

**Integrating the Healthcare Enterprise**



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**IHE IT Infrastructure  
Technical Framework Supplement**

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**Mobile access to Health Documents  
(MHD)**

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**FHIR<sup>®</sup> DSTU2  
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

30 This is a supplement to the IHE IT Infrastructure Technical Framework V12.0. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

This supplement is published on June 2, 2016 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  
35 Technical Framework. Comments are invited and may be submitted at [http://www.ihe.net/ITI\\_Public\\_Comments](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.

40 *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.

45

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](http://ihe.net/IHE_Domains).

50 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](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/Technical\\_Frameworks](http://ihe.net/Technical_Frameworks).

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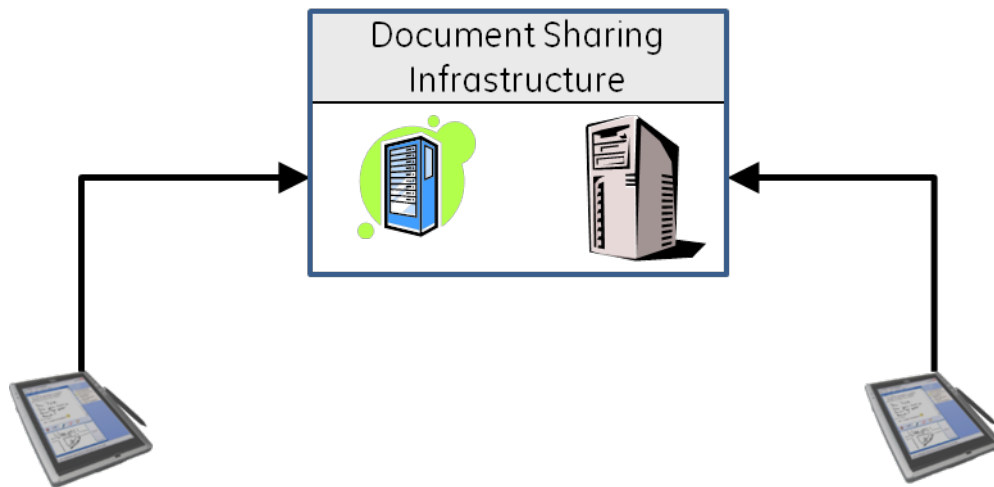
## Introduction to this Supplement

155 The IHE MHD Profile and the HL7<sup>®1</sup> FHIR<sup>®2</sup> activities are working together to revise and enhance the transactions profiled here. For details on HL7 FHIR. See <http://hl7.org/fhir>

This supplement uses FHIR DSTU2 defined resources -- DocumentReference, DocumentManifest, List, Patient, Practitioner, OperationOutcome, and Bundle.

160 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-

165 constrained systems, access to an XDS Repository. The following figure shows one possible way to implement MHD within a document sharing environment (that may be, but is not necessarily, XDS based). This implementation choice is not mandatory and we recognize other architectures will be implemented.



170

**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

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<sup>1</sup> HL7 is the registered trademark of Health Level Seven International.

<sup>2</sup>FHIR is the registered trademark of Health Level Seven International.

175 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.

180 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:

- 185 • Medical devices including those targeted by the IHE Patient Care Devices (PCD) domain or PCHA/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+).
- 190 • 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

- 195 • How important are Folders? We could support Document Source → Document Recipient ability to create and update Folders. To support Document Consumer → Document Responder support of folders would require adding another Transaction for Find Folders, or some other method that the Document Consumer obtains knowledge of the Folder (such as through `_include`). Are folders really important today, or have they been  
200 replaced by the `ReferenceIdList`?
- Find Document References does not support the `GetRelatedDocuments` stored query in the same way, but the queries provided can provide the same functionality.
- There is no declared option to indicate a system that requires minimal metadata support. Therefore a Document Source that uses minimal metadata will receive an error from a  
205 Document Recipient that doesn’t support minimal metadata.
- MHD does not declare options for the various associations (replaces, transforms, appends), but rather provides the capability to all. Therefore the Document Responder must be assumed to support all of these transforms. Is there a reason to bring those named options into MHD, or is this presumed capability sufficient?

- 210
- Should ITI-68 be allowed to also act like a FHIR Binary endpoint? That is it could return a Binary resource with the content contained if the Accept headers ask for FHIR types?
  - There is more detail in an XDS error on Provide and Register Document Set-b that is not obvious how to translate into the FHIR response [ITI-65]. Suggestions welcome.

## Closed Issues

- 215
- MHD\_001: Standards selection is now FHIR DSTU2. The profile will restrict FHIR use to that which can be supported by an underlying XDS environment. 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.
- 220
- 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.
- 225
- 230
- 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.
- 235
- MHD\_031: This version of MHD supports Replace operations.
  - MHD\_032: This version of MHD supports other Association types.
  - MHD\_033: This version of MHD provides only minimal support for Folders. A Document Source can create Folders, possibly update Folder. A Document Responder can return Folders that are related to other queries. However there is no defined method to search for Folders. Searching for Folders, as FHIR List, should be obvious.
- 240
- MHD\_025: This version is based on HL7 FHIR DSTU2. Lessons learned were folded into HL7 FHIR for DSTU2 under a joint efforts of IHE and HL7. Each revision of MHD is not expected to be backward compatible, until FHIR goes normative and MHD goes Final Text.
- 245



- MHD\_026: DSTU2 has aligned the use of typeCode as DocumentReference.type, and classCode as DocumentReference.class.
- MHD\_030: Include support for ReferenceIdList
- 250 • 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  
255 experience on how to resolve.
- MHD\_035: FHIR does not provide an ad-hoc metadata extension mechanism like custom slots in XDS.

260

## Volume 1 – Profiles

*Add Section 33*

### **33 Mobile access to Health Documents (MHD) Profile**

265 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  
270 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,  
275 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  
280 required additional libraries to those that are necessary to process SOAP, WSSE, MIME-Multipart, MTOM/XOP, ebRIM, and multi-depth XML.

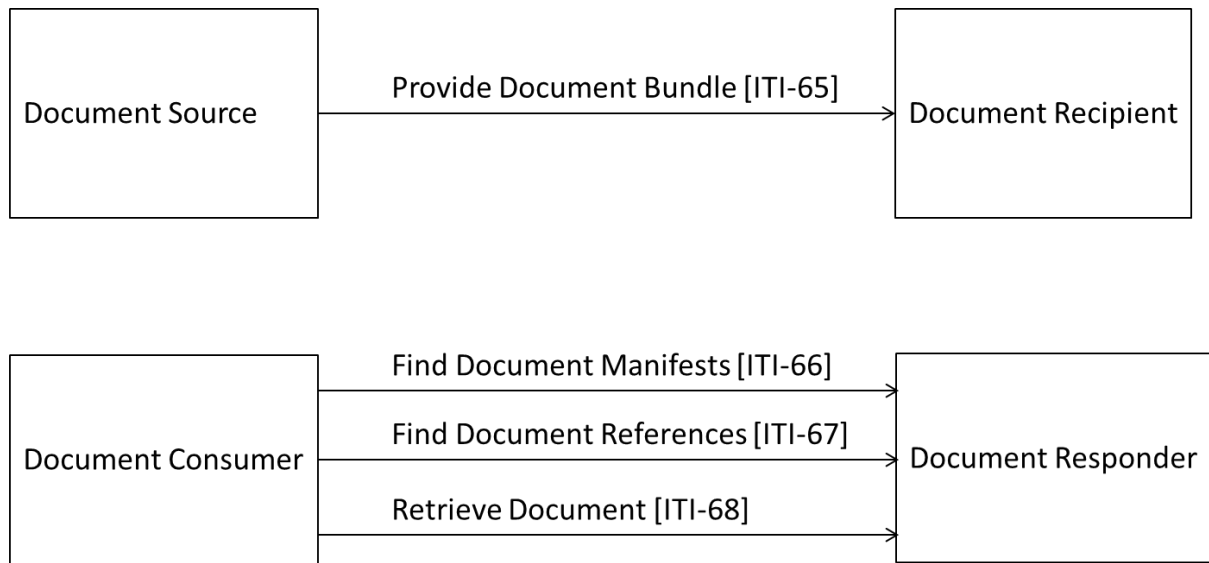
The Mobile access to Health Documents (MHD) Profile defines one pair of actors and a transaction used to submit or push new document entries from the mobile device to a receiving system. Another set of actors and transactions is used to query a list of document entries  
285 containing specific metadata,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

#### **290 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.



295

**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.

300

**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

305

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.

