduction**

This supplement updates the XDS profile to support delaying document content assembly until the time of retrieval by adding an option for Delayed Document Assembly

Delaying document assembly is not specific to any type of content profile; it is expected that all document content profiles used by XDS may be shared as Stable Documents using Delayed
70 Document Assembly in the same way they are shared in the base XDS profile.

> Note: This Supplement makes use of content from the Metadata Update Supplement released for Trial Implementation at the same time. Some Vol. 3 sections referenced herein are new sections created by the Metadata Update Supplement.

The use of Delayed Document Assembly allows some types of source systems to operate in a
75 more efficient way than is supported prior to the introduction of this option. XDS is designed with the expectation that the document is entirely created prior to registering the metadata with the Document Registry. The use of Delayed Document Assembly allows source systems to register the existence of stable document content but defer actually assembling the document content only if and when it is retrieved. This deferral of the creation of the document content is
80 preferred in an application architecture where a great deal of content is available for sharing but saved as a set of distinct elementary records in a clinical database and not as documents. To convert all this content to documents is considered a waste of resources for any document which is never requested. Thus, only content that is specifically requested is formed into a document.

Delayed Document Assembly is distinct from On-Demand Documents in that Delayed
85 Document Assembly is consistent with the current assumptions of XDS, namely that Document Entries in the Document Registry reflect Documents that are static, clinician attested documents and the content of the document is identified prior to registration of the Document Entry. On-Demand Documents allows the content of the document to be identified at the time of receipt of the retrieval request. Delayed Document Assembly has been designed to be as transparent as
90 possible to Document Consumer Actors. Document Consumers Actors may easily support Stable Documents whose assembly has been delayed just as if they were a regular Stable Document since the only constraint on Document Consumers brought by this Delayed Document Assembly option is to support responses to queries with the presence of Stable Document Entries that have zero size and hash values.

95 The following describes a high level XDS workflow for Delayed Document Assembly where the content for the documents is managed as records in a clinical database.

- The Integrated Document Source/Repository determines that a new document could be created from the clinical database contents it is monitoring. At this time the Integrated Document Source/Repository has identified exactly what clinical database records would be
100 used to create the document.

3

- The Integrated Document Source/Repository registers this document with a Document Registry and assigns a unique identifier for the document. This registration includes a zero value hash or size since the document has not yet been assembled. .

105
- A Document Consumer which supports access to Delayed Document Assembly queries the Document Registry. The Document Registry returns the entry created by the Integrated Document Source/Repository.

- The Document Consumer decides it requires this document and initiates a Retrieve Document Set transaction to the Integrated Document Source/Repository identified in the query response. The Integrated Document Source/Repository uses the unique identifier
110 specified in the Retrieve Document Set to identify which records in the clinical database were identified for this document at the time of registration. If new content became available after the registration of the document it will not be included in the document content. The content is extracted from the clinical database, formed into a properly formatted document and returned to the Document Consumer. The Integrated Document Source/Repository also
115 must update the entry originally submitted to the Document Registry to set non-zero values for hash and size. The XDS Metadata Update supplement describes the mechanism for doing this.

If new content becomes available that the Integrated Document Source/Repository wishes to make available, then that actor will publish a new entry to the Document Registry representing
120 the new content. That new entry could also be a replacement for the prior entry.

Open Issues and Questions

- None

Closed Issues

125 All Closed Issues from the Public Comment version of this supplement have been moved to http://wiki.ihe.net/index.php?title=ITI_On-Demand_Documents#Closed_Issues_from_Public_Comment.

_____

4

Volume 1 – Integration Profiles

130 ## 1.7 History of Annual Changes

Add the following bullet to the end of the bullet list in section 1.7

- Update the XDS Profile to add the Delayed Document Assembly Option.

2.1 Dependencies among Integration Profiles

135   Note: No new dependencies are introduced with this supplement

Update Section 10 as follows: (Here starts the updates to the XDS Vol. 1 material)

10 XDS Integration Profile

Update Section 10.1 as follows

140 ## 10.1 Actors/ Transactions

10.2 XDS Integration Profile Options

Update Table 10.2-1b as follows:

Table 10.2-1b XDS.b - Actors and Options

Actor	Options	Vol & Section
Document Source	Document Replacement	ITI TF-1: 10.2.1
	Document Addendum	ITI TF-1: 10.2.2
	Document Transformation	ITI TF-1: 10.2.3
	Folder Management	ITI TF-1: 10.2.4
	Basic Patient Privacy Enforcement	ITI TF-2b:3.41.4.1.3.1
Document Repository	No options defined	
Document Registry (Note 2)	Patient Identity Feed (Note 1)	ITI TF-2a: 3.8
	Patient Identity Feed HL7v3 (Note 1)	ITI TF-2b: 3.44
Integrated Document Source / Repository	Document Replacement	ITI TF-1: 10.2.1
	Document Addendum	ITI TF-1: 10.2.2

