Integrating the Healthcare Enterprise

IHE IT Infrastructure Technical Framework Supplement

Mobile access to Health Documents (MHD)

Trial Implementation

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

Foreword

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

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This supplement is published on March 12, 2015 for trial implementation and may be available for testing at subsequent IHE Connectathons. The supplement may be amended based on the results of testing. Following successful testing it will be incorporated into the IT Infrastructure Technical Framework. Comments are invited and may be submitted at http://www.ihe.net/ITI_Public_Comments.

This supplement describes changes to the existing technical framework documents.

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

Amend Section X.X by the following:

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

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

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

CONTENTS

Introduction to this Supplement

The IHE MHD Profile and the HL7 FHIR activities are working together to revise and enhance the transactions profiled here. For details on HL7 FHIR See http://hl7.org/fhir

The current status of this evolution can be found on the IHE Wiki at http://wiki.ihe.net/index.php?title=MHD_Status

The Mobile access to Health Documents (MHD) Profile defines one standardized interface to health documents (a.k.a. an Application Programming Interface (API)) for use by mobile devices so that deployment of mobile applications is more consistent and reusable. The transactions defined here leverage the document content and format agnostic metadata concepts from XDS, but simplify them for access by constrained environments including mobile devices. The MHD Profile does not replace XDS. MHD can be used to allow mobile devices, or other resource-constrained systems, access to an XDS Repository. The following figure shows one possible way to implement MHD within a document sharing environment (that may, but is not necessarily, XDS based). This implementation choice is not mandatory and we recognize other architectures will be implemented. An Implementation Guide is being maintained at **http://wiki.ihe.net/index.php?title=MHD_Implementation_Guide**

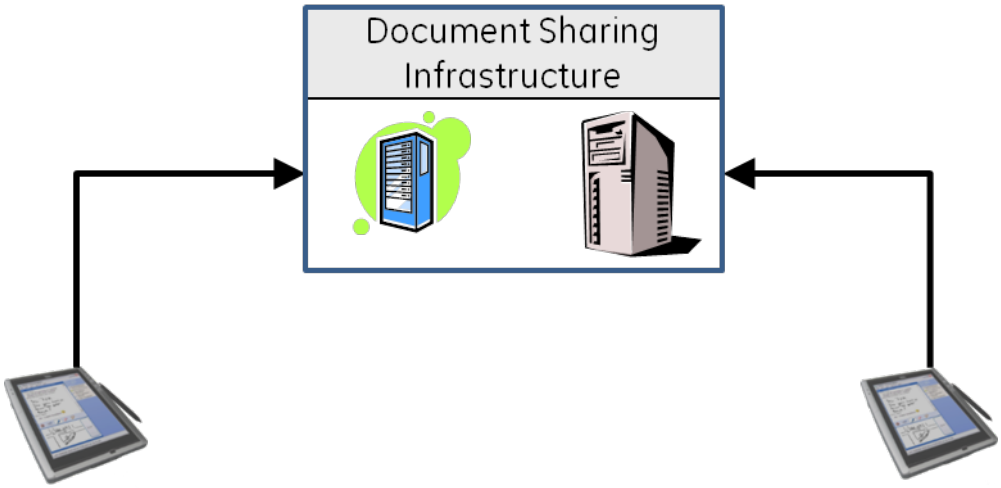

Figure 1: Mobile access to a Document Sharing environment.

The XDS Profile is specifically designed to and includes characteristics to support the needs of Cross-Enterprise security, privacy, and interoperability, by supporting this level of policy and operational needs. The MHD Profile has simplified the interactions in ways that are more consistent with use within a single policy domain. MHD transactions are not specifically tied to XDS; some of the system implementations envisioned may interface directly to an organizational EHR, or a multi-national PHR.

The MHD Profile supports a broad set of XDS use cases and functionality while keeping the technology as simple as possible. MHD is focused on a useful subset of the XDS use cases and does not try to reproduce the full scalability, flexibility, privacy, or security supported by the more robust XDS infrastructure. The following are examples of environments which may choose the MHD Profile over the XDS Profile:

- Medical devices including those targeted by the IHE Patient Care Devices (PCD) domain or Continua organization, submitting data in the form of documents.
- Kiosks used by patients in hospital registration departments.
- PHR publishing into a staging area for subsequent import into an EHR or HIE.
- Patient or provider applications that are configured to securely connect to a PHR in order to submit a medical history document (e.g., BlueButton+).
- Electronic measurement devices participating in an XDW workflow and pulling medical history documents from an HIE.
- A General Practitioner physician's office with minimal IT capabilities using a mobile application to connect to an HIE or EHR.

Open Issues and Questions

- None – although more work will be necessary after HL7 FHIR DSTU2

Closed Issues

- MHD_001: Standards selection is now FHIR. The profile will restrict FHIR use to that which can be supported by an underlying XDS environment, keeping with the fact this is the MHD Profile. The broad expectation is to use DocumentReference for DocumentEntry, DocumentManifest for SubmissionSet, and List for Folders. The inclusion of other FHIR resources as needed. The Provide Document Bundle will be a bundle of the various resources necessary to be equivalent to the XDS Provide And Register Document Set-b [ITI-41]. The Find Document References will query on DocumentReference resources. The Find Document Manifests will query on DocumentManifest resources.
- MHD_002: Security model is recommended to use IUA Profile, but not mandated as there are plenty of HTTP based security models that layer in between the low level transport (TCP) and the HTTP encoding. These security models can be layered in without modifying the characteristics of this profile. The use of TLS will be encouraged, specifically the use of ATNA, but will not be mandated. The IUA Profile includes guidance on the use of the current common implementations of OpenID Connect and OAuth 2.
- MHD_027: The Provide Document Bundle transaction allows for referencing the document content or including the document content. This is a capability not included in

XDS for a Document Source, but is reasonable for a Document Recipient to implement. Does IHE need to provide a Create Document type transaction so that the Document Source could publish before using references in the Provide Document Bundle Transaction? Resolution: there is expectation of supporting this in the future.

- MHD_031: This version of MHD does not support Replace operations. There is expectation of supporting this in the future.
- MHD_032: This version of MHD does not support other Association types. There is expectation of supporting this in the future.
- MHD_033: This version of MHD does not support Folders. There is an experimental mapping provided. There is expectation of supporting this in the future.
- MHD_025: This version is based on HL7 FHIR DSTU1. We choose to not use FHIR 'extensions'. Lessons learned are being folded into HL7 FHIR for DSTU2 under a joint IHE-HL7 workgroup. This will result in a future revision of MHD to align with DSTU2. Each revision is not expected to be backward compatible, until FHIR goes normative and MHD goes Final Text.
- MHD_026: There are some mismatches between elements in FHIR and IHE's Document Sharing model. For example the use of typeCode as DocumentReference.type, and classCode as DocumentReference.class, where in FHIR the definitions of these are not as clear. The MHD Profile will define an interpretation and also work to fix the FHIR specification. These fixes to FHIR will be managed by an IHE-HL7 Joint Workgroup for FHIR DSTU2.
- MHD_028: The MHD Profile does not define how to utilize the DocumentReference.service. This element might be used to describe the SOAP-based endpoint for the Repository location including homeCommunityId. This should not be needed in MHD use-cases and thus is not specified here, but a Document Responder may want to fill out the service element.
- MHD_029: Appendix Z – Current Volume 2 text includes material that should go into TF-2x:Appendix Z (Initially published by PDQm). After Trial Implementation and alignment with DSTU2 we will move this material to Appendix Z (documented in this MHD supplement).
- MHD_030: The initial MHD and FHIR development of DocumentReference did not include referenceIdList, which was subsequently added as a Change Proposal and is now Final Text. This revision of MHD specifies the use of the .identifier element to hold the identifiers in referenceIdList. This allows for query, but is not a proper final solution. This will be addressed for FHIR DSTU2 by the joint IHE-HL7 workgroup.
- MHD_034: This version of MHD identifies Patient and Author resources as contained within the DocumentReference, and DocumentManifest. As FHIR defines 'contained' resources these have no existence outside of their containment and are always thus

carried only within the original resource for which they were contained. This works well to support the XDS method of revision on DocumentEntry and SubmissionSet. This presents a conflict with the XDS Affinity Domain managed Patient identity. We need experience on how to resolve.

- MHD_035: FHIR does not provide an ad-hoc metadata extension mechanism like custom slots in XDS.

Volume 1 – Profiles

Add Section 33

33 Mobile access to Health Documents (MHD) Profile

Applications specific to resource-constrained and mobile devices are an emerging platform for healthcare-enhancing software. The MHD Profile is not limited to mobile devices, using the term "mobile" only as a grouping for mobile applications, mobile devices or any other systems that are resource- and platform-constrained. These constraints may drive the implementer to use simpler network interface technology. There are numerous deployed implementations of Document Sharing that need a simpler network interface technology, for example those hosted by a Health Information Exchange (HIE), large health provider electronic health record (EHR), or personal health record (PHR).

The Mobile access to Health Documents (MHD) Profile defines one standardized interface to health documents (a.k.a. an Application Programming Interface (API)) for use by mobile devices so that deployment of mobile applications is more consistent and reusable. In this context, mobile devices include tablets, smartphones, and embedded devices including home-health devices. This profile is also applicable to larger systems where needs are simple, such as pulling the latest summary for display. The critical aspects of the 'mobile device' are that it is resource-constrained, has a simple programming environment (e.g., JSON, JavaScript), simple protocol stack (e.g., HTTP), and simple display functionality (e.g., HTML browser). The goal is to limit required additional libraries to those that are necessary to process SOAP, WSSE, MIME-Multipart, MTOM/XOP, ebRIM, and multi-depth XML.

The Mobile access to Health Documents (MHD) Profile defines one pair of actors and a transaction used to submit or push new document entries from the mobile device to a receiving system. Another set of actors and transactions is used to query a list of document entries containing specific metadata, and to retrieve a copy of a specific document.

MHD's transactions leverage the metadata concepts from XDS, but simplify the technology requirements for access by mobile devices.

The MHD Profile does not replace XDS. Rather, it enables simplified access by mobile devices to an XDS (or a similar) document management environment containing health information.

33.1 MHD Actors, Transactions, and Content Modules

Figure 33.1-1 shows the actors directly involved in the MHD Profile and the relevant transactions between them.

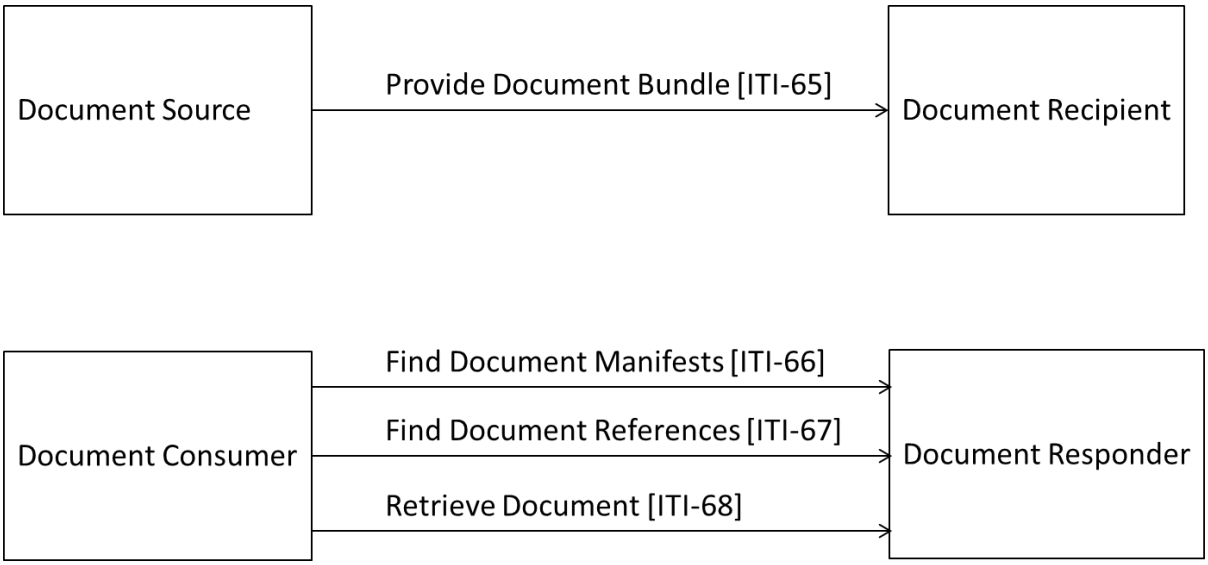

Figure 33.1-1: MHD Actor Diagram

Table 33.1-1 lists the transactions for each actor directly involved in the MHD Profile. In order to claim support of this Profile, an implementation of an actor must perform the required transactions (labeled "R") and may support the optional transactions (labeled "O"). Actor groupings are further described in Section 33.3.