310 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 Actors are expected to be implemented in a service environment that does not have the constraints of a mobile device.

315 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.

320 In the IHE XDS Profile, the Document Registry and Document Repository Actors are independent to enable the widest possible deployment architectures. For finding and retrieving documents, the MHD Profile provides a single actor that provides the capability of the Registry and Repository functionality, called the MHD Document Responder. The goal is to ease configuration needs on the mobile health application and mobile health application deployment,  
 325 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.

### 330 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	<i>No options defined</i>	--

Actor	Options	Volume & Section
Document Recipient	<i>No options defined</i>	--
Document Consumer	<i>No options defined</i>	--
Document Responder	<i>No options defined</i>	--

335

### 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.

340 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		

345

### 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:

350

- 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.

355

- 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.
- 360 • 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  
365 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**

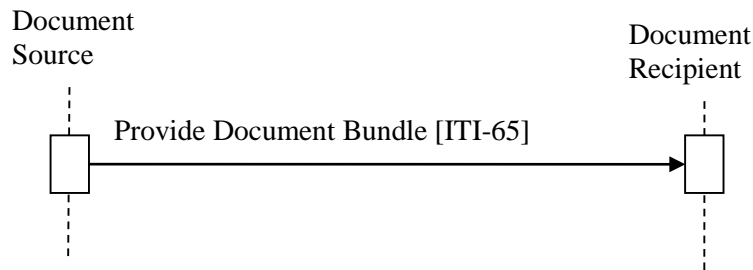
370 In this use case, a new document or set of documents is published from the mobile device. For example, a mobile device is a medical device that has acquired new health measurements, or a mobile device has a user-interface used to capture user input such as a Patient Consent. This device-created content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

375 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 the PDQm or PIXm Profiles. The patient id 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  
380 Recipient.

This use case 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**

385 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**

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### 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.

395

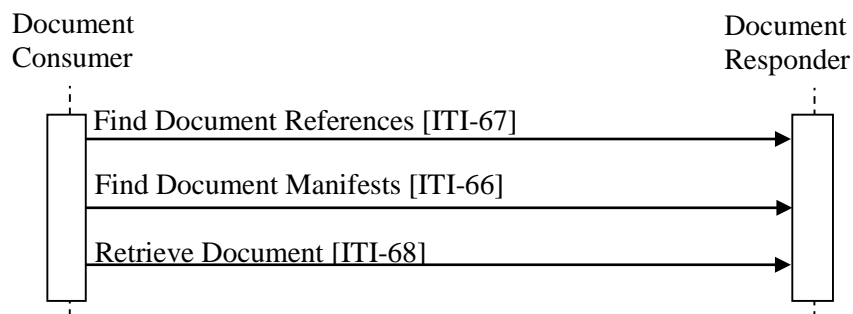
#### 33.4.3.2 Discovery and Retrieval of existing documents Process Flow

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.

400

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

405 The MHD Profile defines a set of transactions against FHIR 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

410 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

415 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 Organization responsible for the operational environment using MHD perform Risk Assessments in the design and deployment of the operational environment. See FHIR DSTU2 Security

420 <http://hl7.org/fhir/DSTU2/security.html>.

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

425 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.

430 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.



For example, the client (Document Source or Document Consumer) need only support http interactions using JSON encoding, while ATNA Audit Message transaction requires SYSLOG protocol and XML encoding. However, when grouped with XDS actors, the whole system must comply with the ATNA requirement mandated in XDS. For this reason, the use of ATNA Audit Logging is not mandated. This would mean that the Organization responsible for 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 (patient.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

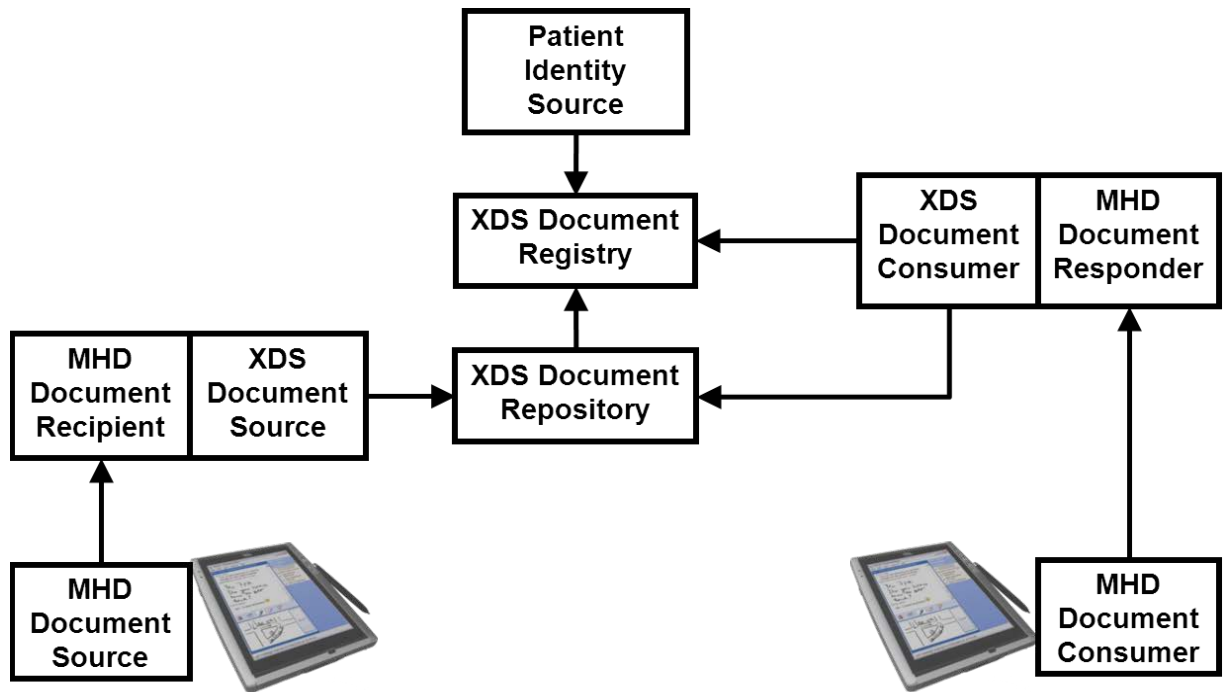
### 33.6.1 MHD Actor grouped with XDS infrastructure

When the MHD Document Recipient 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 Actor. 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 might be expected to fill in any necessary missing metadata 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 might be expected to fill in any necessary missing metadata information, convert any user authentication credentials, and implement fully the IHE ATNA Secure Node or Secure Application Actors.

Not diagrammed here is how PDQm and/or PIXm could similarly be used and implemented.

These two environments are illustrated in Figure 3.66.1-1.



465

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

### 33.6.2 MHD Actors grouped with XCA infrastructure

470 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 might be required to fill in any necessary missing metadata information, convert any user authentication credentials, and implement fully the ATNA Secure Node or Secure Application requirements.