Actor	Options	Vol & Section
	Document Transformation	ITI TF-1: 10.2.3
	Folder Management	ITI TF-1: 10.2.4
	Basic Patient Privacy Enforcement	ITI TF-2b: 3.42.4.1.4.1
	Delayed Document Assembly	**ITI TF-1: 10.2.8**
Document Consumer	Basic Patient Privacy Enforcement	ITI TF-2a: 3.18.4.1.3.5
		ITI TF-2b: 3.43.4.1.3.1
	Basic Patient Privacy Proof	ITI TF-2a: 3.18.4.1.3.6
	Delayed Document Assembly	**ITI TF-1: 10.2.8**
Patient Identity Source	Patient Identity Feed (Note 1)	ITI TF-2a: 3.8
	Patient Identity Feed HL7v3 (Note 1)	ITI TF-2b: 3.44

145

Add section 10.2.8

10.2.8 Delayed Document Assembly Option

A Document Consumer declares the Delayed Document Assembly option when it is able to
150 understand that some documents included in the response to a Registry Stored Query will have a zero size and hash value but once retrieved those attributes will be updated to the correct values.

An Integrated Document Source/Repository declares the Delayed Document Assembly option if it is able to:

- Register Stable Document Entries with size and hash zero to represent a stable document
155 who's content has not yet been assembled

- Assemble the Document Content upon receipt of a Retrieve Document Set transaction.

- Update the size and hash values by grouping with an XDS.b Document Administrator Actor in order to update the document entry

In order for an Integrated Document Source/Repository to support the Delayed Document
160 Assembly option it must interact with a Document Registry supporting the Document Metadata Update Option.

Update section 10.4.13 which was created by the On-Demand Documents Supplement

10.4.13 XDS Document Entry Types

(…)

6

165 ## 10.4.13.1 Use Cases Summary

Each type of XDS Document Entry is designed for a different environment of document sharing. To determine which type of XDS Document Entry should be used, an analysis of the environment is needed. Stable Document Entries and On-Demand Document Entries may co-exists in an XDS Affinity Domain, In particular, queries can be formulated to return both
170 document entry types for a specific patient.

Case 1: Sharing of Stable, Source Attested Document

In this model, health data is published by a well-identified and responsible source (clinician, care delivery organization, individual consumer, etc.). The source determines when a meaningful collection of data should be published based on clinical events or other activities understood by
175 the source and potential remote entities. The source publishes stable collections of data in the form of one or more documents, for potential use by other entities. Other entities access the documents by querying for a list of documents that have been published, and retrieving those that are of interest. Documents are source attested; consistency and wholeness is the responsibility of the source, which provides explicit context for each document (legal record keeping
180 requirements). Complete documents are stored in repositories. If errors need to be corrected or updates are needed, they are the responsibility of the source. Entities accessing these records are offered trust guaranties equivalent or superior to paper records shared today.

Case 2: Sharing of Stable, Source Attested Document with assembly of content delayed to retrieval time

185 **In this model, health data is still controlled by a well-identified and responsible source (clinician, care delivery organization, individual consumer, etc.) but that source does not maintain its content in the form of a document. Generally, content is stored as records in a clinical database and compiled into a document in response to a request. This type of source can be more efficient by using the inherent mechanism for marking content without**
190 **forming it in a Document unless requested. To support these types of systems, XDS allows for deferral of the actual assembly of the document content until a Retrieve Document Set transaction requests it. Use of the Delayed Document Assembly Option should be limited to those organizations which need this performance enhancement, but in all other aspects are delivering and managing (e.g. need for corrections and updates) content in the same**
195 **fashion as a Stable Document Entry.**

Case 32: Sharing of On-Demand Document

As part of an extract from a health record, some documents, containing specific types of content, may be automatically generated with non-stable or dynamic content. These documents are "dynamic" in that each retrieval of the document may result in different content. Documents
200 whose content is assembled at the time of retrieval have no inherent stable properties like persistence or stewardship. The wholeness of a dynamically created document will not be based on any clinician attestation and may require careful clinical interpretation depending on the content and the span of aggregation performed by the document authoring system. If the document authoring system originates from a single care delivery organization, context and

205 wholeness may be quite good. If the aggregation was performed across multiple health delivery organizations, the aggregator may have difficulties assuming legal and clinical responsibility for the aggregated content. An example of a dynamically created document is a summary that collects information related to multiple healthcare events or on-going healthcare events.

210 **Delayed Document Assembly Option Process Flow**

Copy here the content of the Introduction from the sentence starting "The use of Delayed Document Assembly allows… " until the the end of the Introduction.

215 **On-Demand Documents Process Flow**

(…)

220 # Volume 2 – Transactions

3.18 Registry Stored Query

Vol. 2a: Update section 3.18.4.1.3 Expected Actions by adding the following content to the end of the section

3.18.4.1.3 Expected Actions

225 (. . .)

