Life Image Network Integration Whitepaper

June 01, 2018

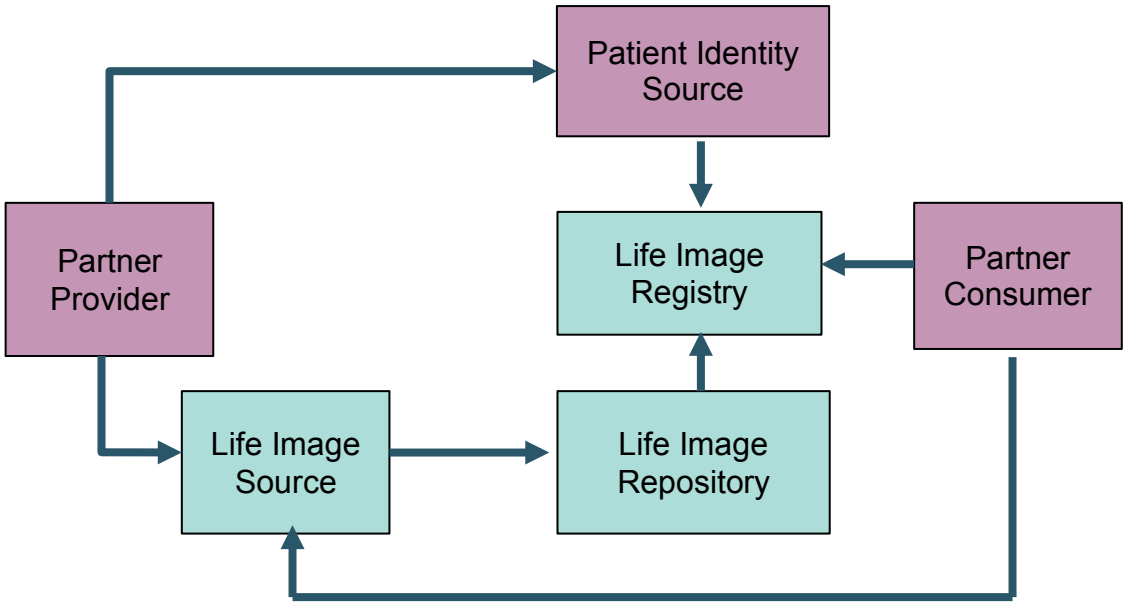
Overview

Life Image has embraced a number of standards-based approaches for interoperability giving integration partners a pallet of options based on their specific application needs. This document defines the core Life Image service offerings and details their supported integration standards, profiles and options.

Intended Audience

This document is intended for Life Image Partners seeking to integrate either as a provider of patient health information, a consumer or both. The content is intended for a technical audience familiar with healthcare interoperability scenarios and standards and, ideally, is aware of the role that Integrating the Healthcare Enterprise (IHE) plays in coordinating interoperability efforts.

Life Image Network Core Services



Partner Provider and Consumer - Services and Transactions

Core Service Offerings

1. Life Image Registry: The Registry, hosting all patient identities and document metadata as well as supporting the capacity for ad-hoc queries, represents the primary focus of patient information discovery workflows initiated by the Consumer. Patient identities are fed to the Registry directly from the Partner Provider while document metadata is registered by the Repository when processing provided documents.