Table 33.1-1: MHD - Actors and Transactions

Actors	Transactions	Optionality	Section in Vol. 2
Document Source	Provide Document Bundle [ITI-65]	R	ITI TF-2c:3.65
Document Recipient	Provide Document Bundle [ITI-65]	R	ITI TF-2c:3.65
Document Consumer	Find Document Manifests [ITI-66]	O (Note 1)	ITI TF-2c:3.66
	Find Document References [ITI-67]	O (Note 1)	ITI TF-2c:3.67
	Retrieve Document [ITI-68]	O (Note 1)	ITI TF-2c:3.68
Document Responder	Find Document Manifests [ITI-66]	R	ITI TF-2c:3.66
	Find Document References [ITI-67]	R	ITI TF-2c:3.67
	Retrieve Document [ITI-68]	R	ITI TF-2c:3.68

Note 1: Document Consumer shall implement at least one transaction: Find Document Manifests, Find Document References, or Retrieve Document.

33.1.1 Actor Descriptions and Actor Profile Requirements

Most requirements are documented in Transactions (Volume 2) and Content Modules (Volume 3). This section documents any additional requirements on profile's actors.

The Document Source and Document Consumer Actors are designed so that they can be implemented on a mobile device, and yet have sufficient functionality to support a wide range of applications and use cases.

The Document Recipient and Document Responder are expected to be implemented in a service environment that does not have the constraints of a mobile device.

The transactions in the MHD Profile correspond to the following equivalent transactions used in XDS.

MHD	XDS
[ITI-65] Provide Document Bundle	[ITI-41] Provide and Register Document Set-b
[ITI-67] Find Document References	[ITI-18] Registry Stored Query – FindDocuments or FindDocumentsByReferenceId
[ITI-66] Find Document Manifests	[ITI-18]Registry Stored Query - FindSubmissionSets
[ITI-68] Retrieve Document	[ITI-43] Retrieve Document Set

Note: The transaction names are pluralized, but the corresponding endpoints follow the FHIR convention of singular naming.

The MHD transactions are not precisely equal to the XDS transactions, as the MHD Profile provides less functionality. These limitations are:

- Retrieve Document can only retrieve one document at a time.
- Find Document References does not support the GetRelatedDocuments stored query in ITI-18.

In the IHE XDS Profile, the Document Registry and Document Repository actors are independent to enable the widest possible deployment architectures. The MHD Profile combines the Registry and Repository functionality in one actor, called the MHD Document Responder. The goal is to ease configuration needs on the mobile health application and mobile health application deployment, and reduce the overall solution complexity. The MHD Document Recipient and the MHD Document Responder actors are independent because there are use cases where only one is needed, such as supporting a mobile medical measuring device that simply creates and submits new documents. More general-purpose systems may implement both of these actors to provide a complete service definition for the hosting organization.

While the MHD Profile can be used as an interface to an XDS environment, the MHD Profile does not support all of the functionality supported by the XDS Document Source and Document Consumer Actors.

33.2 MHD Actor Options

Options that may be selected for this Profile are listed in the Table 33.2-1 along with the actors to which they apply. Dependencies between options when applicable are specified in notes.

Table 33.2-1: MHD - Actors and Options

Actor	Options	Volume & Section
Document Source	*No options defined*	- -
Document Recipient	*No options defined*	- -
Document Consumer	*No options defined*	- -
Document Responder	*No options defined*	- -

33.3 MHD Actor Required Groupings

Actor(s) which are required to be grouped with another actor(s) are listed in this section. The grouped actor may be from this profile or a different domain/profile. These mandatory required groupings, plus further descriptions if necessary, are given in the table below.

An actor from this profile (Column 1) must implement all of the required transactions in this profile in addition to all of the required transactions for the grouped profile/actor listed (Column 2).

Table 33.3-1: MHD - Actors Required Groups

MHD Actor	Actor to be grouped with	Technical Framework Reference	Content Binding Reference
Document Source	None		
Document Recipient	None		
Document Consumer	None		
Document Responder	None		

33.4 MHD Overview

33.4.1 Concepts

The MHD Profile supports a broad set of the XDS use cases and functionality while keeping the implementation as simple as possible. The MHD Profile is focused on a subset of the use cases that XDS supports and does not try to reproduce the full scalability, flexibility, privacy, or security supported by a more robust XDS infrastructure. Example use cases are:

- Medical devices such as those targeted by the IHE Patient Care Devices (PCD) domain, submitting data in the form of documents.
- Kiosks used by patients in hospital registration departments .
- PHR publishing into a staging area for subsequent import into an EHR or HIE.

- Patient or provider applications that are configured to securely connect to a PHR in order to submit Recording history document (e.g., BlueButton+).
- Electronic measurement devices participating in XDW workflows and pulling medical history documents from an HIE.
- A General Practitioner physician's office with minimal IT capabilities using a mobile application to connect to an HIE or EHR.

These specific use cases can be generalized into two general use cases. The first is the general use case of publishing new document(s) from the mobile device. The second general use case is where the mobile device needs to discover available documents and retrieve documents of interest. There are clearly complex use cases that combine these two general use cases; however, they are not specifically described in this profile. Where more complex use cases are needed, use of one of the more robust Document Sharing profiles is likely more appropriate.

33.4.2 Use Case #1: Publication of new documents

33.4.2.1 Publication of new documents Use Case description

In this use case, a new document or set of documents is published from the mobile device. For example, a mobile device is a medical device that has acquired new health measurements, or a mobile device has a user-interface used to capture user input such as a Patient Consent. This device-created content is formed by the application -- implementing the MHD Document Source -- into a Document and is submitted with the metadata.

This use case presumes that the mobile device knows or discovers the patient identity. The patient identity might be obtained through some IHE transactional method such as those in the PIX/PDQ/PDQm Profiles, might simply be entered via some device interface (RFID, Bar-Code), a user interface, or be specified in a configuration setting (e.g., mobile PHR Application). The use case also allows for identity cross-referencing to be implemented in the Document Recipient.

This use case also presumes that the mobile device knows the location of the URL endpoints, likely through a configuration setting, or a workflow driven by a web interface.

33.4.2.2 Publication of new documents Process Flow

The publication of a new document(s) is done using the Provide Document Bundle transaction, which carries both the document metadata and the document (analogous to an XDS Provide and Register Document Set-b [ITI-41] transaction).

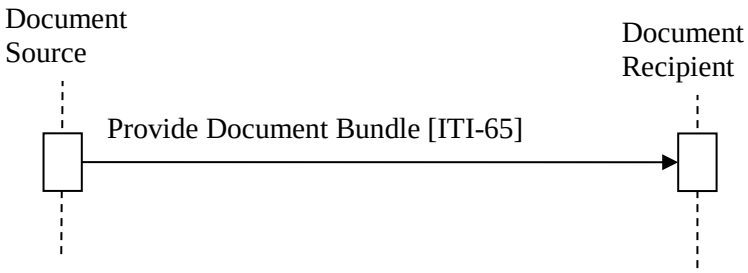

Figure 33.4.2.2-1: Basic Process Flow in Provide Document Bundle Transaction

33.4.3 Use Case #2: Discovery and Retrieval of existing documents

33.4.3.1 Discovery and Retrieval of existing documents Use Case Description

In this use case, the mobile device needs access to existing documents. For example, a mobile device involved in a workflow needs to determine the current state of the workflow, or the mobile device needs to discover the most current medical summary.

33.4.3.2 Discovery and Retrieval of existing documents Process Flow

The Find Document References transaction is used to provide parameterized queries that result in a list of DocumentEntry query results.

Alternatively, the Find Document Manifest transaction is used to provide parameterized queries that result in a set of Document SubmissionSets.

The Retrieve Document transaction is used to get the document itself.

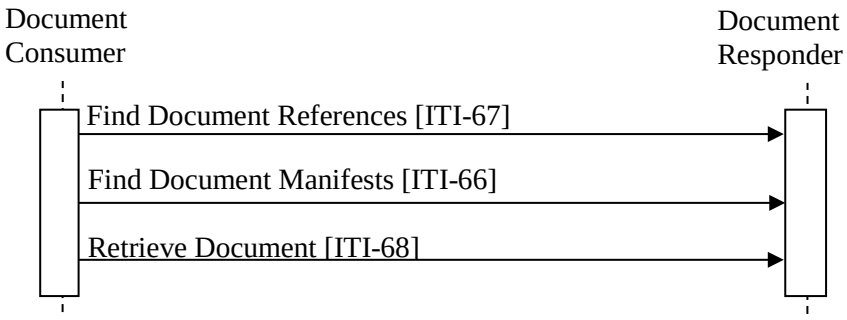

Figure 33.4.3.2-1: Basic Process Flow in MHD Profile

33.4.4 Mapping to RESTful operators

The MHD Profile provides the resources and transactions against those resources. These are summarized in Table 33.4.4-1. MHD does not use any additional extended or custom methods.

Table 33.4.4-1: Methods and Resources

HTTP Method	Transactions on Document Reference	Transactions on Document Manifest	Transactions on Document
GET	Find Document References [ITI-67]	Find Document Manifests [ITI-66]	Retrieve Document [ITI-68]
PUT	Prohibited	Prohibited	Prohibited
POST	Provide Document Bundle [ITI-65]		
DELETE	Prohibited	Prohibited	Prohibited
UPDATE	Prohibited	Prohibited	Prohibited
HEAD	Not Specified	Not Specified	Not Specified
OPTIONS	Not Specified	Not Specified	Not Specified
TRACE	Not Specified	Not Specified	Not Specified

Note: Items are marked Prohibited because the MHD Profile is focused on core Document Sharing (XDS, XDR, etc.) capability, and is not trying to address the larger use-cases of metadata update.

33.5 MHD Security Considerations

There are many security and privacy concerns with mobile devices, including lack of physical control. Many common information technology uses of HTTP, including REST, are accessing far less sensitive information than health documents. These factors present an especially difficult challenge for the security model. It is recommended that application developers perform a Risk Assessment in the design of the applications, and that operational environment using MHD perform Risk Assessments in the design and deployment of the operational environment.

A resource server should not return any patient information unless proper authentication and communications security have been proven.

There are many reasonable methods of securing interoperability transactions. These security models can be layered in without modifying the characteristics of the MHD Profile transactions. The use of TLS is encouraged, specifically the use of the ATNA Profile. User authentication on mobile devices is encouraged using Internet User Authorization (IUA) Profile. The network communication security and user authentication are layered in at the HTTP transport layer and do not modify the interoperability characteristics defined in the MHD Profile.

The Security Audit logging (e.g., ATNA) is recommended. Support for ATNA-based audit logging on the mobile health device may be beyond the ability of this constrained environment. This would mean that the operational environment must choose how to mitigate the risk of relying only on the service side audit logging.

The ITI-66, 67 and 68 transactions include the Patient ID (subject.identifier) as a mandatory query parameter on the Resource URL. This URL pattern does present a risk when using typical web server audit logging of URL requests, and browser history. In both of these cases the URL with the patient identity is clearly visible. These risks should be mitigated in system or operational design.

33.6 MHD Cross Profile Considerations

33.6.1 MHD Actor grouped with XDS infrastructure

When the MHD Document Recipient Actor is acting as a proxy for an XDS environment, it could be grouped with an XDS Document Source or an XDS Integrated Document Source/Repository. In this way, the Provide Document Bundle [ITI-65] transaction would be converted by the grouped system into an XDS Provide and Register Document Set-b [ITI-41] transaction. It is expected that the MHD Document Recipient, acting as a proxy, would be configured to support only a designated set of mobile devices authorized by the hosting organization and use the security model defined by that hosting organization. The proxy would be expected to fill in any necessary missing information, convert any user authentication credentials, and implement fully the IHE ATNA Secure Node or Secure Application actors.

When the MHD Document Responder is acting as a proxy for an XDS environment, it could be grouped with an XDS Document Consumer. In this way the MHD Find Document Manifests [ITI-66], Find Document References [ITI-67], and Retrieve Document [ITI-68] transactions will be supported in the system through the use of the XDS Registry Stored Query [ITI-18] and Retrieve Document Set-b [ITI-43] transactions as needed. It is expected that this proxy would be configured to support a designated set of mobile devices and the security model defined by the hosting organization. The proxy would be expected to fill in any necessary missing information, convert any user authentication credentials, and implement fully the IHE ATNA Secure Node or Secure Application actors.