If the Document Consumer supports the Delayed Document Assembly Option it shall accept the following values of hash and size to indicate that the assembly of the document content has been delayed until the document is retrieved.

230 • **size = 0 (zero)**
- **hash = da39a3ee5e6b4b0d3255bfef95601890afd80709 (SHA1 hash of a zero length file)**

3.42 Register Document Set-b

235 *Vol. 2b: Update section 3.42.4.1.1 Trigger Events by adding the following content*

3.42.4.1.1 Trigger Events

The Register Document Set-b Request message is triggered when:

- A Document Repository wants to register metadata for a set of documents it holds.
240 These documents may have been stored in the Document Repository by a Document Consumer (using the Provide and Register Document Set-b transaction [ITI-41]) or generated internally by an Integrated Document Source/Repository. **If an Integrated Document Source/Repository declares the Delayed Document Assembly Option and is registering a Stable Document Entry with size=0 it shall internally mark the document contents that will be assembled if a Retrieve Document Set [ITI-**
245 **43] transaction is received containing the uniqueID of the registered Stable Document Entry.**

Vol. 2b: Update section 3.42.4.1.2 Message Semantics by adding the following content

---

9

3.42.4.1.2 Message Semantics

250 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.

The Registry actor shall store, and later include in metadata returned in a query response, the XDSDocumentEntry.repositoryUniqueId attribute along with other metadata attributes received

255 in the Register Document Set-b [ITI-42] transaction as determined by profile and transaction requirements. If the XDSDocumentEntry.URI attribute is received by the Registry actor in the Register Document Set-b [ITI-42] transaction, then it shall be returned in query responses.

If an Integrated Document Source/Repository declares the Delayed Document Assembly Option, it shall be able to register a Stable Document Entry with the following attribute

260 **values**

- **size = 0 (zero)**
- **hash = da39a3ee5e6b4b0d3255bfef95601890afd80709 (SHA1 hash of a zero length file)**

3.43 Retrieve Document Set

265 *Vol. 2b: Update Section 3.43.4.1.3 by adding the following text to the end*

3.43.4.1.3 Expected Actions

(. . .)

If an Integrated Document Source/Respository declares the Delayed Document Assembly Option and has registered the document being retrieved with

270 - **size = 0 (zero)**
- **hash = da39a3ee5e6b4b0d3255bfef95601890afd80709 (SHA1 hash of a zero length file)**

It shall:

- **Assemble into a complete document the content identified at the time the Integrated Document Source/Repository registered the associated Stable Document Entry in the**
275 **Document Registry.**
- **Return the assembled document in response to the Retrieve Document Set Request**
- **Save the assembled document for future retrievals since all future retrievals shall return the identical content.**
- **Update the Stable Document Entry in the Document Registry with the size and hash**
280 **values consistent with the assembled document. This update shall be accomplished by grouping with the Document Administrator actor in the XDS.b profile and using the Update Document Set (ITI-57) transaction.**

Vol. 2b: Update Section 3.43.4.2.3 by adding the following text to the end

285 **3.43.4.2.3 Expected Actions**

(. . .)

If a Document Consumer declares the Delayed Document Assembly Option it shall not use the size=0 and hash=SHA1 hash of a zero length file values to verify documents. If verification is desired the Document Consumer shall use an appropriate stored query from
290 **the Registry Stored Query [ITI-18] transaction to get the updated size and hash values.**

4   Cross-Transaction Specifications

> *Vol. 3: Update the hash and size by adding the specified text to the existing explanation: Note: the examples are already existing in the table and are not specific to this supplement.*

295

hash	(...)
	
	If an Integrated Document Source/Repository supporting the Delayed Document Assembly option has delayed assembly of the XDS Document content until retrieval, this value shall contain the SHA1 hash of a zero length file (da39a3ee5e6b4b0d3255bfef95601890afd80709).
	
	`<rim:Slot name="hash">`
	`      <rim:ValueList>`
	`            <rim:Value>`
	
	`      da39a3ee5e6b4b0d3255bfef95601890afd80709`
	`            </rim:Value>`
	`      </rim:ValueList>`
	`</rim:Slot>`
		Cp/P	SHA1 hash
			
			ITI TF-2.b:
			
			3.41.4.1

(...)			

size	(...)
	
	If an Integrated Document Source/Repository supporting the Delayed Document Assembly option has delayed assembly of the XDS Document content until retrieval, this value shall contain zero.
	
	`<rim:Slot name="size">`
	`      <rim:ValueList>`
	`            <rim:Value>3654</rim:Value>`
	`      </rim:ValueList>`
	`</rim:Slot>`
		Cp/P	Integer
			
			ITI TF-2b:
			
			3.41.4.1