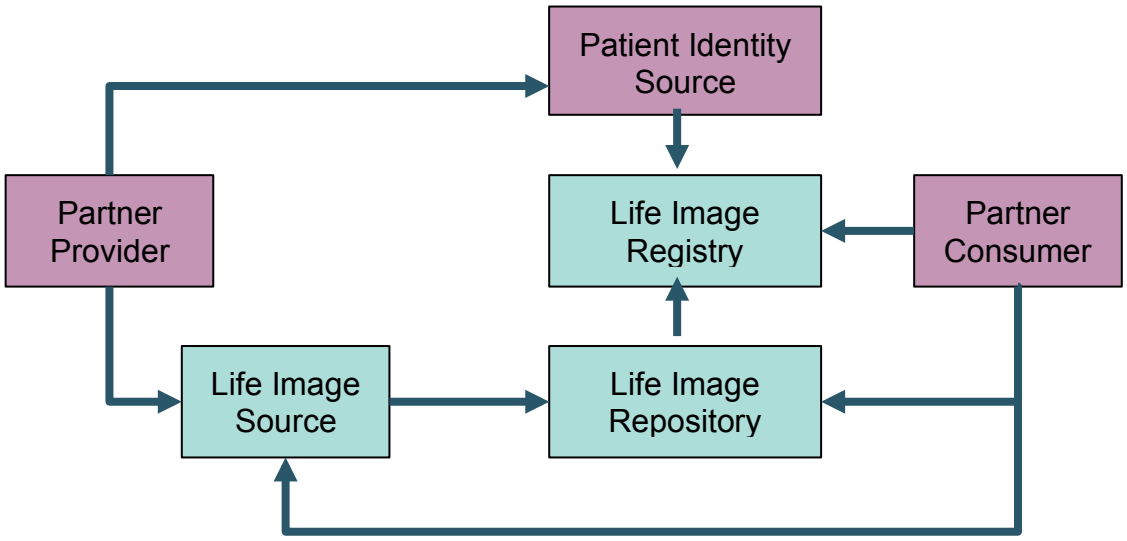
2. Life Image Repository: The Repository, hosting all patient clinical document content including HL7® Clinical Document Architecture (CDA®) documents and DICOM® imaging KOS manifests, represents the primary focus of patient document content retrieval workflows initiated by the Consumer. All patient documents are provided to the Repository by the Source on behalf of the Partner Provider.

3. Life Image Source: The Source, hosting all patient DICOM imaging study content, represents the primary focus of patient image content retrieval workflows initiated by the Consumer. All patient imaging studies are provided to the Source by the Partner Provider.

Core Integration Profiles and Standards

1. XDS.b/XDS-I.b: Cross-Enterprise Document Sharing for Imaging (XDS-I.b) is an interoperability profile coordinated by the Integrating the Health Enterprise (IHE) for the purpose of facilitating the registration, distribution and access to patient documents and image studies across health enterprises.
2. FHIR®: Fast Healthcare Interoperability Resources is an interoperability standard created by Health Level Seven International (HL7) for the purpose of providing a simple, consistent, and rigorous mechanism for exchanging data between healthcare applications.
3. MHD: Mobile Access to Health Documents is an interoperability profile coordinated by the IHE for the purpose of facilitating query and retrieval of patient documents through a lightweight FHIR-based REST API.
4. WIA: Web-based Image Access is an interoperability profile coordinated by the IHE for the purpose of facilitating image sharing and interactive viewing of imaging studies through a lightweight REST API.

Life Image Network from an XDS-I.b Perspective



Partner XDS-I.b Provider and Consumer - Services and Transactions with Technical Designations

The primary means of integration with the Life Image Network is through its support for the IHE Cross-Enterprise Document Sharing for Imaging profile (XDS-I.b). With SOAP-based XDS-I.b, partners can provide, query and retrieve submissions of patient identities and documents (both CDA diagnostic reports and DICOM imaging studies).

Core XDS-I.b (SOAP) Integration Points

ITI-8: Patient Identity Feed

The ITI-8 transaction is used by the Partner Provider to provide patient identity information to the Life Image Network.

Technical Details	
Protocol	MLLP
Format	HL7v2 ADT 01, 04, 05 and 08
IHE Standard	ITI TF-2a Section 3.8

ITI-18: Registry Stored Query

The ITI-18 transaction is used by the Partner Consumer to query the Life Image Registry for all metadata associated to a specified patient-id. After the Consumer has established the identity of the patient in question, this transaction typically initiates the patient document discovery workflow.

Technical Details	
Protocol	HTTP/SOAP MTOM/XOP
Format	ebXML RIM and RS
IHE Standard	ITI TF-2a Section 3.18

ITI-41: Provide And Register Document-Set

The ITI-41 transaction is used by the Partner Provider to provide submissions of patient documents (both CDA clinical diagnostic reports and DICOM imaging studies) to the Life Image Network through the Recipient endpoint of the Life Image Source.