These two environments are illustrated in Figure 3.66.1-1.

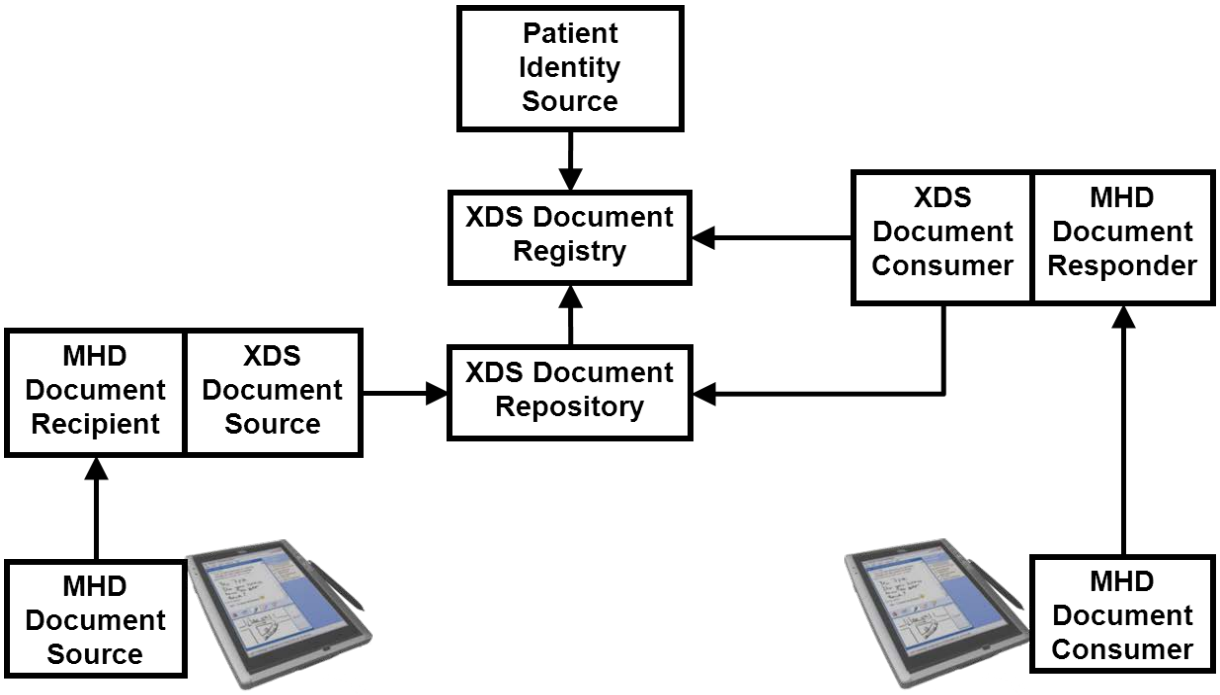

Figure 33.6.1-1: MHD Actors grouped with XDS Document Sharing

33.6.2 MHD Actors grouped with XCA infrastructure

When a MHD Document Responder acts as a proxy into an XCA environment, it could be grouped with an Initiating Gateway. This type of MHD Document Responder will support the Find Document Manifests [ITI-66], Find Document References [ITI-67], and Retrieve Document [ITI-68] transactions by utilizing the XCA Cross Gateway Query [ITI-38] and Cross Gateway Retrieve [ITI-39] transactions as necessary. This type of proxy would be configured to support a designated set of mobile devices and enable a security model as defined by the hosting organization. The proxy would be required to fill in any necessary missing information, convert any user authentication credentials, and implement fully the ATNA Secure Node or Secure Application requirements.

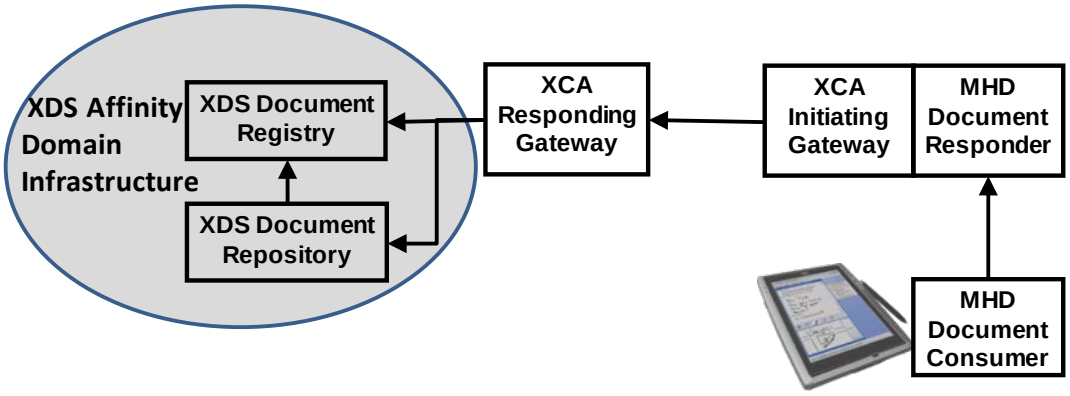

Figure 33.6.2-1: MHD Actors grouped with XCA

33.6.3 MHD Actor grouped with Retrieve Information for Display (RID) Profile

The Retrieve Information for Display (RID) Profile includes a similar set of transactions to those defined in the MHD Profile for Document Consumer. The RID Profile is focused more on delivering display-ready health information that may or may not be document based, whereas the MHD Profile is providing access to Documents and the metadata about the document. Grouping the RID Information Source Actor with a MHD Document Responder Actor will provide both access to the metadata and document content, and also access to display-ready information.

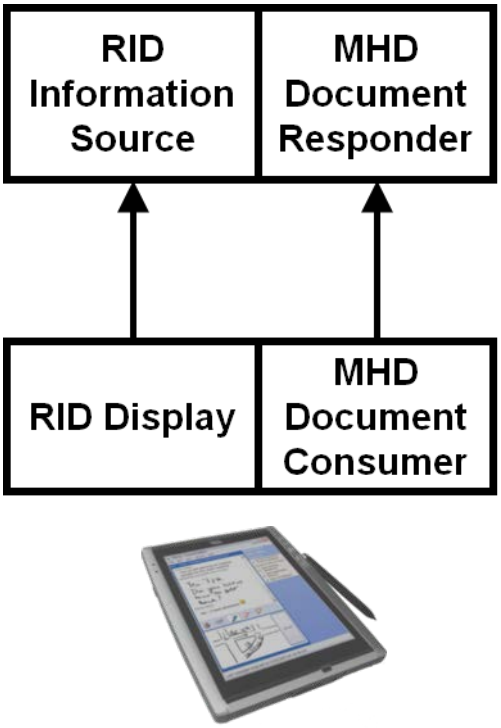

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Figure 33.6.3-1: MHD Actors grouped with RID

Appendices

Actor Summary Definitions

Update (and add) the following terms to the IHE TF General Introduction Namespace list of actors:

Document Source - The Document Source Actor is the producer and publisher of documents **and metadata~~. It is responsible for sending documents to a Document Repository Actor. It also supplies metadata to the Document Repository Actor for subsequent registration of the documents with the Document Registry Actor.~~**

Document Consumer - The Document Consumer Actor queries for document metadata meeting certain criteria, and may retrieve selected documents.

Document Recipient: ~~This~~ The Document Recipient Actor receives **~~a set of~~** documents **and metadata** sent by another actor. **~~Typically this document set will be made available to the intended recipient who will choose to either view it or integrate it into a Health Record.~~**

Document Responder – The Document Responder Actor is receiver of and responder to requests for document entries and documents.

Transaction Summary Definitions

Add the following terms to the IHE TF General Introduction Namespace list of Transactions:

Provide Document Bundle - This transaction is used to transfer documents and metadata, and is analogous to a Provide and Register Document Set-b transaction.

Find Document Manifests – This transaction is used to provide parameterized queries that result in a list of Document Manifest resources.

Find Document References – This transaction is used to provide parameterized queries that result in a list of Document Reference resources.

Retrieve Document – This transaction is used to get documents.

Volume 2c – Transactions

Add Sections 3.65, 3.66, 3.67 and 3.68

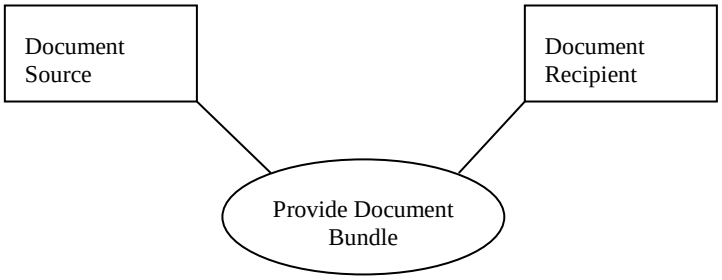
3.65 Provide Document Bundle

This section corresponds to Transaction ITI-65 of the IHE Technical Framework. Transaction ITI-65 is used by the Document Source and Document Recipient Actors.

3.65.1 Scope

This transaction is used to publish a new document entry and the document.

3.65.2 Use Case Roles



Actor: Document Source

Role: Sends Document Entry and Document to the Receiver

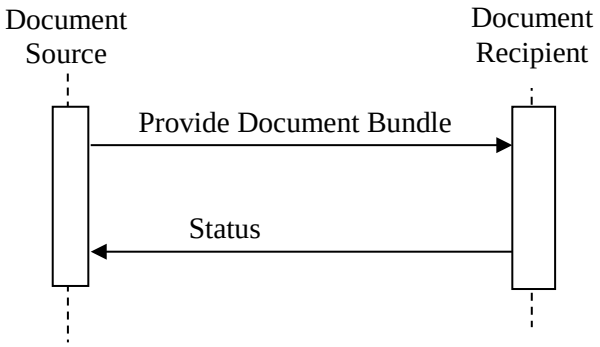
Actor: Document Recipient

Role: Accepts the document and metadata sent from the Source.

3.65.3 Referenced Standard

HL7 FHIR	Fast Health Interoperability Resources DSTU v0.82 (a.k.a. DSTU1)
IETF RFC2616	Hypertext Transfer Protocol – HTTP/1.1
IETF RFC3986	Uniform Resource Identifier (URI): Generic Syntax
IETF RFC4627	The application/json Media Type for JavaScript Object Notation (JSON)
IETF RFC6585	Additional HTTP Status Codes
CORS	Cross-Origin Resource Sharing http://www.w3.org/TR/cors/

3.65.4 Interaction Diagram



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3.65.4.1 Provide Document Bundle Message

This message uses the HTTP POST method on the target Provide Document Bundle endpoint to convey the metadata and the document(s) as a FHIR transaction.

3.65.4.1.1 Trigger Events

495 This method is invoked when the Document Source needs to submit one or more documents to a Document Recipient.

3.65.4.1.2 Message Semantics

The Document Source shall initiate an HTTP POST Entity composed of a FHIR bundle containing the DocumentManifest and one or more DocumentReference, zero or more Binary
500 resources and zero or more List resources is sent to the Document Recipient.

This message will create the resources referenced in the FHIR bundle. The media type of the HTTP body conforms to the following requirements:

1. The Document Source shall either use mimeType **application/json+fhir** for the JSON representation or **application/atom+xml** for the XML representation.

2. The Document Recipient shall support both representations of FHIR bundles.

See http://www.hl7.org/implement/standards/fhir/extras.html#bundle for complete requirements for FHIR bundles.

The Provide Document Bundle message is sent to the URL defined below. The format for a Provide Document Bundle Section URL is:

```
documentBundleSectionURL := http://<location>
```

Where:

location – a locally defined root part of arbitrary path.

For example: `http://example.com/example`

3.65.4.1.2.1 FHIR encoding of a resource bundle

The FHIR resource bundle is made up of one or more top-level FHIR DocumentReference resources, zero or more Binary resources, zero or more List resources, and one DocumentManifest resource. Refer to ITI TF-3:5.4.1 for a detailed overview of how Document Sharing metadata attributes are mapped to FHIR resources.

For complete information on FHIR bundle base encoding rules, see: http://www.hl7.org/implement/standards/fhir/extras.html#bundle.