475

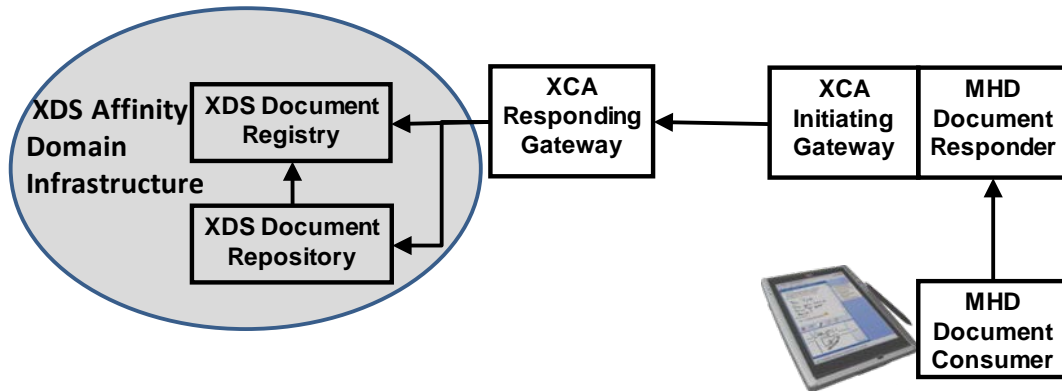


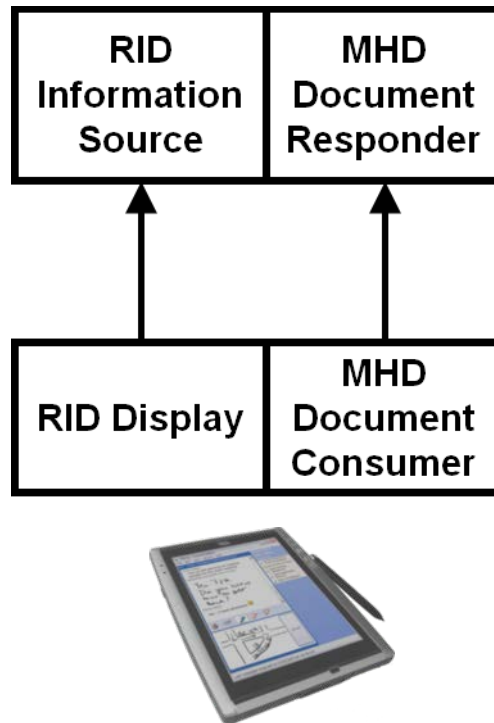
Figure 33.6.2-1: MHD Actors grouped with XCA

480

### 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 with a MHD Document Responder will provide both access to the metadata and document content, and also access to display-ready information.

485



490

**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:*

495 **Document Source** - The Document Source 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.~~

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

**Document Recipient:** ~~This~~ The Document Recipient 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.~~

505 **Document Responder** – The Document Responder sends documents and/or metadata in response to a request from another actor.

### Transaction Summary Definitions

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

510 **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.

515 **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*

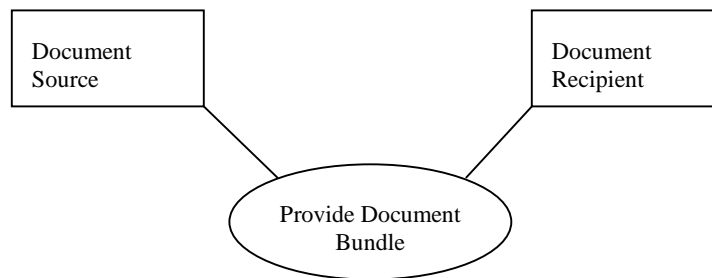
### 520 3.65 Provide Document Bundle

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.

### 525 3.65.2 Use Case Roles



**Actor:** Document Source

**Role:** Sends Document Entry and Document to the Document Recipient

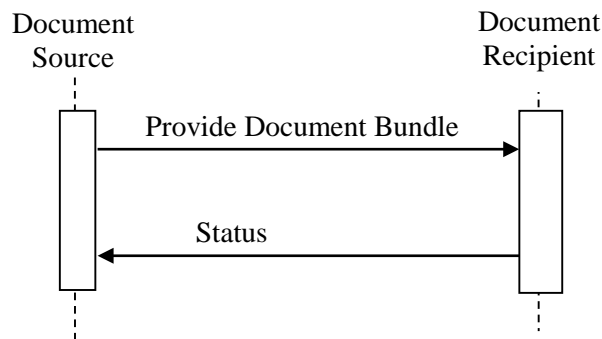
### 530 **Actor:** Document Recipient

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

### 3.65.3 Referenced Standard

HL7 FHIR	HL7® FHIR® standard DSTU2 (v1.0.2) <a href="http://hl7.org/fhir/DSTU2/index.html">http://hl7.org/fhir/DSTU2/index.html</a>
IETF RFC 2616	Hypertext Transfer Protocol – HTTP/1.1
IETF RFC 7540	Hypertext Transfer Protocol – HTTP/2
IETF RFC 3986	Uniform Resource Identifier (URI): Generic Syntax
IETF RFC 4627	The application/json Media Type for JavaScript Object Notation (JSON)
IETF RFC 6585	Additional HTTP Status Codes

### 3.65.4 Interaction Diagram



535

#### 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

540 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

545 The Document Source shall initiate a FHIR “transaction” using a “create” action by sending an HTTP POST request methods composed of a FHIR Bundle Resource containing the DocumentManifest resource, one or more DocumentReference Resources, zero or more List Resources, and zero or more Binary Resources to the Document Recipient. Refer to ITI TF-3: 5.4.1 for a detailed on the FHIR Resources and how Document Sharing metadata attributes are mapped.

This message will create the Resources contained in the FHIR Bundle Resource.

550 The media type of the HTTP body shall be either “application/json+fhir” or “application/xml+fhir”.

See <http://hl7.org/fhir/DSTU2/http.html#transaction> for complete requirements of a transaction. See <http://hl7.org/fhir/DSTU2/bundle-transaction.html> for example of a transaction bundle.

555 The Provide Document Bundle message is sent to the base URI as defined in FHIR. See <http://hl7.org/fhir/DSTU2/http.html> for the definition of “http” access methods and “base”.

#### 3.65.4.1.2.1 Bundle Resources

For complete information on constructing a FHIR Bundle Resource, see: <http://hl7.org/fhir/DSTU2/bundle.html>

560 The FHIR `Bundle.meta.profile` shall include the value “http://ihe.net/fhir/tag/iti-65”. All resources that are indicated as ‘contained’ in ITI TF-3: 5.4.1 shall be contained using the FHIR contained method (See <http://hl7.org/fhir/DSTU2/references.html#contained>).

The `DocumentReference.content.attachment.url` points at the document content, which shall be in the Bundle as a Binary Resource.

#### 3.65.4.1.2.2 Patient Identity

565 All of the `DocumentReference.subject`, and `DocumentManifest.subject` values shall be a Reference to a FHIR Patient resource (URL). This value may be to a Patient Resource in the Bundle, or one obtained through use of PDQm or PIXm, or by some other means.

When `sourcePatientInfo` is provided, the `DocumentReference.context.sourcePatientInfo` shall be a reference to a contained Patient Resource.

#### 570 3.65.4.1.2.3 Replace, Transform, Signs, and Append Associations

The `DocumentReference.relatesTo` element indicates an association between `DocumentReference` resources. The `relatesTo.target` element in the provided `DocumentReference` points at the pre-existing `DocumentReference` that is being replaced, transformed, signed, or appended. The `relatesTo.code` element in the provided

575 `DocumentReference` shall be the appropriate relationship type code defined in <http://hl7.org/fhir/DSTU2/valueset-document-relationship-type.html>.

#### 3.65.4.1.3 Expected Actions

The Document Recipient shall accept both media types `application/json+fhir` and `application/xml+fhir`.

580 On receipt of the submission, the Document Recipient shall validate the resources and respond with one of the HTTP codes defined in Section 3.65.4.2.2 Message Semantics.



The Document Recipient shall process the bundle atomically, analogous to the Provide and Register Document Set-b [ITI-41] transaction and FHIR “transaction” as specified in <http://hl7.org/fhir/DSTU2/http.html#transaction> .