Technical Details	
Protocol	HTTP/SOAP MTOM/XOP
Format	ebXML RIM and RS
IHE Standard	ITI TF-2b Section 3.41

ITI-42: Register Document-Set

The ITI-42 transaction is used primarily by the Life Image Repository to provide submissions of patient document metadata to the Life Image Registry. Similar to RAD-68, typical workflows would, in general,

not require Partner Sources to make submissions directly to the Registry but given that all network services are independent, direct submission to the Registry is possible.

Technical Details	
Protocol	HTTP/SOAP MTOM/XOP
Format	ebXML RIM and RS
IHE Standard	ITI TF-2b Section 3.42

ITI-43: Retrieve Document-Set

The ITI-43 transaction is used primarily by the Partner Consumer to retrieve patient documents (both CDA clinical diagnostic reports and DICOM imaging manifests) from the Life Image Repository.

Technical Details	
Protocol	HTTP/SOAP MTOM/XOP
Format	ebXML RIM and RS
IHE Standard	ITI TF-2b Section 3.43

RAD-68: Provide and Register Imaging Document-Set

The RAD-68 transaction (a extension of ITI-41) is used primarily by the Life Image Source to provide submissions of patient documents (both CDA clinical diagnostic reports and DICOM imaging manifests) to the Life Image Repository. Typical workflows would, in general, not require Partner Sources to make submissions directly to the Repository but given that all network services are independent, direct submission to the Repository is possible.

Technical Details	
Protocol	HTTP/SOAP MTOM/XOP
Format	ebXML RIM and RS
IHE Standard	RAD TF-3 Section 4.68

RAD-69: Retrieve Imaging Document-Set

The RAD-69 transaction is used by the Partner Consumer to retrieve DICOM imaging study documents (both “rendered” images or “raw” DICOM) from the Life Image Source.

Technical Details	
Protocol	HTTP/SOAP MTOM/XOP
Format	ebXML RIM and RS
IHE Standard	RAD TF-3 Section 4.69

RAD-55: WADO-URI Retrieve Images

The RAD-55 transaction is used by the Partner Consumer to retrieve DICOM imaging study documents (both “rendered” JPEG or “raw” DICOM) from the Life Image Source using a single RESTful API.

Technical Details	
Protocol	HTTP/REST
Format	NEMA/Web Services
IHE Standard	RAD TF-3 Section 4.55

RAD-107: WADO-RS Retrieve Images

The RAD-107 transaction is used by the Partner Consumer to retrieve DICOM imaging study documents (both “rendered” JPEG or “raw” DICOM) from the Life Image Source using a single RESTful API.

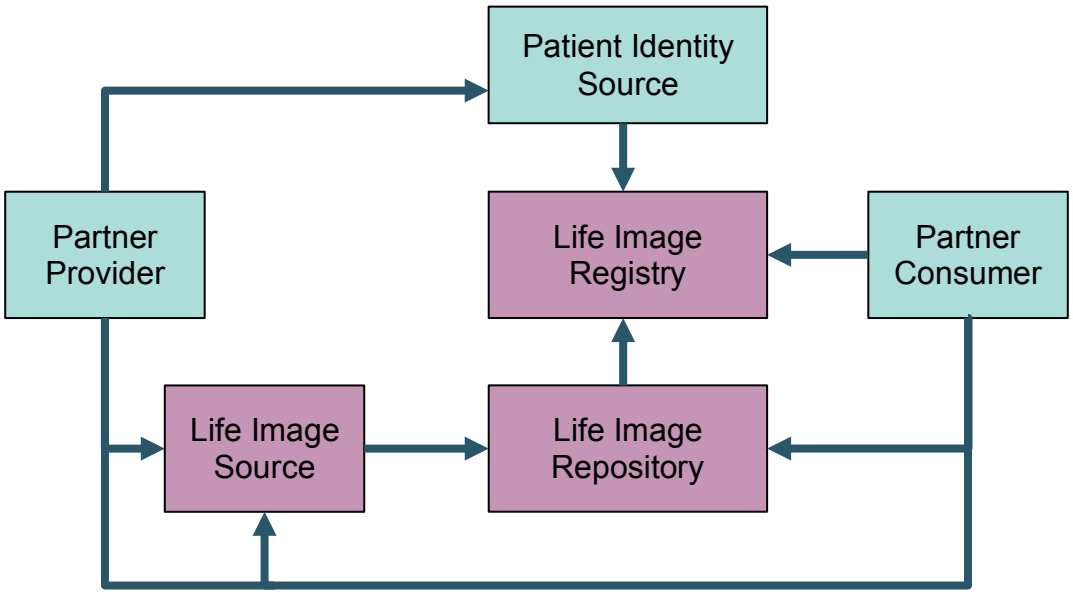
Technical Details	
Protocol	HTTP/REST
Format	NEMA/Web Services
IHE Standard	WIA Section 4.107