The FHIR resource bundle shall use the tag **http://ihe.net/fhir/tag/iti-65**, and all resources within shall be self-contained; this includes all referenced FHIR resources (such as Patient and Custodian). The Document Source shall use FHIR contained resources to achieve this. (See http://www.hl7.org/implement/standards/fhir/references.html#contained).

The document location attribute shall be either:

- a URL with a reference to a FHIR Binary resource with base64 encoded content attribute in the same bundle
- or, a reference to an existing Binary resource in the location attribute (which has been created outside the scope of the Provide Document Bundle transaction)

See examples in Figures 3.65.4.1.2.1-1 and 3.65.4.1.2.1-2.

```
{
      "title": "example DocumentEntry",
      "id": "urn:uuid:2e82c1f6-a085-4c72-9da3-8640a32e42ab",
      "content": {
      "resourceType": "DocumentReference",
      "location": "https://example.org/fhir/Binary/1e404af3-077f-4bee-b7a6-
a9be97e1ce32"
      }
```

```
}

… other entries

{
   "title": "example Binary resource",
   "id": "https://example.org/fhir/Binary/1e404af3-077f-4bee-b7a6-
a9be97e1ce32",
   "content": {
   "resourceType": "Binary",
   "contentType": "text/plain",
      "content": "dGhpcyBpcyBteSBkb2N1bWVudC4="
   }
}
```

Figure 3.65.4.1.2.1-1: Example of a DocumentReference referring to a FHIR Binary resource with base64 encoded content

```
{
      "title": "example DocumentEntry",
      "id": "urn:uuid:2e82c1f6-a085-4c72-9da3-8640a32e42ab",
      "location": "https://somehost/mhd2/Binary/fbc41da1-2936-46c3-98c4-
cf2c13c32a7d"
}

… no Binary resource in the bundle
```

Figure 3.65.4.1.2.1-2: Example of a reference to an existing Binary resource in the location attribute

3.65.4.1.2.2 Patient Identity

The `patientId` value shall be encoded according to the mapping rules in ITI TF-3:5.4.1 with the assigning authority included. The Document Recipient may use Patient ID cross-referencing, such as defined in the ITI PIX Profile, to provide support for multiple Patient Identity assigning authorities.

3.65.4.1.3 Expected Actions

On receipt of the submission, the Document Recipient shall validate the resources and respond with one of the HTTP codes defined in the FHIR API, see Section 3.65.4.2.2.

The Document Recipient shall process the bundle atomically, analogous to the Provide & Register Document Set-b [ITI-41] transaction and FHIR transactions as specified in http://www.hl7.org/implement/standards/fhir/http.html#transaction.

The Document Recipient validates the bundle first against the FHIR specification, Guidance to what FHIR considers a valid resource can be found at

http://www.hl7.org/implement/standards/fhir/resources.html#root. The Document Recipient shall also verify the FHIR resource attributes for consistency with the Document Sharing metadata requirements as specified for attributes ITI TF-3:5.4.1. The Document Recipient may verify the existence of location URLs that point to Resources outside the FHIR Bundle.

All resources other than DocumentManifest, Binary, DocumentReference, and List may be rejected by the Document Recipient with a HTTP status code of 404.

When the MHD Document Recipient is grouped with an XDS Document Source, the Document Recipient shall transform the Document Entry into a proper Provide and Register Document Set-b [ITI-41] transaction. The Document Recipient shall create appropriate Association metadata for resources in the FHIR bundle.

When the MHD Document Recipient is grouped with an XDS Document Source that supports the Document Replace Option, and it encounters a DocumentReference with a `relatesTo` attribute and a type code of replaces (defined in http://hl7.org/fhir/document-relationship-type), it shall replace the existing DocumentEntry denoted by `relatesTo.target`.

If the Document Replace Option is not supported by any of the actors, MHD Document Recipient shall return an OperationOutcome containing an issue with code PartialReplaceContentNotProcessed as detailed in Section 3.65.4.2.2.

When the MHD Document Recipient is grouped with an XDS Document Source that supports the Folder Management Option, List resources shall be mapped to XDS Folders using ITI TF-3: Table 5.4.1.1-1.

If the Folder Management Option is not supported by any of the actors, the MHD Document Recipient shall return an OperationOutcome profiled containing an issue with code PartialFolderContentNotProcessed as detailed in Section 3.65.4.2.2.

Some FHIR attributes do not translate to XDS concepts; the handling of these attributes is left to the implementer of the Document Recipient.

When the location attribute is provided as an absolute URL, the Document Recipient shall retrieve the binary content prior to creating the submission. When the location attribute is a relative URL, the Document Recipient shall resolve it to a Binary resource contained in the bundle.

3.65.4.2 Status Message

The Document Recipient returns a HTTP Status code appropriate to the processing, conforming to the transaction specification requirements as specified in http://www.hl7.org/implement/standards/fhir/http.html#transaction

3.65.4.2.1 Trigger Events

This message shall be sent once the document(s) is/are received and completely processed.

3.65.4.2.2 Message Semantics

When the Document Recipient has successfully processed the POST transaction, then the Document Recipient shall return the HTTP response code 200 – OK to indicate success. The Document Recipient shall return the created resources as a FHIR bundle in the format received, with the following characteristics:

- The server assigned id in `entry.id`
- The client-assigned id in a "alternate" link on the entry
- `entry.content` and `entry.summary` are not required

On failure, the Document Recipient shall return the HTTP response codes as follows:

- 400 Bad Request - resource could not be parsed or failed basic FHIR validation rules like reference inconsistencies, schema violations, etc.
- 404 Not Found - resource type not supported. This shall be accompanied by OperationOutcome providing additional detail.
- 422 Unprocessable Entity - one or more proposed resources violated applicable FHIR profiles or server business rules. This response shall be accompanied by an OperationOutcome resource providing additional detail. XDS error codes, when encountered, shall be referenced verbatim in `issue.type.value`.

In addition, the Document Recipient may also send 5xx status codes to indicate non-transaction related failures. Note that the Document Source may also encounter non-FHIR endpoints which will not return an OperationOutcome in the error response.

The Document Recipient may return HTTP redirect responses (responses with values of 301, 302, 303 or 307) in response to a request. The Document Source shall follow redirects, but if a loop is detected, it may report an error.

3.65.4.2.3 Expected Actions

The Document Source processes the results according to application-defined rules.

If a Document Source cannot automatically recover from an error condition, at a minimum, it should display the error to the user.

3.65.5 Security Considerations

The Document Recipient shall support CORS and may restrict origins from which this transaction can be initiated.

See the general Security Considerations in ITI TF-1:33.5.

3.65.5.1 Security Audit Considerations

The security audit criteria are similar to those for the Provide and Register Document Set –b transaction [ITI-41] as this transaction does export a document. Grouping a Document Source or

Document Recipient with an ATNA Secure Node or Secure Application is recommended, but not mandated. The Document Source may be considered overburdened to fully implement the requirements of Secure Node or Secure Application. The Document Recipient is more full featured and should generate the equivalent to the audit event defined in ITI TF-2b:3.41.7.1.2 Document Repository or Document Recipient audit message.

3.66 Find Document Manifests

This section corresponds to Transaction ITI-66 of the IHE Technical Framework. Transaction ITI-66 is used by the Document Consumer and Document Responder actors.

3.66.1 Scope

The Find Document Manifests transaction is used to find Document Manifests that satisfy a number of parameters, and is equivalent to ITI-18 (Registry Stored Query), FindSubmissionSets query from the XDS stored query catalog from [ITI-18] in ITI TF-2a:3.18.4.1.2.3.7.1. The result of the query is a bundle of Document Manifest Resources which reference one or more Document Reference Resources containing document metadata.

3.66.2 Actor Roles

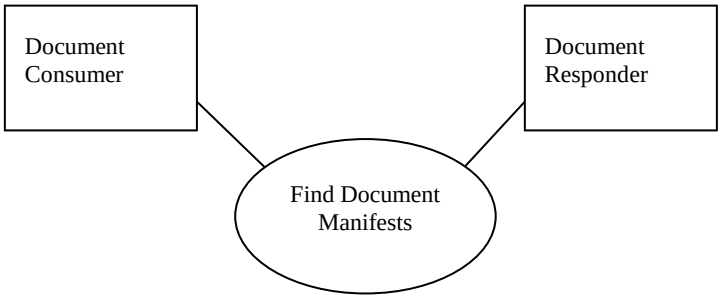


Figure 3.66.2-1: Use Case Diagram

Table 3.66.2-1: Actor Roles

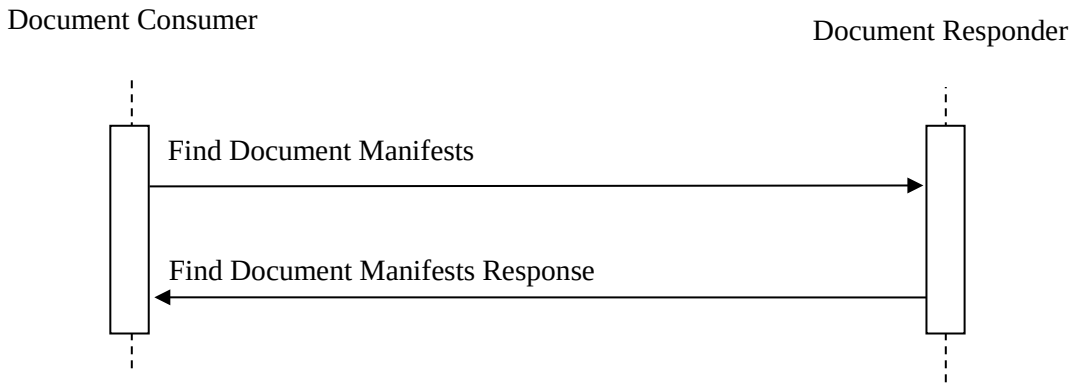
Actor:	Document Consumer
Role:	Requests a list of document manifest resources matching the supplied set of criteria from the Document Responder Actor.
Actor:	Document Responder
Role:	Returns document manifest information for all manifests matching the criteria provided by the Document Consumer Actor.

3.66.3 Referenced Standards

HL7 FHIR	Fast Health Interoperability Resources DSTU v0.82 (A.k.a. DSTU1)
RFC 2616	IETF Hypertext Transfer Protocol – HTTP/1.1

RFC 4287	The Atom Syndication Format
RFC 4627	The application/json Media Type for JavaScript Object Notation
RFC 3968	Uniform Resource Identifier (URI) Generic Syntax
OpenSearch Relevance 1.0 Draft 1	The OpenSearch Relevance Extension

3.66.4 Interaction Diagram



3.66.4.1 Find Document Manifests message

This message represents an HTTP GET parameterized query from the Document Consumer to the Document Responder.

3.66.4.1.1 Trigger Events

When the Document Consumer needs to discover Document Manifests matching various meta-data parameters it issues a Find Document Manifests message.

3.66.4.1.2 Message Semantics

The Document Consumer executes an HTTP GET against the Document Responder's Document Manifest URL.

The search target is formatted as:

```
http://<authority>/<path>/DocumentManifest?<query>
```

This URL is configurable by the Document Responder and is subject to the following constraints.

- The use of http vs. https is a security policy decision.
- The `<authority>` shall be represented as a host (either DNS name or IP address) followed optionally by a port.

- The Document Responder may use the <path> to segregate its implementation of the actor from other REST-based services.
- The <path>, if present, represents the path from which all resources related to a Document Responder are located (Conformance, Profile, DocumentReference, DocumentManifest, and Document resources) and shall not contain a '?'.
- The <query> represents a series of encoded name-value pairs representing the filter for the query specified in Section 3.66.4.1.2.1, as well as control parameters to modify the behavior of the Document Responder such as response format, or pagination.

3.66.4.1.2.1 Query Search Parameters

The Document Consumer may supply and the Document Responder shall be capable of processing all query parameters listed below. All query parameter values shall be appropriately encoded per RFC 3986 “percent” encoding rules. Note that percent encoding does restrict the character set to a subset of ASCII characters which is used for encoding all other characters used in the URL.

Parameters other than those profiled here may be supported by the Document Responder.