585 The Document Recipient shall validate the bundle first against the FHIR specification. Guidance on what FHIR considers a valid Resource can be found at <http://hl7.org/fhir/DSTU2/validation.html>.

The Document Recipient shall also verify the FHIR resource elements for consistency with the Document Sharing metadata requirements as specified for attributes ITI TF-3: Table 4.3.1.1-3. If  
590 necessary for processing, the Document Recipient shall retrieve Resources referenced by absolute URLs in the FHIR Bundle Resource.

If the Document Recipient encounters any errors or if any validation fails, the Document Recipient shall return an error, as documented in Section 3.65.4.2.2. If appropriate, it shall use error codes from ITI TF-3: Table 4.2.4.1-2.

595 If the Provide Document Bundle Message contains a DocumentReference Resource with a `relatesTo` element and the Document Recipient does not support the `relatesTo.code` value, it shall return a warning message, as indicated in Table 3.65.4.1.3-1.

**Table 3.65.4.1.3-1**

<b>relatesTo.code</b>	<b>Warning</b>
replaces	PartialReplaceContentNotProcessed
transforms	PartialTransformContentNotProcessed
appends	PartialAppendContentNotProcessed

600

If the Provide Document Bundle Message contains a List Resource and the Document Recipient does not support Folders, it shall return a `PartialFolderContentNotProcessed` warning.

### **3.65.4.1.3.1 Grouping with an XDS Document Source Actor**

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

610 If the grouped XDS Document Source supports the Document Replacement Option and the Provide Document Bundle Message contains a DocumentReference with a `relatesTo` element that has code equal to "replaces", "transforms", or "appends" (defined in <http://hl7.org/fhir/DSTU2/valueset-document-relationship-type.html>), the XDS Document Source shall include a corresponding RPLC, XFRM, or APND (respectively) Association in the submission set for the Provide and Register Document Set-b [ITI-41] transaction.

615 If the grouped XDS Document Source supports the Folder Management Option, the Document Recipient shall map List Resources in the Bundle Resource to XDS Folders, as specified in ITI TF-3: Table 5.4.1.1-1.

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

### 3.65.4.2 Status Message

620 The Document Recipient returns a HTTP Status code appropriate to the processing, conforming to the transaction specification requirements as specified in <http://hl7.org/fhir/DSTU2/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.

#### 625 3.65.4.2.2 Message Semantics

When the Document Recipient has successfully processed the POST transaction, then the Document Recipient shall return an HTTP response with an overall status code.

630 In order to allow the Document Source to know the outcomes of processing the transaction, and the identities assigned to the resources by the Document Recipient, the Document Recipient SHALL return a Bundle, with type set to transaction-response, that contains one entry for each entry in the request, in the same order, with the outcome of processing the entry. See FHIR <http://hl7.org/fhir/DSTU2/bundle.html#transaction-response>

Each entry element SHALL contain a response element which details the outcome of processing the entry - the HTTP status code. All other elements are not required.

635 On success, the Document Recipient shall return the HTTP status code 200 – OK.

Guidance on handling Access Denied related to use of 403 and 404 can be found in ITI TF-2x: Appendix Z.7.

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

- 640 • 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.
- 422 Unprocessable Entity - one or more proposed resources violated applicable FHIR profiles or server business rules.

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

The Document Recipient may return HTTP redirect responses (responses with HTTP status codes 301, 302, 303 or 307) in response to a request.

#### **3.65.4.2.3 Expected Actions**

650 If the Document Recipient returns an HTTP redirect response (HTTP status codes 301, 302, 303, or 307), the Document Source shall follow that redirection, although it may stop processing if it detects a loop.

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

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

#### **3.65.4.3 Conformance Resource**

Document Recipient implementing this transaction should provide a Conformance Resource as described in ITI TF-2x: Appendix Z.3 indicating the operation has been implemented.

#### **3.65.5 Security Considerations**

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

##### **3.65.5.1 Security Audit Considerations**

665 The security audit criteria are similar to those for the Provide and Register Document Set-b [ITI-41] transaction 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.

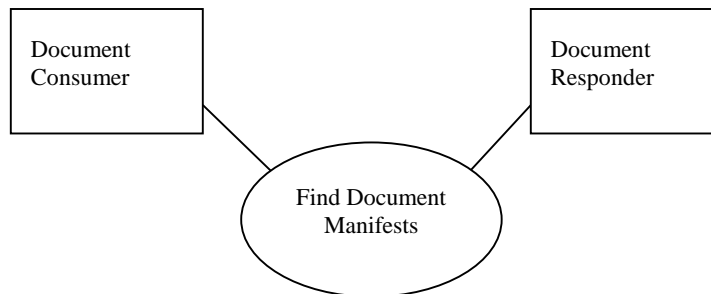
670 **3.66 Find Document Manifests**

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**

675 The Find Document Manifests transaction is used to find DocumentManifest Resources that satisfy a set of parameters. It is equivalent to the FindSubmissionSets query in the Registry Stored Query [ITI-18] transaction, as documented in ITI TF-2a: 3.18.4.1.2.3.7.1. The result of the query is a Bundle containing DocumentManifest Resources that match the query parameters.

**3.66.2 Actor Roles**



680 **Figure 3.66.2-1: Use Case Diagram**

**Actor:** Document Consumer

**Role:** Requests a list of DocumentManifest Resources, matching the supplied set of criteria, from the Document Responder.

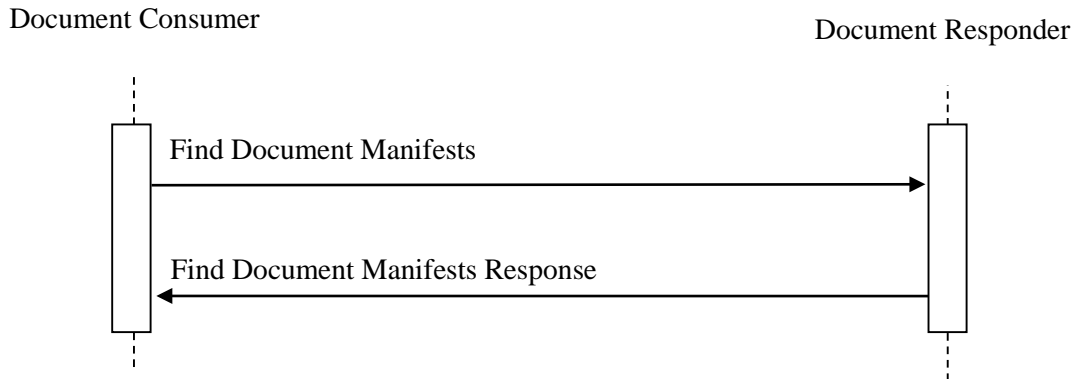
**Actor:** Document Responder

**Role:** Returns DocumentManifest Resources that match the search criteria provided by the Document Consumer.

**3.66.3 Referenced Standards**

HL7 FHIR	HL7® FHIR® standard DSTU2 (v1.0.2) <a href="http://hl7.org/fhir/DSTU2/index.html">http://hl7.org/fhir/DSTU2/index.html</a>
IETF RFC 2616	Hypertext Transfer Protocol – HTTP/1.1
IETF RFC 7540	Hypertext Transfer Protocol – HTTP/2
IETF RFC 3986	Uniform Resource Identifier (URI): Generic Syntax
IETF RFC 4627	The application/json Media Type for JavaScript Object Notation (JSON)
IETF RFC 6585	Additional HTTP Status Codes

### 3.66.4 Interaction Diagram



685

#### 3.66.4.1 Find Document Manifests message

This message uses the HTTP GET method parameterized query to obtain DocumentManifest Resources from the Document Responder.

##### 3.66.4.1.1 Trigger Events

690 When the Document Consumer needs to discover DocumentManifest Resources matching various metadata 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 DocumentManifest URL. The search target follows the FHIR http specification, addressing the DocumentManifest Resource <http://hl7.org/fhir/DSTU2/http.html>:

695

[base]/DocumentManifest?<query>

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

700

The <query> represents a series of encoded name-value pairs representing the filter for the query, as 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

705 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.