RAD-16: DICOM Retrieve Images

The RAD-16 transaction is used by the Partner Consumer to retrieve DICOM imaging study documents (both “rendered” JPEG or “raw” DICOM) from the Life Image Source using a traditional DICOM C-MOVE operation.

Technical Details	
Protocol	TCP/DICOM
Format	DICOM
NEMA Standard	C-MOVE Section C.4.2

Life Image Network from an HL7 FHIR® Perspective



Partner XDS-I.b Provider and FHIR Consumer - Services and Transactions with Technical Designations

An additional means of Partner Consumer integration with the Life Image Network is through its support of the the IHE Mobile Access to Health Documents (MHD) integration profile which leverages RESTful FHIR (rather than the heavier SOAP-based XDS-I.b) to enable Consumers to query and retrieve patient documents. (both CDA clinical diagnostic reports and DICOM imaging studies)

Core MHD for Imaging (FHIR) Integration Points

ITI-67: DocumentReference Search

The ITI-67 DocumentReference Search transaction is used by the Partner Consumer to query the Life Image Registry for all document metadata associated to a specified patient-id. After the Consumer has

established the identity of the patient in question, this transaction typically initiates the patient document discovery workflow.

Technical Details	
Protocol	HTTP/REST
Format	FHIR/DocumentReference
IHE Standard	MHD Section 3.67

ITI-67: DocumentManifest Search

The ITI-67 DocumentManifest Search transaction is used by the Partner Consumer to query the Life Image Registry for all document-set metadata associated to a specified patient-id. After the Consumer has established the identity of the patient in question, this transaction typically initiates the patient document discovery workflow.

Technical Details	
Protocol	HTTP/REST
Format	FHIR/DocumentManifest
IHE Standard	MHD Section 3.66

ITI-68: Binary Read

The ITI-68 Binary Read transaction is used by the Partner Consumer to retrieve document content from the the Life Image Repository.

ITI-TBD: ImagingStudy Search

The ITI-TBD ImagingStudy Search transaction is used by the Partner Consumer to query the Life Image Registry for all imaging study metadata associated to a specified patient-id. After the Consumer has established the identity of the patient in question, this transaction typically initiates the patient imaging study discovery workflow.

Technical Details	
Protocol	HTTP/REST
Format	FHIR/ImagingStudy
IHE Standard	NONE (TBD)

RAD-55: WADO-URI Retrieve Images

The RAD-55 transaction is used by the Partner Consumer to retrieve DICOM imaging study documents (both “rendered” JPEG or “raw” DICOM) from the Life Image Source using a single RESTful API.

Technical Details	
Protocol	HTTP/REST
Format	NEMA/Web Services
IHE Standard	RAD TF-3 Section 4.55

RAD-107: WADO-RS Retrieve Images

The RAD-107 transaction is used by the Partner Consumer to retrieve DICOM imaging study documents (both “rendered” JPEG or “raw” DICOM) from the Life Image Source using a single RESTful API.