There is no deterministic mapping to IHE Document Sharing metadata or FindSubmissionSets query parameters. A Document Responder may return an error or process these parameters in a non-deterministic way.

subject Search Parameter

When Document Consumer is grouped with PDQm Patient Demographics Consumer, and Document Responder is grouped with PDQm Patient Demographics Supplier, then this parameter may be used to identify the associated patient. This parameter is of type `reference`. The Document Consumer gets this reference through the use of the PDQm Profile. Either subject or subject.identifier must be provided.

subject.identifier Search Parameter

This parameter of type `token`, specifies an identifier associated with the patient to which the DocumentManifest Resource is assigned. The identifier specified in this parameter is expressed using the `token` search parameter type. See ITI TF-2x: Appendix Z.2 for use of the `token` data type for identifiers. Either subject or subject.identifier must be provided.

identifier Search Parameter

This parameter of type `token`, specifies an identifier associated with the DocumentManifest Resource. Because the source identifier is already unique the Document Consumer shall populate the identifier portion of the token with the complete OID of the manifest/submission set and shall set the system to “urn:ietf:rfc:3986”.

See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the `token` search parameter type.

created Search Parameter

This parameter of type `date`, specifies the time when the DocumentManifest was created. Document Consumers shall populate the created search parameter using either a less-than or equal to, or greater-than or equal to search parameter modifier. In XDS nomenclature, this query parameter represents from/to parameters filtering by when the submission set was submitted.

author.given and author.family Search Parameters

These parameters of type `string`, specify the name parts of the author person which is associated with the DocumentManifest.

type Search Parameter

This parameter of type `token`, specifies the `contentTypeCode` value supplied in the DocumentManifest resource or, in XDS nomenclature, the content type of the submission set. See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the `token` search parameter type.

status Search Parameter

This parameter of type `token`, specifies the status of the DocumentManifest, or in XDS nomenclature, the availability status of the submission set. The Document Consumer shall populate the identifier portion of the token using one of the short codes listed below.

Short Code	ebRIM Code
current	urn:oasis:names:tc:ebxml-regrep:StatusType:Approved
superseded	urn:oasis:names:tc:ebxml-regrep:StatusType:Deprecated

3.66.4.1.2.2. Populating Expected Response Format

The FHIR standard provides encodings for responses as either XML or JSON. The Document Responder shall support both message encodings, whilst the Document Consumer shall support one and may optionally support both.

The Document Consumer shall indicate the desired response format via the `_format` query parameter.

Document Consumer shall provide a `_format` parameter carrying at least one of the values in Table 3.66.4.1.2.2-1. Multiple values in the `_format` parameter indicate the Document Consumer is capable of processing responses in either response encoding.

Table 3.66.4.1.2.2-1: Desired response encoding

Response Encoding	_format Value
JSON	_format=json *or* _format=application/json+fhir
XML	_format=xml *or* _format=application/xml+fhir

3.66.4.1.3 Expected Actions

The Document Responder shall process the query using the same rules as defined for Registry Stored Query [ITI-18] for FindSubmissionSets. This may be accomplished through grouping the Document Responder with an XDS Document Consumer, and transforming the parameters and combining the returned metadata entries.

3.66.4.1.3.1 Document Responder grouped with an IHE Document Consumer

When the Document Responder is grouped with an XDS Document Consumer, it shall map the query parameters as listed in Table 3.66.4.1.3-1, and shall execute a Registry Stored Query [ITI-18] for FindSubmissionSets. No additional Query parameters as defined in FHIR are required of the Document Responder.

Table 3.66.4.1.3-1: FindSubmissionSets Query Parameter Mapping

ITI 66 Parameter Name	ITI-18 Parameter Name
subject.id	$XDSSubmissionSetPatientId
(Not supported) [3]	$XDSSubmissionSetSourceId
created[1]	$XDSSubmissionSetSubmissionTimeFrom
created[2]	$XDSSubmissionSetSubmissionTimeTo
author.given/author.family	$XDSSubmissionSetAuthorPerson
type	$XDSSubmissionSetContentType
status	$XDSSubmissionSetStatus

[1] This FindSubmissionSets parameter is used when the greater than parameter modifier is used on the created parameter. For example: ?created=>=2008-02-04

[2] This FindSubmissionSets parameter is used when the less than parameter modifier is used on the created parameter. For example: ?created=<=2008-04-04

[3] The $XDSSubmissionSetSourceId is not a supported search parameter in FHIR DSTU1

A translation of these query parameters from FHIR query parameter format to the IHE Document Sharing metadata format is provided in ITI TF-2c:3.66.4.1.3.1.

For example, a query represented as:


```
http://mhd-sample:8080/ihe/DocumentManifest?subject.id=1234-
3|1.3.2.3.4.3&status=current
```

Would result in the following Registry Stored Query [ITI-18] being executed:

```
...
<rim:AdhocQuery id="urn:uuid:f26abbcb-ac74-4422-8a30-edb644bbc1a9">
      <rim:Slot name="$XDSSubmissionSetPatientId">
            <rim:ValueList>
                  <rim:Value>1234-3^^^&amp;amp;1.3.2.3.4.3&amp;amp;ISO</rim:Value>
            </rim:ValueList>
      </rim:Slot>
      <rim:Slot name="$XDSSubmissionSetStatus">
            <rim:ValueList>
                  <rim:Value>urn:oasis:names:tc:ebxml-
regrep:StatusType:Approved</rim:Value>
            </rim:ValueList>
      </rim:Slot>
</rim:AdhocQuery>
...
```

3.66.4.1.3.1.1 Translation Token Parameters

Query parameters of type `token` are used to represent codes and identifiers and shall be presented in the query in the format:

```
…&parameter=namespace|identifier
```

The manner in which the Document Responder translates these parameters to ebXML will depend on the type of the corresponding parameter within the FindSubmissionSets stored query.

- If the token parameter translates to a codified stored query parameter then the Document Responder shall represent the token parameter in the Stored Query as: `<Value>('identifier^^namespace')</Value>`
- If the token parameter translates to a patient identifier in the FindSubmissionSets stored query then the Document Responder shall represent the token parameter in the Stored Query as: `<Value>identifier^^^&namespace&ISO</Value>`

3.66.4.1.3.1.2 Translation Of Name Components

Query parameters representing a name, for example “author.given” and “author.family” shall be translated to an appropriate XCN instance in the ebXML query. For example:

```
…&author.given=Marcus&author.family=Welby
```

Would translate to:

```
<Value>^Welby^Marcus^^^</Value>
```


3.66.4.2 Find Document Manifests Response message

The Document Responder returns a HTTP Status code appropriate to the processing as well as a list of the matching document manifest resources.

3.66.4.2.1 Trigger Events

The Document Responder found Document Manifest Resources using the query parameters.

3.66.4.2.2 Message Semantics

The Find Document Manifests Response message is sent from the Document Responder to the Document Consumer as a bundle of DocumentManifest resources.

The "content-type" of the response will depend upon the requested response format indicated by the Document Consumer via the `_format` parameter.

Table 3.66.4.2.2-1 outlines the format of a response based on the values specified in the format parameter.

Table 3.66.4.2.2-1: Response message format

_format Parameter	Content Type	Bundle Format
json *or* application/json+fhir	application/json+fhir; charset=UTF-8	FHIR JSON Bundle
xml *or* application/xml+fhir	application/atom+xml; charset=UTF-8	ATOM Feed (RFC 4287)

The Document Responder shall use a character encoding of UTF-8. Both XML and JSON encodings of the response shall adhere to the FHIR bundle constraints profiled in ITI TF-2x: Appendix Z.1.

3.66.4.2.2.1 Document Manifest Resource Definition in the Context of Query Find Document Manifests Response

Below is the definition for the Document Manifest Resource contained within the Find Document Manifests response message. The components of the Document Manifest Resource with cardinality greater than 0 (as shown below) are required, and the detailed description of the message is provided here. All other attributes of the response are optional.

This definition describes the data elements relevant for this transaction. It is a restriction of the Document Manifest Resource found in chapter 6.5 of the FHIR standard. For the complete FHIR definition of this Resource, see ITI TF-2x: Appendix W.

Figure 3.66.4.2.2-1: Document Manifest Resource definition (Diagram from HL7 FHIR, does not include IHE constraints)

850 The attributes of this definition are described in the following table. These attributes are discussed further in ITI TF-3:5.3. See ITI TF-3:5.4.1.2 for mapping from XDS to FHIR.

Table 3.66.4.2.2.1-1: DocumentManifest Resource attributes

Resource Definition	IHE constraint	Description	XDS Metadata
DocumentManifest		The primary record matching the specified filter parameters supplied by the Document Consumer.	Submission Set
text Narrative [0..1]	String	Text summary for human interpretation	comments
masterIdentifier Identifier [1..1]		Unique identifier for the set of documents.	uniqueId

Resource Definition	IHE constraint	Description	XDS Metadata
Identifier Identifier [1..*]	[1..*]	Other identifiers for the manifest.	entryUUID,
Subject Resource(Patient) [1..*]	(Patient) Note 1	The subject of the set of documents. Must be one Patient subject with use of 'official', which may be external (non-contained).	reference to patient resource or contained patient resource with just id populated.
recipient Resource(Practitioner|Organization) [0..*]	(Practitioner|Organization) Note 1	Intended to get notified about this set of documents	intendedRecipient
type CodeableConcept [0..1]		What kind of document set this is	contentTypeCode
Author Resource(Practitioner|Device|Patient|RelatedPerson) [0..*]		Who and/or what authored the document	author[1]
Created dateTime [0..1]		When this document was created	submissionTime
Source uri [0..1]		The source system/application	sourceId
Status code {DocumentReferenceStatus} [1..1]		The current status of the document manifest	availabilityStatus
Supersedes Resource(DocumentManifest) [0..0]	[0..0]	not used	
Description string [0..1]		Human readable description (title)	title
confidentialityCode CodeableConcept [0..0]	[0..0]	not used	
Content Resource(DocumentReference) [1..*]		List of links to DocumentReferences	List of references to DocumentEntries

Note 1: Indicates that the data within the XDS SubmissionSet metadata be represented as a contained resource. See ITI TF-3:5.4.4.4.7.

3.66.4.2.2.3 Resource Bundling

Resource Bundling shall comply with the guidelines in ITI TF-2x: Appendix Z.1.

Additionally, the Document Responder shall include any resources referenced by the metadata listed in Table 3.66.4.2.2.1-1 as a contained resource. This means that references to these resources shall point to resource data contained in the resource.

3.66.4.2.3 Expected Actions

The Document Consumer shall process the results according to application-defined rules. The Document Consumer should be robust as the response may contain DocumentManifest entries that match the query parameters but are not compliant with this Profile on DocumentManifest.

If a Document Consumer cannot automatically recover from an error condition, at a minimum, it should display the error to the user.

3.66.4.2.4 Profile Resource

Document Responders implementing [ITI-66] shall provide a Profile Resource as described in ITI TF-2x: Appendix Z.3 indicating all query parameters and data elements implemented by the Document Responder. An example of a Profile Resource for ITI-66 is located in ITI TF-2x: Appendix W.

3.66.4.2.5 Conformance Resource

Document Responders implementing [ITI-66] shall provide a Conformance Resource as described in ITI TF-2x: Appendix Z.4 indicating the query operation for the Document Manifest Resource has been implemented and shall include all query parameters implemented for the Document Manifest Resource. An example of a Conformance Resource for ITI-66 is located in ITI TF-2x: Appendix W.

3.66.5 Security Considerations

See the general Security Considerations in ITI TF-1:33.5.

3.66.5.1 Security Audit Considerations

The security audit criteria are similar to those for the Registry Stored Query [ITI-18] transaction as this transaction does import a document entry. Grouping a Document Consumer or Document Responder with an ATNA Secure Node or Secure Application is recommended, but not mandated. The Document Consumer may be considered overburdened to fully implement the requirements of Secure Node or Secure Application. The Document Responder is more full featured and should generate the equivalent of the audit event defined in ITI TF-2a:3.18.5.1.2 Document Registry audit message.

3.67 Find Document References

This section corresponds to Transaction ITI-67 of the IHE Technical Framework. Transaction ITI-67 is used by the Document Consumer and Document Responder actors.

3.67.1 Scope

The Find Document References transaction is used to find Document References that satisfy parameters, and is equivalent to Registry Stored Query [ITI-18]), FindDocuments and FindDocumentsByReferenceId query from [ITI-18] in ITI TF-2a:3.18.4.1.2.3.7.1.

The result of the query is a FHIR bundle of Document Reference Resources which match the query parameters.