710 The Document Consumer shall include search parameter `patient` or `patient.identifier`; Parameters other than those profiled here may be supported by the Document Responder.

`patient`

This parameter is of type `Reference(Patient)`. The Document Consumer may get this reference through the use of the PDQm or PIXm Profiles, or by some other method.

`patient.identifier`

715 This parameter, of type `token`, specifies an identifier associated with the patient to which the DocumentManifest Resource is assigned. See ITI TF-2x: Appendix Z.2.2 for use of the `token` data type for identifiers.

`created`

720 This parameter, of type `date`, specifies the time when the DocumentManifest was created. See FHIR <http://hl7.org/fhir/DSTU2/search.html#date> for use of the `date` search type.

`author.given` and `author.family`

725 These parameters, of type `string`, specify the name parts of the author person which is associated with the DocumentManifest. See ITI TF-2x: Appendix Z.2.3 for use of the `string` data type.

`type`

This parameter, of type `token`, specifies the `type.coding` value supplied in the DocumentManifest resource. See ITI TF-2x: Appendix Z.2.2 for additional constraints on the use of the `token` search parameter type.

730 `status`

This parameter, of type `token`, specifies the status of the DocumentManifest. If included in the query, the Document Consumer shall populate the `code` portion of the token with one of the codes listed below. The system portion of the token shall not be populated.

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

735

### 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 support both.

740 See ITI TF-2x: Appendix Z.6 for details.

### 3.66.4.1.3 Expected Actions

The Document Responder shall process the query to discover the DocumentManifest entries that match the search parameters given.

#### 3.66.4.1.3.1 Document Responder grouped with an XDS Document Consumer

745 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.

750 **Table 3.66.4.1.3-1: FindSubmissionSets Query Parameter Mapping**

ITI-66 Parameter Name	ITI-18 Parameter Name
patient or patient.identifier	\$XDSSubmissionSetPatientId
(Not supported)	\$XDSSubmissionSetSourceId
created <sup>Note 1</sup>	\$XDSSubmissionSetSubmissionTimeFrom
created <sup>Note 2</sup>	\$XDSSubmissionSetSubmissionTimeTo
author.given/author.family	\$XDSSubmissionSetAuthorPerson
type	\$XDSSubmissionSetContentType
status	\$XDSSubmissionSetStatus

Note 1 This FindSubmissionSets parameter is used when the greater than parameter modifier is used on the created parameter.

Note 2 This FindSubmissionSets parameter is used when the less than parameter modifier is used on the created parameter.

755 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 through Section 3.66.4.1.3.1.2

#### 3.66.4.1.3.1.1 Translation of Token Parameter

Query parameters of type token are used to represent codes and identifiers. See <https://www.hl7.org/fhir/search.html#token>.

760 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>('code^^system')</Value>`

- 765
- 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>code^^^&system&ISO</Value>`

- If the token parameter translates to a simple string, then the code shall be used for the parameter and the system shall be ignored.

770 **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:

775

```
<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.

780 **3.66.4.2.1 Trigger Events**

The Document Responder completed processing of the Find Document Manifests message.

**3.66.4.2.2 Message Semantics**

Based on the query results, the Document Responder will either return an error or success.

785 Guidance on handling Access Denied related to use of 200, 403 and 404 can be found in ITI TF-2x: Appendix Z.7.

When the Document Responder needs to report an error, it shall use HTTP error response codes and should include a FHIR OperationOutcome with more details on the failure. See FHIR <http://hl7.org/fhir/DSTU2/http.html> and <http://hl7.org/fhir/DSTU2/operationoutcome.html>

790 If the Find Document Manifests message is processed successfully, whether or not any DocumentManifest Resources are found, the HTTP status code shall be 200. The Find Document Manifests Response message shall be a Bundle Resource containing zero or more DocumentManifest Resources. If the Document Responder is sending warnings, the Bundle Resource shall also contain an OperationOutcome Resource that contains those warnings.

The response shall adhere to the FHIR Bundle constraints specified in ITI TF-2x: Appendix Z.1.

795 **3.66.4.2.2.1 DocumentManifest Resource Contents**

The DocumentManifest Resource is defined in the FHIR specification <http://hl7.org/fhir/DSTU2/documentmanifest.html>

See ITI TF-3: 5.4.1.2 for IHE restrictions on the DocumentManifest Resource and for a mapping of ebXML attributes to DocumentManifest elements.



800 **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 Resources that match the query parameters but are not compliant with this transaction on DocumentManifest.

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

**3.66.4.3 Conformance Resource**

810 Document Responders implementing this transaction should provide a Conformance Resource as described in ITI TF-2x: Appendix Z.3 indicating the query operation for the DocumentManifest Resource has been implemented and shall include all query parameters implemented for the DocumentManifest Resource.

**3.66.5 Security Considerations**

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

**3.66.5.1 Security Audit Considerations**

815 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  
820 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

825 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

830 The Find Document References transaction is used to find DocumentReference Resources that satisfy a set of parameters. It is equivalent to the FindDocuments and FindDocumentsByReferenceId queries from the Registry Stored Query [ITI-18] transaction. The result of the query is a FHIR Bundle containing DocumentReference Resources that match the query parameters.

#### 3.67.2 Actor Roles

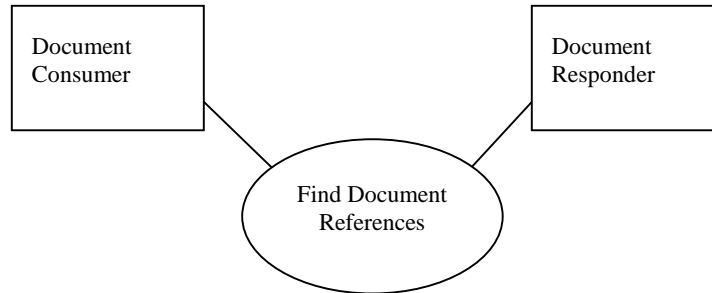


Figure 3.67.2-1: Use Case Diagram

835

**Actor:** Document Consumer

**Role:** Requests a list of DocumentReference Resources, matching the supplied set of criteria, from the Document Responder.

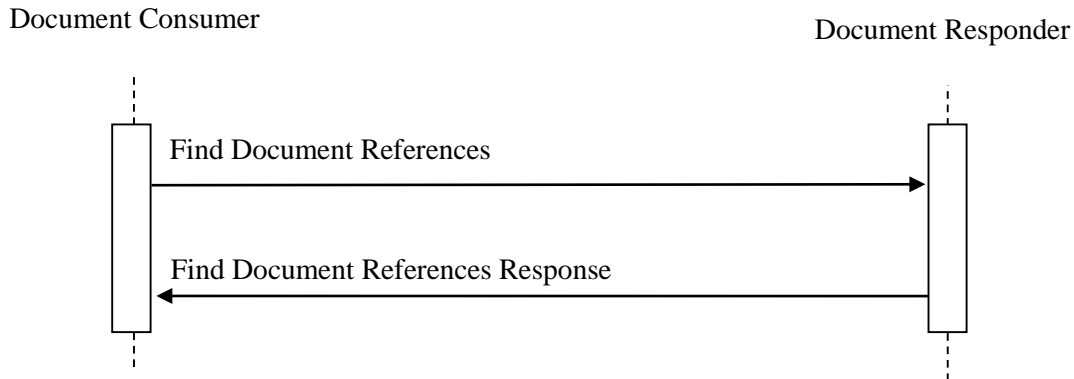
**Actor:** Document Responder

**Role:** Returns DocumentReference Resources that match the search criteria provided by the Document Consumer.

#### 3.67.3 Referenced Standards

HL7 FHIR	HL7® FHIR® standard DSTU2 (v1.0.2) <a href="http://hl7.org/fhir/DSTU2/index.html">http://hl7.org/fhir/DSTU2/index.html</a>
IETF RFC 2616	Hypertext Transfer Protocol – HTTP/1.1
IETF RFC 7540	Hypertext Transfer Protocol – HTTP/2
IETF RFC 3986	Uniform Resource Identifier (URI): Generic Syntax
IETF RFC 4627	The application/json Media Type for JavaScript Object Notation (JSON)
IETF RFC 6585	Additional HTTP Status Codes

### 3.67.4 Interaction Diagram



#### 840 3.67.4.1 Find Document References message

This message uses the HTTP GET method parameterized query to obtain DocumentReference Resources from the Document Responder.

##### 3.67.4.1.1 Trigger Events

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

##### 3.67.4.1.2 Message Semantics

The Document Consumer executes an HTTP GET against the Document Responder's DocumentReference URL. The search target follows the FHIR http specification, addressing the DocumentReference Resource <http://hl7.org/fhir/DSTU2/http.html>:

850 [base]/DocumentReference?<query>

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

- 855 • The <query> represents a series of encoded name-value pairs representing the filter for the query, as 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

860 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.

The Document Consumer shall include search parameter `patient` or `patient.identifier`; Parameters other than those profiled here may be supported by the Document Responder.

865 `patient`

This parameter is of type `Reference(Patient)`. The Document Consumer get this reference through the use of the PDQm or PIXm Profile.

`patient.identifier`

870 This parameter, of type `token`, specifies an identifier associated with the patient to which the `DocumentReference` Resource is assigned. Please see ITI TF-2x: Appendix Z.2.2 for additional constraints on the use of the `token` search parameter type.

`indexed`

875 This parameter, of type `date`, specifies the time when the `DocumentReference` was created. See FHIR <http://hl7.org/fhir/DSTU2/search.html#date> for use of the `date` search type.

`author.given` and `author.family`

These parameters, of type `string`, specify the name parts of the author person which is associated with the `DocumentReference`. See ITI TF-2x: Appendix Z.2.3 for use of the `string` data type.

880 `status`

This parameter, of type `token`, specifies the status of the `DocumentReference`, or in Document Sharing 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.

885

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

`class`

890 This parameter, of type `token`, specifies the general classification of the `DocumentReference` resource, or in Document Sharing nomenclature, the class code of the Document Entry. See ITI TF-2x: Appendix Z.2.2 for additional constraints on the use of the `token` search parameter type.

`type`

This parameter, of type `token`, specifies the specific type of the `DocumentReference` resource or in Document Sharing nomenclature, the type code of the Document Entry.

- 895 See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the `token` search parameter type.
- `setting`
- 900 This parameter, of type `token`, specifies the specific practice setting of the `DocumentReference` resource or in Document Sharing nomenclature, the `PracticeSettingCode` of the Document Entry. See ITI TF-2x: Appendix Z.2 for additional constraints on the use of the `token` search parameter type.
- `period`
- 905 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 Document Sharing nomenclature, this query parameter represents `from/to` parameters for the `serviceStartTime` and `serviceStopTime` of the Document Entry.
- `facility`
- 910 This parameter, of type `token`, specifies the kind of facility found in `DocumentReference resource.context.facilityType`; or in Document Sharing nomenclature, the healthcare facility type of the Document Entry. See ITI TF-2x: Appendix Z.2.2 for additional constraints on the use of the `token` search parameter type.
- `event`
- 915 This parameter, of type `token`, specifies the main clinical acts documented by the `DocumentReference` resource or in Document Sharing nomenclature, the event code list of the Document Entry. See ITI TF-2x: Appendix Z.2.2 for additional constraints on the use of the `token` search parameter type.
- `securityLabel`
- 920 This parameter, of type `token`, specifies the security labels of the document referenced by `DocumentReference` resource or in IHE Document Sharing nomenclature, the `confidentialityCode` of the Document Entry. See ITI TF-2x: Appendix Z.2.2 for additional constraints on the use of the `token` search parameter type.
- `format`
- 925 This parameter, of type `token`, specifies the format of the `DocumentReference` resource or in Document Sharing nomenclature, the format code of the Document Entry. See ITI TF-2x: Appendix Z.2.2 for additional constraints on the use of the `token` search parameter type.
- `related-id`
- 930 This parameter, of type `token`, represents other identifiers associated with the `DocumentReference` resource. In IHE Document Sharing nomenclature, this query parameter represents the `referenceIdList`. See ITI TF-2x: Appendix Z.2.2 for additional constraints on the use of the `token` search parameter type.

### 3.67.4.1.2.2 Populating Expected Response Format

935 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.

See ITI TF-2x: Appendix Z.6 for details.

### 3.67.4.1.3 Expected Actions

940 The Document Responder shall process the query to discover the DocumentReference entries that match the search parameters given.