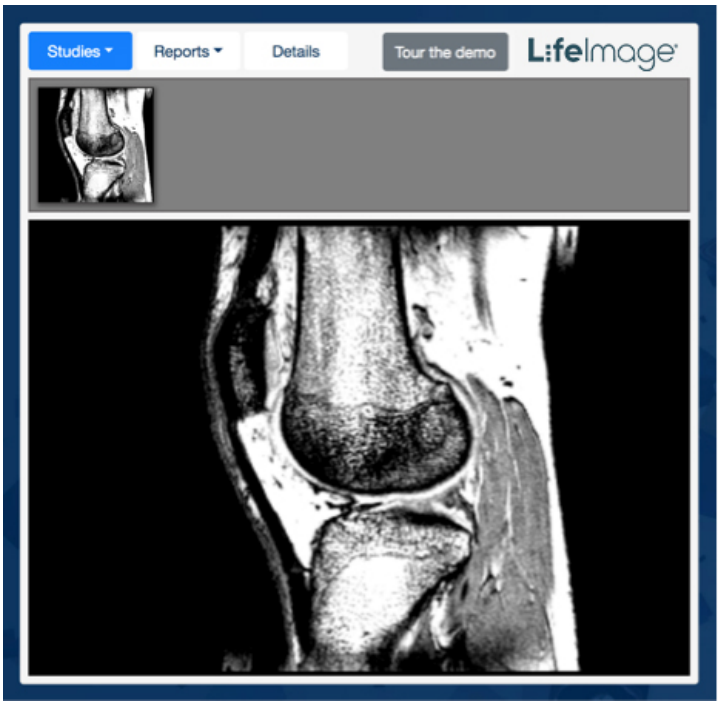
Technical Details	
Protocol	HTTP/REST
Format	NEMA/Web Services
IHE Standard	WIA Section 4.107

Life Image SMART® Viewer

Overview

Life Image supports componentized diagnostic content integration through the Life Image SMART® Viewer, a web-based SMART® on FHIR® powered fully integratable user interface component.

This viewer can be hosted within a SMART® on FHIR® Container as a fully registered SMART® App supporting the full SMART® launch sequence OR it can be simply integrated within a traditional HTML page by hosting it within an embedded HTML iframe element.



The Life Image SMART® on FHIR® Powered SMART® Viewer App

In general, the host for this SMART® on FHIR® powered component will invoke this viewer specifying some contextual details such as patient-id, study-id and/or accession-number and the viewer will then initiate the use of various standard protocols (XDS-I.b, FHIR, DICOMweb, etc.) and procedures to create a comprehensive view of all the patient's diagnostic details including interactive DICOM image viewing and HL7 CDA® report rendering.

The Life Image SMART Viewer uses OAUTH2 "confidential app" (see the SMART App Authorization Guide for more details) profile strategy for securing access to the viewer component.

IHE Integration Statement
Life Image Network

Vendor	Product Name	Version	Date
Life Image	Life Image Network	1.1	06/01/2018

This product implements all transactions required in the IHE Technical Framework to support the IHE Integration Profiles, Actors and Options listed below:

Integration Profiles Implemented	Actors Implemented	Options Implemented
Consistent Time (CT)	Time Client (ITI-1)	None
Audit Trail and Node Authentication (ATNA)	Secure Application (ITI-19, ITI-20)	None
Cross-Enterprise Document Sharing (XDS.b)	Document Registry (ITI-18, ITI-42)	- Patient Identity Feed (ITI-8)
Multiple Patient Queries (MPQ)	Document Registry (ITI-51)	- PatientId Only Query
Cross-Enterprise Document Sharing for Imaging (XDS-I.b)	Document Registry	None
Cross-Enterprise Document Sharing (XDS.b)	Document Repository (ITI-41, ITI-42, ITI-43)	None
Cross-Enterprise Document Sharing for Imaging (XDS-I.b)	Document Repository (RAD-68)	None
Cross-Enterprise Document Reliable Interchange (XDR)	Document Source	None
Cross-Enterprise Document Sharing for Imaging (XDS-I.b)	Imaging Document Source (RAD-68)	- Set of DICOM Instances (RAD-16, RAD-55, RAD-69)

		- PDF Report - CDA Wrapped Text Report - CDA Imaging Report with Structured Headings
Cross-Enterprise Document Sharing (XDS.b)	Document Consumer (ITI-18, ITI-43)	None
Cross-Enterprise Document Sharing for Imaging (XDS-I.b)	Imaging Document Consumer (RAD-55, RAD-69)	None
Cross-Enterprise Document Reliable Interchange (XDR)	Document Recipient (ITI-41)	None
Internet address for vendor's IHE Information: www.lifeimage.com		
Links to Standards Conformance Statements for the Implementation		
HL7	www.lifeimage.com	
DICOM	www.lifeimage.com	
FHIR	www.lifeimage.com	
Links to general information on IHE		
In North America: www.ihe.net	In Europe: www.ihe-europe.net	In Japan: www.ihe-j.org
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