3.67.2 Actor Roles

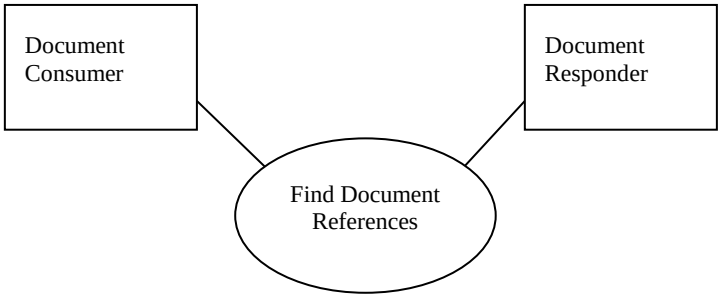


Figure 3.67.2-1: Use Case Diagram

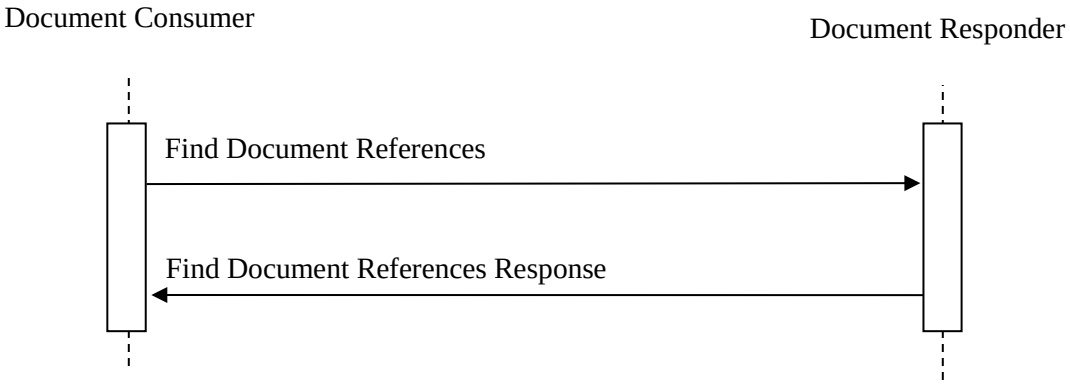
Table 3.67.2-1: Actor Roles

Actor:	Document Consumer
Role:	Requests a list of document reference resources matching the supplied set of criteria from the Document Responder Actor.
Actor:	Document Responder
Role:	Returns document references information for all matching the criteria provided by the Document Consumer Actor.

3.67.3 Referenced Standards

HL7 FHIR	Fast Health Interoperability Resources DSTU v0.82 (A.k.a. DSTU1)
RFC 2616	IETF Hypertext Transfer Protocol – HTTP/1.1
RFC 4287	The Atom Syndication Format
RFC 4627	The application/json Media Type for JavaScript Object Notation
RFC 3968	Uniform Resource Identifier (URI) Generic Syntax
OpenSearch Relevance 1.0 Draft 1	The OpenSearch Relevance Extension

3.67.4 Interaction Diagram



3.67.4.1 Find Document References message

This message represents an HTTP GET parameterized query from the Document Consumer to the Document Responder.

3.67.4.1.1 Trigger Events

When the Document Consumer needs to discover Document References matching various metadata parameters it issues a Find Document References message.

3.67.4.1.2 Message Semantics

The Find Document References message is conducted by the Document Consumer by executing an HTTP GET against the Document Responder's Document References URL. The search target is formatted as:

```
http://<authority>/<path>/DocumentReference?<query>
```

This URL is configurable by the Document Responder and is subject to the following constraints.

- The use of http vs. https is a security policy decision.
- The `<authority>` shall be represented as a host (either DNS name or IP address) followed optionally by a port.
- The Document Responder may use the <`path`> to segregate its implementation of the actor from other REST-based services.
- The <`path`>, if present, represents the path from which all resources related to a Document Responder are located (Conformance, Profile, DocumentReference, DocumentManifest, and Document resources) and shall not contain a '?'.

- The <query> represents a series of encoded name-value pairs representing the filter for the query specified in Section 3.67.4.1.2.1, as well as control parameters to modify the behavior of the Document Responder such as response format, or pagination.

3.67.4.1.2.1 Query Search Parameters

The Document Consumer may supply and the Document Responder shall be capable of processing all query parameters listed below. All query parameter values shall be appropriately encoded per RFC 3986 Percent-Encoding rules. Note that Percent-Encoding does restrict the character set to a subset of ASCII characters which is used for encoding all other characters used in the URL.

Parameters other than those profiled here may not be supported by the Document Responder.

subject Search Parameter

When Document Consumer is grouped with PDQm Patient Demographics Consumer, and Document Responder is grouped with PDQm Patient Demographics Supplier, then this parameter may be used to identify the associated patient. This parameter is of type `reference`. The Document Consumer gets this reference through the use of the PDQm Profile. Either subject or subject.identifier must be provided.

subject.identifier Search Parameter

This parameter of type `token`, specifies an identifier associated with the patient to which the DocumentReference Resource is assigned. The identifier specified in this parameter is expressed using the `token` search parameter type. Please see ITI TF-2x: Appendix Z.2 for additional constraints on the use of the token search parameter type. Either subject or subject.identifier must be provided.

identifier Search Parameter

This of type `token`, specifies an identifier associated with the DocumentReference Resource. Because the source identifier is already unique the Document Consumer shall populate the identifier portion of the token with the complete OID of the DocumentReference and shall set the system to “urn:ietf:rfc:3986”.

See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the `token` search parameter type.

created Search Parameter

This parameter of type `date`, specifies the time when the DocumentReference was created. Document Consumers shall populate the created search parameter using either a less-than or equal to, or greater-than or equal to search parameter modifier. In IHE Document Sharing nomenclature, this query parameter represents from/to parameters filtering by when the DocumentEntry was submitted.

author.given and author.family Search Parameters

These parameters of type `string`, specify the name parts of the author person which is associated with the DocumentReference.

status Search Parameter

This parameter of type `token`, specifies the status of the DocumentReference, or in XDS nomenclature, the availability status of the Document Entry. The consumer shall populate the identifier portion of the token using one of the short codes listed below.

Short Code	ebRIM Code
current	urn:oasis:names:tc:ebxml-regrep:StatusType:Approved
superseded	urn:oasis:names:tc:ebxml-regrep:StatusType:Deprecated

class Search Parameter

This parameter of type `token`, specifies the general classification of the DocumentReference resource, or in XDS nomenclature, the class code of the Document Entry. See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the `token` search parameter type.

type Search Parameter

This parameter of type `token`, specifies the specific type of the DocumentReference resource or in XDS nomenclature, the type code of the Document Entry. See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the `token` search parameter type.

period Search Parameter

This parameter of type `date`, represents the time of service that is being documented by the DocumentReference. The period search parameter specifies an interval which the time of service overlaps. In XDS nomenclature, this query parameter represents from/to parameters for the serviceStartTime and serviceStopTime of the Document Entry.

Examples:

ITI-67 Parameter Value	ITI-18 Parameter Value
period=2012-01-05	$XDSDocumentEntryServiceStartTimeTo = 20120105235959 $XDSDocumentEntryServiceStopTimeFrom = 20120105000000
period=>=2012-01-05	$XDSDocumentEntryServiceStopTimeFrom = 20120105000000
period=>=2012-01-05 &period=<=2012-01-12	$XDSDocumentEntryServiceStartTimeTo = 20120112235959$XDSDocumentEntryServiceStopTimeFrom = 20120105000000

facilityType Parameter

This parameter of type `token`, specifies the kind of facility of the DocumentReference resource or in XDS nomenclature, the healthcare facility type of the Document Entry. See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the `token` search parameter type.

event Parameter

This parameter of type `token`, specifies the main clinical acts documented by the DocumentReference resource or in XDS nomenclature, the event code list of the Document Entry. See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the `token` search parameter type.

confidentiality Parameter

This parameter of type `token`, specifies the confidentiality of the DocumentReference resource or in XDS nomenclature, the confidentiality code of the Document Entry. See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the `token` search parameter type.

format Parameter

This parameter of type `token`, specifies the format of the DocumentReference resource or in XDS nomenclature, the format code of the Document Entry. See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the `token` search parameter type.

identifier Search Parameter

This parameter of type `token`, represents other identifiers associated with the DocumentReference resource. In XDSIHE Document Sharing nomenclature, this query parameter represents the referenceIdList. See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the token search parameter type.

3.67.4.1.2.2 Populating Expected Response Format

The FHIR standard provides encodings for responses as either XML or JSON. The Document Responder shall support both message encodings, whilst the Document Consumer shall support one and may support both.

The Document Consumer shall indicate the desired response format via the `_format` query parameter.

Document Consumer shall provide a `_format` parameter carrying at least one of the values indicated in Table 3.6766.4.1.2.2-1. Multiple values in the `_format` parameter indicate the Document Consumer is capable of processing responses in either response encoding.

Table 3.67.4.1.2.2-1: Desired response encoding

Response Encoding	_format Value
JSON	_format=json *or* _format=application/json+fhir
XML	_format=xml *or* _format=application/xml+fhir

3.67.4.1.3 Expected Actions

The Document Responder shall process the query using the same rules as defined for ITI-18 Registry Stored Query for FindDocuments or FindDocumentsByReferenceId. This may be accomplished through grouping the Document Responder with a Document Sharing Document Consumer, and transforming the parameters and combining the returned metadata entries.

3.67.4.1.3.1 Document Responder grouped with a XDS Document Consumer

When the Document Responder is grouped with a Document Consumer, it shall map the query parameters as listed in Table 3.67.4.1.3-1, and shall execute an ITI-18 Registry Stored Query for FindDocuments. All of the following query parameters shall be supported by the Document Responder. No additional query parameters as defined in FHIR are required of the Document Responder, but they may be offered. The value of the Optionality column is consistent with optionality of query parameter in ITI-18.

Table 3.67.4.1.3-1: XDS FindDocuments Query Parameter Mapping

ITI-67 Parameter Name	ITI-18 Parameter Name	Optionality
subject or subject.identifier	$XDSDocumentEntryPatientId	R
created [Note 1]	$XDSDocumentEntryCreationTimeFrom	O
created [Note 2]	$XDSDocumentEntryCreationTimeTo	O
author.given / author.family	$XDSDocumentEntryAuthorPerson	O
status	$XDSDocumentEntryStatus	O
(Not supported) [Note 3]	$XDSDocumentEntryType	N/A
class	$XDSDocumentEntryClassCode	O
type	$XDSDocumentEntryTypeCode	O
(Not supported) [Note 3]	$XDSDocumentEntryPracticeSettingCode	N/A
period [Note 1]	$XDSDocumentEntryServiceStartTimeFrom	O
period [Note 2]	$XDSDocumentEntryServiceStartTimeTo	O
period [Note 1]	$XDSDocumentEntryServiceStopTimeFrom	O

ITI-67 Parameter Name	ITI-18 Parameter Name	Optionality
period [Note 2]	$XDSDocumentEntryServiceStopTimeTo	O
facilityType	$XDSDocumentEntryHealthcareFacilityTypeCode	O
event	$XDSDocumentEntryEventCodeList	O
confidentiality	$XDSDocumentEntryConfidentialityCode	O
format	$XDSDocumentEntryFormatCode	O
identifier	$XDSDocumentEntryReferenceIdList	O

Note 1: This FindDocuments parameter is used when the greater than parameter modifier is used on the created parameter. For example: ?created=>=2008-02-04

Note2: This FindDocuments parameter is used when the less than parameter modifier is used on the created parameter. For example: ?created=<=2008-04-04

Note3: The $XDSDocumentEntryType and $XDSDocumentEntryPracticeSettingCode are not a supported query parameter in HL7 FHIR DSTU1.

A translation of these query parameters from FHIR query parameter format to the XDS metadata format is provided in ITI TF-2c:3.66.4.1.3.1.1 through ITI TF-2c:3.66.4.1.3.1.2.

3.67.4.2 Find Document References Response message

The Document Responder returns a HTTP Status code appropriate to the processing as well as a list of the matching document reference resources.

3.67.4.2.1 Trigger Events

The Document Responder found Document Reference Resources using the query parameters.

3.67.4.2.2 Message Semantics

The Find Document References Response message is sent from the Document Responder to the Document Consumer as a bundle of DocumentReference resources.

The “content-type” of the response will depend upon the requested response format indicated by the Document Consumer via the `_format` parameter. See Table 3.67.4.2.2-1

The Document Responder shall use a character encoding of UTF-8. Both XML and JSON encodings of the response shall adhere to the FHIR bundle constraints profiled in ITI TF-2x: Appendix Z.1.

3.67.4.2.2.1 DocumentReference Resource Definition in the Context of Query Find Document References Response

Figure 3.67.4.2.2-1 is the definition for the Document Reference Resource contained within the Find Document References response message. components of the DocumentReferences Resource with cardinality greater than 0 are required. The detailed description of the message is provided here. All other attributes of the response are optional.