#### 3.67.4.1.3.1 Document Responder grouped with a XDS Document Consumer

945 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 or FindDocumentsByReferenceIdList. All of the query parameters in Table 3.67.4.1.3-1 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
patient or patient.identifier	\$XDSDocumentEntryPatientId	R
indexed <sup>Note 1</sup>	\$XDSDocumentEntryCreationTimeFrom	O
indexed <sup>Note 2</sup>	\$XDSDocumentEntryCreationTimeTo	O
author.given / author.family	\$XDSDocumentEntryAuthorPerson	O
status	\$XDSDocumentEntryStatus	O
(Not supported) <sup>Note 3</sup>	\$XDSDocumentEntryType	N/A
class	\$XDSDocumentEntryClassCode	O
type	\$XDSDocumentEntryTypeCode	O
setting	\$XDSDocumentEntryPracticeSettingCode	O
period <sup>Note 1</sup>	\$XDSDocumentEntryServiceStartTimeFrom	O
period <sup>Note 2</sup>	\$XDSDocumentEntryServiceStartTimeTo	O
period <sup>Note 1</sup>	\$XDSDocumentEntryServiceStopTimeFrom	O
period <sup>Note 2</sup>	\$XDSDocumentEntryServiceStopTimeTo	O
facility	\$XDSDocumentEntryHealthcareFacilityTypeCode	O
event	\$XDSDocumentEntryEventCodeList	O
securitylabel	\$XDSDocumentEntryConfidentialityCode	O

ITI-67 Parameter Name	ITI-18 Parameter Name	Optionality
format	\$XDSDocumentEntryFormatCode	O
related-id	\$XDSDocumentEntryReferenceIdList	O

- 950 Note 1: This FindDocuments parameter is used when the greater than parameter modifier is used on the indexed parameter.  
 Note 2: This FindDocuments parameter is used when the less than parameter modifier is used on the indexed parameter.  
 Note 3: The \$XDSDocumentEntryType is not a supported query parameter in HL7 FHIR.

955 A translation of these query parameters from FHIR query parameter format to the IHE Document Sharing metadata format is provided in Section 3.66.4.1.3.1.1 through Section 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

- 960 The Document Responder completed processing of the Find Document Reference message.

#### 3.67.4.2.2 Message Semantics

Based on the query results, the Document Responder will either return an error or success. Guidance on handling Access Denied related to use of 200, 403 and 404 can be found in ITI TF-2x: Appendix Z.7 (reproduced here for readability).

- 965 When the Document Responder needs to report an error, it shall use HTTP error response codes and should include a FHIR OperationOutcome with more details on the failure. See FHIR <http://hl7.org/fhir/DSTU2/http.html> and <http://hl7.org/fhir/DSTU2/operationoutcome.html>

- 970 If the Find Document References message is processed successfully, whether or not any DocumentReference Resources are found, the HTTP status code shall be 200. The Find Document References Response message shall be a Bundle Resource containing zero or more DocumentReference Resources. If the Document Responder is sending warnings, the Bundle Resource shall also contain an OperationOutcome Resource that contains those warnings.

The response shall adhere to the FHIR Bundle constraints specified in ITI TF-2x: Appendix Z.1.

#### 3.67.4.2.2.1 DocumentReference Resource Contents

- 975 The DocumentReference Resource is defined in the FHIR specification <http://hl7.org/fhir/DSTU2/documentreference.html>

See ITI TF-3: 5.4.1.1 for the IHE restrictions on DocumentReference Resource and for a mapping from IHE Document Sharing Profiles (e.g., XDS) to FHIR.

### **3.67.4.2.2.3 Resource Bundling**

980 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.

#### **3.67.4.2.2.3.1 Document location**

985 The Document Responder shall place into the `DocumentReference.content.attachment.url` element a URI that can be used by the Document Consumer to retrieve the document using the Retrieve Document [ITI-68] transaction. IHE does not specify the format of the URL.

Note to implementer: The Document Responder might encode into the URL all the necessary parameters the Document Consumer would need to perform a Retrieve Document Set [ITI-43] transaction. The Document Responder might maintain a cache of parameters and encode the URL with simply unique identifiers. The 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, the document content can be returned to the Document Consumer.

990

### **3.67.4.2.3 Expected Actions**

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

1000 If a Document Consumer cannot automatically recover from an error condition, it should, at a minimum, display the error to the user.

### **3.67.4.3 Conformance Resource**

1005 Document Responders implementing this transaction should provide a Conformance Resource as described in ITI TF-2x: Appendix Z.3 indicating the query operation for the DocumentReferences Resource has been implemented and shall include all query parameters implemented for the DocumentReference Resource.

### **3.67.5 Security Considerations**

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

#### **3.67.5.1 Security Audit Considerations**

1010 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



1015 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.

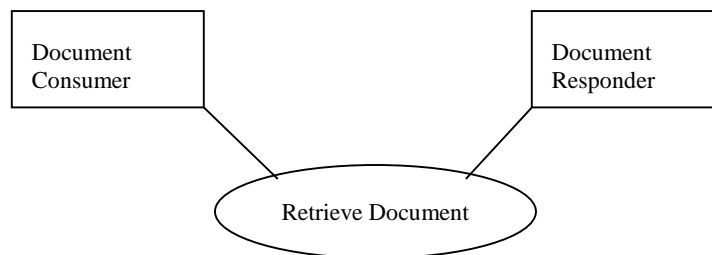
### 3.68 Retrieve Document

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.

1020 **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**



1025

**Actor:** Document Consumer

**Role:** Requests a document from the Document Responder

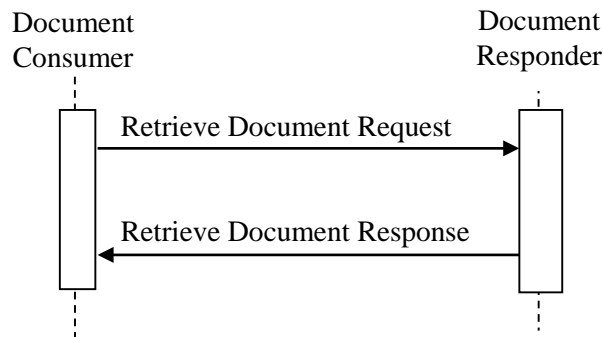
**Actor:** Document Responder

**Role:** Serves the document to the Document Consumer

1030 **3.68.3 Referenced Standard**

HL7 FHIR	HL7® FHIR® standard DSTU2 (v1.0.2) <a href="http://hl7.org/fhir/DSTU2/index.html">http://hl7.org/fhir/DSTU2/index.html</a>
IETF RFC 2616	Hypertext Transfer Protocol – HTTP/1.1
IETF RFC 7540	Hypertext Transfer Protocol – HTTP/2
IETF RFC 3986	Uniform Resource Identifier (URI): Generic Syntax
IETF RFC 6585	Additional HTTP Status Codes

### 3.68.4 Interaction Diagram



#### 3.68.4.1 Retrieve Document Request Message

1035 This message is an HTTP GET request to retrieve the document.

##### 3.68.4.1.1 Trigger Events

The Document Consumer wants to obtain a document.

##### 3.68.4.1.2 Message Semantics

1040 The Document Consumer sends a HTTP GET request to the server. The Document Consumer request may be to retrieve the document content referenced by a `DocumentReference.content.attachment.url`.

The Document Consumer may provide 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 `DocumentReference.content.attachment.contentType`.

1045 The 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 Retrieve Document Response Message

1050 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

1055 This message shall be an HTTP Response, as specified by RFC 2616. When the requested document is returned, the Document Responder shall respond with HTTP Status Code 200. The HTTP message-body shall be the content of the requested document.

Table 3.68.4.2.2-1 contains error situations and the HTTP Response.

1060 **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

The Document Responder may return other HTTP Status Codes. Guidance on handling Access Denied related to use of 200, 403 and 404 can be found in ITI TF-2x: Appendix Z.7.

1065 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 HTTP Status Codes 301, 302, 303 or 307) in response to a request.

### 3.68.4.2.3 Expected Actions

1070 Document Consumer must follow redirects, but if a loop is detected, it may report an error. The Document Consumer is expected to continue its workflow upon receiving the document. 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

1075 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 [ITI-43] transaction as this transaction does retrieve the content of a document. Grouping the Document

1080 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.

1085

## Volume 3 – Content Modules

Add Section 5.4

### 5.4 FHIR Representation

1090

This section contains the mapping between IHE Document Sharing Metadata and the FHIR Resources.

#### 5.4.1 Metadata Object Types mapped to FHIR

For details on FHIR resources and data-types see HL7 FHIR <http://hl7.org/fhir/DSTU2/>.

1095

There are some Document Sharing Metadata attributes that must be treated as ‘contained’ FHIR Resources. These are indicated using “Note 1”, and also use of the word ‘contained’ in the Notes column of Table 5.4.1.1-1. The details of the FHIR ‘contained’ mechanism is found at <http://hl7.org/fhir/DSTU2/references.html#contained>.

##### 5.4.1.1 DocumentEntry Metadata Attributes

Table 5.4.1.1-1 provides a mapping of DocumentEntry attributes to FHIR Resource elements. The full DocumentEntry metadata attribute definition is in Section 4.2.3.2.

1100

Note: FHIR contains a similar mapping that is intended to be the same as Table 5.4.1.1-1. The FHIR mapping can be found at <http://hl7.org/fhir/DSTU2/documentreference-mappings.html#xds>.

**Table 5.4.1.1-1: FHIR DocumentReference mapping to DocumentEntry**

FHIR DocumentReference	IHE constraint	Document Sharing Metadata	Notes
masterIdentifier Identifier [0..1]	[1..1]	uniqueId	
identifier Identifier [0..*]		entryUUID	When the DocumentReference.identifier carries the entryUUID then the DocumentReference.identifier.use shall be ‘official’