The definition is a restriction of the DocumentReference Resource found in chapter 6.4 of the FHIR DSTU1 standard. (See
1065 http://www.hl7.org/implement/standards/fhir/documentreference.html for details). For the complete FHIR definition of this Resource, see ITI TF-2x: Appendix W.

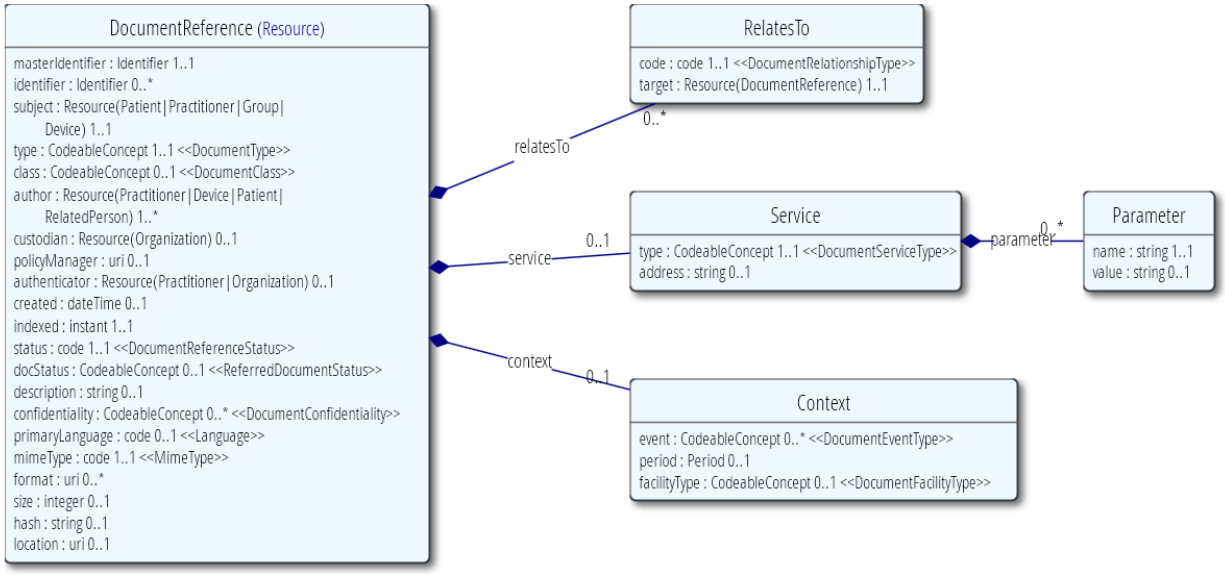


Figure 3.67.4.2.2-1: Document Reference Resource definition (From FHIR DSTU1 DocumentReference)

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The attributes of this definition are described in the following table. These attributes are discussed further in ITI TF-3:5.3. See ITI TF-3:5.4.1.1 for mapping from IHE Document Sharing (e.g., XDS) to FHIR.

1075 **Table 3.67.4.2.2.1-1: DocumentReference Resource attributes**

FHIR DocumentReference Resource Definition	IHE constraint	Description	Document Sharing Metadata (e.g., XDS)
DocumentReference		The primary record matching the specified filter parameters supplied by the Document Consumer.	Document Entry
text Narrative [0..1]	String	Text summary for human interpretation	comments

FHIR DocumentReference Resource Definition	IHE constraint	Description	Document Sharing Metadata (e.g., XDS)
masterIdentifier Identifier [1..1]		Unique identifier for the document reference.	uniqueId
identifier Identifier [0..*]	[1..*]	Other identifiers for the manifest.	entryUUID, referenceIdList
subject Resource(Patient) [1..1]	(Patient) Note 1	The subject of the documents. All XDS patient defining metadata must be combined into one Patient object that must be contained.	patientId, sourcePatientId, sourcePatientInfo
type CodeableConcept [1..1]		A low-level classification of documents within a classCode that describes class, event, specialty, and setting.	typeCode
class CodeableConcept [0..1]		A high-level classification of documents that indicates the kind of document, e.g., report, summary, note, consent.	classCode
author Resource(Practitioner) [0..*]	(Practitioner) Note 1	Who and/or what authored the document	authorPerson Note 1
custodian Resource(Organization) [0..1]	[0..0]	Identifies the organization or group who is responsible for ongoing maintenance of and access to the document.	(Not Used) Note 4
policyManager uri [0..1]	[0..0]	A reference to a domain or server that manages policies under which the document is accessed and/or made available.	(Not Used) Note 4

FHIR DocumentReference Resource Definition	IHE constraint	Description	Document Sharing Metadata (e.g., XDS)
authenticator Resource(Practitioner|Organization [0..1]		Who/What authenticated the document	legalAuthenticator
created dateTime [0..1]		When this document was created	creationTime
indexed Instant [1..1]		When this document reference was created	creationTime
status code {DocumentReferenceStatus} [1..1]		The current status of the document reference	availabilityStatus
docStatus CodeableConcept [0..1]	[0..0]		(Not Used) [Note 4]
relatesTo [0..*]		Relationship to other documentReferences	Relationship Association
relatesTo.code code [1..1]	restrained to the value "replaces" for ITI-65.	relationship type (Replaces, Transforms, signs, appends)	Relationship type
relatesTo.target Resource(DocumentReference) [1..1]		pointer to related DocumentReference	relationship reference
description string [0..1]		Human readable description (title)	title
confidentiality CodeableConcept [0..*]		Sensitivity of source document	confidentialityCode
primaryLanguage code [0..1]		the primary human language for the document	language
mimeType code [1..1]		Mime type of the referenced document	mimeType
format uri [0..*]	[1..1]	Format/content rules for the document	formatCode
size integer [0..1]		size of the document in bytes	size

FHIR DocumentReference Resource Definition	IHE constraint	Description	Document Sharing Metadata (e.g., XDS)
hash string [0..1]		HexBinary representation of the SHA1 hash of the document	hash Note 5
location uri [0..1]	[1..1]	where to access the document (Note 2)	note 2
service [0..1]	[0..0]	not used (might contain SOAP endpoint information)	(Not Used) Note 4
context [0..1]		Clinical context of the document	
context.event CodeableConcept [0..*]		Clinical Acts Documented	eventCodeList
context.period Period [0..1]		Time of service that is being documented	serviceStartTime serviceStopTime
context.facilityType CodeableConcept [0..1]		Kind of facility where patient was seen	healthcareFacilityType Code
(not supported)		The code specifying the clinical specialty where the act that resulted in the document was performed (e.g., Family Practice, Laboratory, Radiology).	practiceSettingCode Note 3

Note 1: Indicates that the data within the XDS document entry be represented as a contained resource. See ITI TF-3:5.4.4.4.7

Note 2: The location is created by the Document Responder as a dereferenceable URL that the Document Consumer can use to retrieve the document. This may be a temporary or permanent reference.

Note 3: These elements are not supported in HL7 DSTU1. Therefore can't be returned to a Document Consumer

Note 4: These HL7 FHIR DSTU1 elements are not used in XDS. Therefore would not be present. Document Consumers should be robust to these elements holding values.

Note 5: The IHE Document Sharing metadata element hash holds the SHA1 hash encoded in hexbinary, this same SHA1 hash is encoded in HL7 FHIR in base64.

3.67.4.2.2.3 Resource Bundling

Resource Bundling shall comply with the guidelines in ITI TF-2x: Appendix Z.1.

The Document Responder shall include any resources referenced by the metadata listed in Table 3.67.4.2.2.1-1 as a contained resource. This means that references to these resources shall point to resource data contained in the bundle as entries.

3.67.4.2.2.3 Document location

The Document Responder shall place into the `location` element a URL that can be used by the Document Consumer to retrieve the document using the Retrieve Document [ITI-68] transaction.

The Document Responder may choose to encode into the URL all the necessary parameters the Document Consumer would need to perform an XDS Retrieve Document Set [ITI-43] transaction. The Document Responder may choose to maintain a cache of parameters and encode the URL with simply unique identifiers. The `location` URL is completely in the control of the Document Responder, so it is up to that implementation to assure that when the Document Consumer executes the URL that the document content can be returned to the Document Consumer.

3.67.4.2.3 Expected Actions

The Document Consumer shall process the results according to application-defined rules. The Document Consumer should be robust as the response may contain DocumentReference entries that match the query parameters but are not compliant with this Profile on DocumentReference.

If a Document Consumer cannot automatically recover from an error condition, it should, at a minimum, display the error to the user.

3.67.4.2.4 Profile Resource

Document Responders implementing [ITI-67] shall provide a Profile Resource as described in ITI TF-2x: Appendix Z.3 indicating all query parameters and data elements implemented by the Document Responder. An example of a Profile Resource for ITI-67 is located in ITI TF-2x: Appendix W.

3.67.4.2.5 Conformance Resource

Document Responders implementing [ITI-67] shall provide a Conformance Resource as described in ITI TF-2x: Appendix Z.4 indicating the query operation for the Document References Resource has been implemented and shall include all query parameters implemented for the Document Reference Resource.

3.67.5 Security Considerations

See the general Security Considerations in ITI TF-1:33.5.

3.67.5.1 Security Audit Considerations

The Security audit criteria are similar to those for the Registry Stored Query transaction [ITI-18] as this transaction does import a DocumentEntry. Grouping the Document Consumer or Document Responder with an ATNA Secure Node or Secure Application is recommended, but not mandated. The Document Consumer may be considered overburdened to fully implement the requirements of Secure Node or Secure Application. The Document Responder is more full featured and should generate an equivalent event to the audit event defined in ITI TF-2a:3.18.5.1.2 Document Registry audit message.

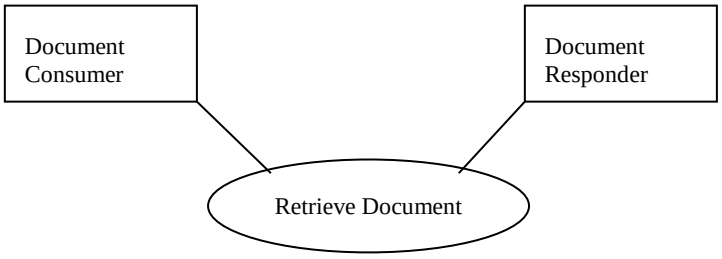
3.68 Retrieve Document

This section corresponds to Transaction ITI-68 of the IHE Technical Framework. Transaction ITI-68 is used by the Document Consumer and Document Responder Actors.

3.68.1 Scope

The Retrieve Document transaction is used by the Document Consumer to retrieve a document from the Document Responder.

3.68.2 Use Case Roles



Actor: Document Consumer

Role: Requests a document identified by URL from the Document Responder

Actor: Document Responder

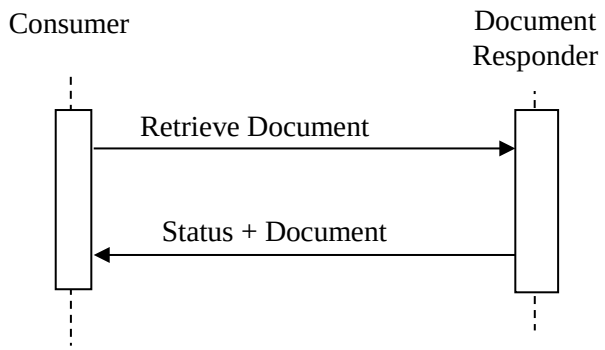
Role: Serves the document at the provided resource URL to the Document Consumer

3.68.3 Referenced Standard

RFC2616 IETF Hypertext Transfer Protocol – HTTP/1.1

RFC6585 IETF Additional HTTP Status Codes

3.68.4 Interaction Diagram



3.68.4.1 Retrieve Document request Message

This message is an HTTP GET request to retrieve the document.

3.68.4.1.1 Trigger Events

The Document Consumer requests a copy of an identified document.

3.68.4.1.2 Message Semantics

The Document Consumer sends a HTTP GET request to the server using the DocumentReference.location URI. The Document Consumer may use content negotiation by providing a HTTP Accept header, according to the semantics of the HTTP protocols (see RFC 2616, Section 14.1). The only MIME type assured to be returned is the MIME type indicated in the Document Reference.

HTTP If-Unmodified-Since header shall not be included in the GET request.

3.68.4.1.3 Expected Actions

The Document Responder shall provide the document in the requested MIME type, or reply with an HTTP status code indicating the error condition. The Document Responder is not required to transform the document.

3.68.4.2 Status + Document Message

This is the return message sent by the Document Responder.

3.68.4.2.1 Trigger Events

The HTTP Response message is sent when completing the Retrieve Document Request.

3.68.4.2.2 Message Semantics

This message complies with the HTTP response message, as required by RFC 2616. When the document is returned the Document Responder shall respond with HTTP response code 200 and the HTTP body contains the Document requested.

If the specified URI is not known to the Document Responder, the Document Responder shall return HTTP response code 404 (not found) with the suggested reason phrase “Document not found”.

If the Document was deprecated, the Document Responder may send a status code of 410, if this is acceptable by privacy and security policy. Otherwise, it shall send a status code of 404. The Document Consumer may choose to then use the Find Document References [ITI-67] transaction to find the updated content.

If the Document Responder is not able to format the document in any content types listed in the 'Accept' field, it shall return HTTP response code 406 – Not Acceptable.

If the HTTP request specified is otherwise not a legal value according to this transaction, the Document Responder shall return HTTP response-code 403 (forbidden) with the suggested reason-phrase “request type not supported”.

Table 3.68.4.2.2-1: HTTP Error Response Codes and Suggested Text

Situation	HTTP Response
URI not known	404 Document Not Found
Document Deprecated	410 Gone (or 404 if 410 is unacceptable due to security/privacy policy)
Document Responder unable to format document in content types listed the 'Accept' field	406 – Not Acceptable
HTTP request specified is otherwise not a legal value	403 Forbidden/Request Type Not Supported

Other HTTP response codes may be returned by the Document Responder, indicating conditions outside of the scope of this transaction, for example, 401 – Authentication Failed might be returned if Document Responder is grouped with an actor in the IHE IUA or EUA profiles.

The Document Responder should complement the returned error code with a human readable description of the error condition.

The Document Responder may return HTTP redirect responses (responses with values of 301, 302, 303 or 307) in response to a request. Document Consumer must follow redirects, but if a loop is detected, it may report an error.

3.68.4.2.3 Expected Actions

The Document Consumer is expected to continue its workflow upon receiving the document. The document content returned would be that document described in the DocumentReference. The Document Consumer should be robust on handling of the document content.

If a Document Consumer cannot automatically recover from an error condition, at a minimum, it should display the error to the user.

3.68.5 Security Considerations

See the General Security Considerations in ITI TF-1:33.5.

3.68.5.1 Security Audit Considerations

The Security audit criteria are similar to those for the Retrieve Document Set – b transaction [ITI-43] as this transaction does import a DocumentEntry. Grouping the Document Consumer or Document Responder with an ATNA Secure Node or Secure Application is recommended, but not mandated. The Document Consumer may be considered overburdened to fully implement the requirements of Secure Node or Secure Application. The Document Responder is more full featured and should generate an equivalent event to the audit event defined in ITI TF-2b:3.43.6.1.2 Document Repository audit message.

Appendices

Update the following appendix to the Volume 2x Appendices

Initially published in the PDQm Supplement (Please refer to PDQm for initial text)

Appendix Z – FHIR Implementation Material

Volume 3 – Content Modules

Add Section 5.4

5.4 FHIR Representation

The Document Sharing Metadata are mapped to FHIR resources and data-types. The high level mapping is provided in the Transaction definitions in Volume 2c. The data-types used are defined using HL7 FHIR at http://hl7.org/fhir.

For more details on the mapping see http://wiki.ihe.net/index.php?title=MHD-rev2-vol-3.

For examples see http://wiki.ihe.net/index.php?title=MHD_Implementation_Guide.

5.4.1 Metadata Object Types mapped to FHIR

Details on data type and resource encoding described in detail in the HL7 FHIR specification found at http://hl7.org/fhir.

5.4.1.1 DocumentEntry Metadata Attributes

Table 5.4.1.1-1 provides a mapping of the metadata attributes associated with a DocumentEntry object to FHIR resources. The full DocumentEntry metadata attribute definition is in Section 4.2.3.2.

Table 5.4.1.1-1: DocumentEntry Metadata mapping to FHIR

DocumentEntry Metadata Attribute	Description	FHIR	Notes
Author	Characterizes the humans and/or machines that authored the document. This attribute contains the sub-attributes: authorInstitution, authorPerson, authorRole, authorSpecialty and authorTelecommunication.	DocumentReference.author	Contained author resource of type Practitioner with: • authorInstitution: Practitioner.organization • authorPerson: Practitioner.identifier and Practitioner.name • authorRole: Practitioner.role • authorSpecialty: Practitioner.specialty • authorTelecommunication: Practitioner.telecom

DocumentEntry Metadata Attribute	Description	FHIR	Notes
availabilityStatus	Characterizes the lifecycle status of the DocumentEntry	DocuumentReference.status	Approved → status=current Deprecated → status=superseded
classCode	A high-level classification of documents that indicates the kind of document, e.g., report, summary, note, consent.	DocumentReference.class	
comments	Comments associated with the document.	DocumentReference.text	string only, no markup allowed
confidentialityCode	The code specifying the level of confidentiality of the document.	DocumentReference.confidentiality	
creationTime	Characterizes the time the author created the document.	DocumentReference.created	
entryUUID	A globally unique identifier used to manage the entry.	DocumentReference.identifier	When the DocumentReference.identifier carries the entryUUID then the DocumentReference.identifier.use shall be 'official'
eventCodeList	This list of codes represents the main clinical acts, such as a colonoscopy or an appendectomy, being documented.	DocumentReference.context.event	
formatCode	Code globally uniquely specifying the format of the document.	DocumentReference.format	
hash	Hash of the document itself.	DocumentReference.hash	The IHE Document Sharing metadata element hash holds the SHA1 hash encoded in hexbinary, this same SHA1 hash is encoded in HL7 FHIR in base64.
healthcareFacilityTypeCode	This code represents the type of organizational setting of the clinical encounter during which the documented act occurred.	DocumentReference.context.facilityType	

DocumentEntry Metadata Attribute	Description	FHIR	Notes
homeCommunityId	A globally unique identifier for a community.		The homeCommunityId is not carried as it is not usable by the Document Consumer
languageCode	Specifies the human language of character data in the document.	DocumentReference.primaryLanguage	
legalAuthenticator	Characterizes a participant who has legally authenticated or attested the document within the authorInstitution.	DocumentReference.authenticator	
limitedMetadata	Indicates whether the Document Entry was created using the less rigorous requirements of metadata as defined for the Metadata-Limited Document Source.		Not applicable [Note 1]
mimeType	MIME type of the document.	DocumentReference.mimeType	
objectType	The type of DocumentEntry		Not Applicable [Note 1]
patientId	The patientId represents the subject of care of the document.	DocumentReference.subject.identifier	Contained Patient resource with Patient.identifier.use element set to 'official'
practiceSettingCode	The code specifying the clinical specialty where the act that resulted in the document was performed (e.g., Family Practice, Laboratory, Radiology).		Not applicable [Note 1]
referenceIdList	A list of identifiers that apply to the document.	DocumentReference.identifier	When the DocumentReference.identifier carries the referenceIdList values then the DocumentReference.identifier.use shall be 'secondary'
repositoryUniqueId	The globally unique identifier of the repository where the document is stored.		Not Applicable [Note 1]
serviceStartTime	Represents the start time the service being documented took place.	DocumentReference.context.period	

DocumentEntry Metadata Attribute	Description	FHIR	Notes
serviceStopTime	Represents the stop time the service being documented took place.	DocumentReference.context.period	
size	Size in bytes of the document.	DocumentReference.size	
sourcePatientId	The sourcePatientId represents the subject of care medical record Identifier (e.g., Patient Id) in the local patient Identifier Domain of the creating entity.	DocumentReference.subject	Contained Patient resource with Patient.identifier.use element set to 'usual'
sourcePatientInfo	This attribute contains demographic information of the source patient to whose medical record this document belongs.	DocumentReference.subject	Contained Patient resource
title	Represents the title of the document.	DocumentReference.description	
typeCode	A low-level classification of documents within a classCode that describes class, event, specialty, and setting.	DocumentReference.type	
uniqueId	The globally unique identifier assigned by the document creator to this document.	DocumentReference.masterIdentifier	
URI	The URI for the document.	DocumentReference.location	May be the same. May also be different. The DocumentReference.location is expected to be accessible to the Document Consumer

Note 1 – Not Applicable - The XDS metadata element has no equivalent element in the HL7 FHIR DSTU1. Therefore Document Source is not able to set these elements, and Document Consumers will not have access to these elements.

5.4.1.2 SubmissionSet Metadata Attributes

Table 5.4.1.2-1 provides a mapping of the metadata attributes associated with a SubmissionSet object to FHIR resources. The full SubmissionSet metadata attribute definition is in Section 4.2.3.3.

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Table 5.4.1.2-1: SubmissionSet Metadata Attribute Definition

Submission Set Metadata Attribute	Description	FHIR Encoding	Notes
author	The humans and/or machines that created the submission set. This attribute contains the sub-attributes: authorInstitution, authorPerson, authorRole, authorSpecialty, authorTelecommunication.	DocumentManifest.author	Contained author resource of type Practitioner with: • authorInstitution: Practitioner.organization • authorPerson: Practitioner.identifier and Practitioner.name • authorRole: Practitioner.role • authorSpecialty: Practitioner.specialty authorTelecommunication: Practitioner.telecom
availabilityStatus	The lifecycle status of the SubmissionSet	DocumentManifest.status	
comments	Comments associated with the SubmissionSet.	DocumentManifest.text	string only, no markup allowed
contentTypeCode	The code specifying the type of clinical activity that resulted in placing these documents in this SubmissionSet.	DocumentManifest.type	
entryUUID	A globally unique identifier used to manage the entry.	DocumentManifest.identifier	When the DocumentManifest.identifier carries the entryUUID then the DocumentReference.identifier. use shall be 'official'
homeCommunityId	A globally unique identifier for a community.		Not Applicable [Note 1]
intendedRecipient	The organization(s) or person(s) for whom the Submission Set is intended.	DocumentManifest.recipient	
limitedMetadata	A flag that the associated SubmissionSet was created using the less rigorous metadata requirements as defined for the Metadata-limited Document Source.		Not Applicable [Note 1]
patientId	The patientId represents the primary subject of care whose longitudinal record is being reflected in this Submission Set.	DocumentManifest.subject	Contained Patient resource with Patient.identifier.use element set to 'official'
sourceId	Identifier of the Document Source that created the SubmissionSet.	DocumentManifest.source	

Submission Set Metadata Attribute	Description	FHIR Encoding	Notes
submissionTime	Point in Time at the Document Source when the Submission Set was created.	DocumentManifest.created	
title	The title of the SubmissionSet.	DocumentManifest.description	
uniqueId	Globally unique identifier for the SubmissionSet assigned by the Document Source.	DocumentManifest.masterIdentifier	

Note 1: Not Applicable - The XDS metadata element has no equivalent element in the HL7 FHIR DSTU1. Therefore Document Source is not able to set these elements, and Document Consumers will not have access to these elements.

5.4.1.3 Folder Metadata Attributes

Table 5.4.1.3-1 provides a mapping of the metadata attributes associated with a Folder object. The full Folder metadata attribute definition is in Section 4.2.3.4.

Table 5.4.1.3-1: Folder Metadata Attribute Definition

Folder Metadata Attribute	Description	FHIR Encoding	Notes
availabilityStatus	The lifecycle status of the Folder		Not Applicable [Note 1]
codeList	The set of codes specifying the type of clinical activities that resulted in placing documents in this Folder.	List.code	
comments	Comments associated with the Folder.	List.text	
entryUUID	A globally unique identifier used to manage the entry.	List.identifier	When the List.identifier carries the entryUUID then the List.identifier.use shall be 'official'
homeCommunityId	A globally unique identifier for a community.		Not Applicable [Note 1]
lastUpdateTime	Most recent point in time that the Folder has been modified.	List.date	
patientId	The patientId represents the subject of care of documents within the Folder.	List.subject.id	Contained Patient resource with Patient.identifier.use element set to 'official'
title	The name of the Folder.		Not Applicable [Note 1]
uniqueId	Globally unique identifier for the Folder.	List.identifier	IdentifierUse=usual

Note 1: Not Applicable - The XDS metadata element has no equivalent element in the HL7 FHIR DSTU1. Therefore Document Source is not able to set these elements, and Document Consumers will not have access to these elements.