subject Resource(Patient  Practitioner  Group  Device) [0..1]	Reference(Patient) [1..1]	patientId	URL Points to an existing Patient Resource representing the XDS Affinity Domain Patient

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FHIR DocumentReference	IHE constraint	Document Sharing Metadata	Notes
type CodeableConcept [1..1]		typeCode	
class CodeableConcept [0..1]		classCode	
author Reference(Practitioner Organization Device Patient RelatedPerson) [0..*]	Reference(Practitioner) [1..*] <sup>Note 1</sup>	authorPerson, authorInstitution, authorDevice	Contained resource of type Practitioner with: <ul style="list-style-type: none"> <li>authorInstitution: Practitioner.organization</li> <li>authorPerson: Practitioner.identifier and Practitioner.name</li> <li>authorRole: Practitioner.role</li> <li>authorSpecialty: Practitioner.specialty</li> <li>authorTelecommunication: Practitioner.telecom</li> </ul>
custodian Reference(Organization) [0..1]	[0..0]		Not Used <sup>Note 3</sup>
authenticator Reference(Practitioner Organization) [0..1]		legalAuthenticator	
created dateTime [0..1]	[0..0]		
indexed instant [1..1]		creationTime	
status code {DocumentReferenceStatus} [1..1]		availabilityStatus	Approved → status=current Deprecated → status=superseded
docStatus CodeableConcept [0..1]	[0..0]		Not Used <sup>Note 3</sup>
relatesTo [0..*]		Relationship Association	See ITI TF-2c: 3.65.4.1.2.3
relatesTo.code code [1..1]		Relationship type	
relatesTo.target Reference(DocumentReference) [1..1]		relationship reference	
description string [0..1]		title	

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FHIR DocumentReference	IHE constraint	Document Sharing Metadata	Notes
securityLabel CodeableConcept [0..*]		confidentialityCode	Note: This is NOT the DocumentReference.me ta, as that holds the meta tags for the DocumentReference itself.
content [1..*]			
content.attachment			
content.attachment.contentType code [0..1]	[1..1]	mimeType	
content.attachment.language code [0..1]		language	
content.attachment.data base64Binary [0..1]	[0..0]		Not Used <sup>Note 3</sup>
content.attachment.url uri [0..1]	[1..1]	retrievable location of the document	
content.attachment.size integer [0..1]	[1..1]	size	
content.attachment.hash string [0..1]	[1..1]	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.
content.attachment.title string [0..1]		comment	
content.attachment.creation dateTime [0..1]			Not Used <sup>Note 3</sup>
content.format Coding [0..*]	[1..1]	formatCode	
context [0..1]			
context.encounter		referenceIdList	When referenceIdList contains an encounter, and a FHIR Encounter is available, it may be referenced.
context.event CodeableConcept [0..*]		eventCodeList	
context.period Period [0..1]		serviceStartTime serviceStopTime	
context.facilityType CodeableConcept [0..1]		healthcareFacilityT ypeCode	



FHIR DocumentReference	IHE constraint	Document Sharing Metadata	Notes
context.practiceSetting CodeableConcept [0..1]		practiceSettingCode	
context.sourcePatientInfo Reference(Patient) [0..1]	Note 1	sourcePatientId and sourcePatientInfo	Contained Patient resource with Patient.identifier.use element set to 'usual'
context.related [0..*]			
context.related.identifier Identifier [0..1]		referenceIdList	
context.related.identifier.ref Reference(Any) [0..1]			May be filled with URL pointers to Resources found in referenceIdList
		homeCommunityId	Not Applicable <sup>Note 2</sup>
		limitedMetadata	Not Applicable <sup>Note 2</sup>
		objectType	Not Applicable <sup>Note 2</sup>
		repositoryUniqueId	Not Applicable <sup>Note 2</sup>

1105

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

Note 2: Not Applicable - The Document Sharing metadata element has no equivalent element in the HL7 FHIR DSTU2. Therefore Document Source is not able to set these elements, and Document Consumers will not have access to these elements.

1110

Note 3: These HL7 FHIR DSTU2 elements are not used in XDS, therefore would not be present. Document Consumers should be robust to these elements holding values.

### 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.

1115

Note FHIR contains a similar mapping that is intended to be the same as the MHD Profile. Found at <http://hl7.org/fhir/DSTU2/documentmanifest-mappings.html#xds>

**Table 5.4.1.2-1: FHIR DocumentManifest mapping to SubmissionSet**

Resource Definition	IHE constraint	Document Sharing metadata	Notes
<b>DocumentManifest</b>		Submission Set	
text Narrative [0..1]		text	String only, no markup allowed

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Resource Definition	IHE constraint	Document Sharing metadata	Notes
masterIdentifier Identifier [0..1]		uniqueId	
identifier Identifier [1..*]		entryUUID	
subject Reference(Patient  Practitioner  Group  Device) [0..1]	Reference(Patient) [1..1]	patientId,	URL Points to an existing Patient resource representing Affinity Domain Patient
recipient Reference(Patient  Practitioner  RelatedPerson  Organization) [0..*]		intendedRecipient	
type CodeableConcept [0..1]		contentTypeCode	
author Reference(Practitioner  Device Patient RelatedPerson ) [0..*]	Note 1	author	Contained author resource of type Practitioner with: <ul style="list-style-type: none"> <li>authorInstitution: Practitioner.organization</li> <li>authorPerson: Practitioner.identifier and Practitioner.name</li> <li>authorRole: Practitioner.role</li> <li>authorSpecialty: Practitioner.specialty</li> <li>authorTelecommunication: Practitioner.telecom</li> </ul>
created dateTime [0..1]		submissionTime	
source uri [0..1]		sourceId	
status code {DocumentReferenceStatus} [1..1]		availabilityStatus	
description string [0..1]		title	
content [1..*]		List of references to DocumentEntries	
content.pAttachment	[0..0]		Not Used <sup>Note 3</sup>
content.pReference Reference(Any) [1..1]	Reference(DocumentReference)	List of references to DocumentEntries	

Resource Definition	IHE constraint	Document Sharing metadata	Notes
related [0..*]	[0..0]		Not Used <sup>Note 3</sup>
related.identifier Identifier [0..1]	[0..0]		Not Used <sup>Note 3</sup>
related.ref Reference(Any) [0..1]	[0..0]		Not Used <sup>Note 3</sup>
		homeCommunityId	Not Applicable <sup>Note 2</sup>
		limitedMetadata	Not Applicable <sup>Note 2</sup>

1120 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.

Note 2: Not Applicable - The Document Sharing metadata element has no equivalent element in the HL7 FHIR DSTU2. Therefore Document Source is not able to set these elements, and Document Consumers will not have access to these elements.

1125 Note 3: These HL7 FHIR DSTU2 elements are not used in XDS, therefore would not be present. Document Consumers should be robust to these elements holding values.

### 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.

1130

Note that FHIR List Resource does not include a Mapping to XDS.

**Table 5.4.1.3-1: FHIR List mapping to Folder metadata**

FHIR List Resource Definition	IHE constraint	Document Sharing Metadata (e.g., XDS)	Notes
<b>List</b>		Folder	
identifier Identifier [0..*]	[1..1]	uniqueId, entryUUID	When the List.identifier carries the entryUUID then the List.identifier.use shall be 'official'; and the uniqueId then the List.identifier.use shall be 'usual'.
title String [0..1]		title	
code CodeableConcept [0..1]		codeList	code.coding is [0..*] so may contain many.

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FHIR List Resource Definition	IHE constraint	Document Sharing Metadata (e.g., XDS)	Notes
subject Reference(Patient  Group  Device  Location) [0..1]	Reference(Patient) [1..1]	patientId,	URL Points to an existing Patient resource representing Affinity Domain Patient
source Reference(Practitioner  Patient  Device) [0..1]	[0..0]		Not Used <sup>Note 3</sup>
encounter Reference(Encounter) [0..1]	[0..0]		Not Used <sup>Note 3</sup>
status code [1..1]		availabilityStatus	
date dateTime [0..1]		lastUpdateTime	
orderedBy CodeableConcept [0..1]	[0..0]		Not Used <sup>Note 3</sup>
mode code [1..1]	shall be 'working'		
note string [0..1]		comments	
entry [0..*]			
entry.flag CodeableConcept [0..1]	[0..0]		Not Used <sup>Note 3</sup>
entry.deleted Boolean [0..1]	[0..0]		Not Used <sup>Note 3</sup>
entry.date dateTime [0..1]	[0..0]		Not Used <sup>Note 3</sup>
entry.item Reference(Any) [1..1]		pointer to DocumentReferences	
emptyReason CodeableConcept [0..1]	[0..0]		Not Used <sup>Note 3</sup>
		homeCommunityId	Not Applicable <sup>Note 2</sup>

1135

Note 1: Indicates that the data within the XDS Folder metadata be represented as a contained resource. See Section 5.4.4.4.7.

Note 2: Not Applicable - The Document Sharing metadata element has no equivalent element in the HL7 FHIR DSTU2. Therefore Document Source is not able to set these elements, and Document Consumers will not have access to these elements.

1140

Note 3: These HL7 FHIR DSTU2 elements are not used in XDS, therefore would not be present. Document Consumers should be robust to these elements holding values.