



DICOM Conformance Statement

Retinal imaging control software

For CX-1, MYD, NM, and NM 2

Version 3.3

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Rev 1.3

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Conformance Statement Overview

These products Retinal imaging control software for CX-1, MYD, NM, and NM 2 (Rics CX-1, MYD, NM and NM 2) implement the necessary DICOM services to download work lists from an information system, save acquired OP, VL, or SC images to a network storage device and inform the information system about the work actually done.

The table below provides an overview of the network services supported by Rics CX-1, MYD, NM, and NM 2.

Network Services

| SOP Classes | User of Service (SCU) | Provider of Service (SCP) |
|--|-----------------------|---------------------------|
| Transfer | | |
| Ophthalmic Photography 8 Bit Image Storage | Yes | No |
| VL Photographic Image Storage | Yes | No |
| Secondary Capture Image Storage | Yes | No |
| Workflow Management | | |
| Modality Worklist | Yes | No |
| Modality Performed Procedure Step | Yes | No |

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1. Introduction

1.1 Revision History

Rics CX-1

| Document Version | Date of Issue | Software Version | Description |
|------------------|------------------|------------------|--|
| 1.0 | June 16, 2009 | 3.0 | Version for Final Text |
| 1.1 | March 17, 2010 | 3.1 | <p>Table 4.2-24 modified. (The detail codes of sequences added.)</p> <p>Table 4.3-1 corrected. (The physical network interfaces corrected.)</p> <p>Table 8.1-10 corrected. (CONFIG to AUTO)</p> |
| 1.3 | December 1, 2010 | 3.3 | <p>Table 4.2-24 changed. (Specific Character Set added.)</p> <p>Table 4.2-28 modified. (The detail of Specific Character Set modified.)</p> <p>Table 8.1-1 modified. (Enhanced Contrast / Bolus)</p> <p>Table 8.1-4 modified. (The detail of Patient's Name)</p> <p>Table 8.1-5 changed. (Study ID)</p> <p>Table 8.1-6 modified. (Patient's Age)</p> <p>Table 8.1-7 changed. (Laterality)</p> <p>Table 8.1-10 changed. (Institution Name, Station Name, Institutional Department Name, Manufacture's Model Name, Device Serial Number, Software Version)</p> <p>Table 8.1-12 changed. (Image Type, Derivation Description)</p> <p>Table 8.1-13 modified. (Pixel Data)</p> <p>Table 8.1-15 modified. (Frame Increment Pointer)</p> <p>Table 8.1-18 changed. (Image Type, Window Center, Window Width)</p> <p>Table 8.1-19 modified. (Lossy Image Compression Ratio)</p> <p>Table 8.1-20 changed. (Light Path Filter Type Stack Code Sequence, Image Path Filter Type Stack Code Sequence, Detector Type)</p> |

| Document Version | Date of Issue | Software Version | Description |
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Rics MYD

| Document Version | Date of Issue | Software Version | Description |
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| 1.1 | March 17, 2010 | 3.1 | Version for Final Text (The products Rics MYD and Rics NM added.) |
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| Document Version | Date of Issue | Software Version | Description |
|------------------|------------------|------------------|---|
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Rics NM

| Document Version | Date of Issue | Software Version | Description |
|------------------|------------------|------------------|---|
| 1.1 | March 17, 2010 | 3.1 | Version for Final Text (The products Rics MYD and Rics NM added.) |
| 1.3 | December 1, 2010 | 3.3 | Table 4.2-24 changed. (Specific Character Set added.) Table 4.2-28 modified. (The detail of Specific Character Set modified.) Table 8.1-1 modified. (Enhanced Contrast / Bolus) Table 8.1-6 modified. (The detail of Patient's Name) Table 8.1-5 changed. (Study ID) Table 8.1-4 modified. (Patient's Age) Table 8.1-7 changed. (Laterality) Table 8.1-10 changed. (Institution Name, Station Name, Institutional Department Name, Manufacture's Model Name, Device Serial Number, Software Version) Table 8.1-12 changed. (Image Type, Derivation Description) Table 8.1-13 modified. (Pixel Data) Table 8.1-15 modified. (Frame Increment Pointer) Table 8.1-18 changed. (Image Type, Window Center, Window Width) Table 8.1-19 modified. (Lossy Image Compression Ratio) Table 8.1-20 changed. (Light Path Filter Type Stack Code Sequence, Image Path Filter Type Stack Code Sequence) Table 8.1-22 changed. (Image Laterality, Anatomic Region Sequence, Detector Type) |

| Document Version | Date of Issue | Software Version | Description |
|------------------|------------------|------------------|---|
| 1.3 | December 1, 2010 | 3.3 | Table 8.1-24 modified. (The detail of Specific Character Set modified.) |

Rics NM 2

| Document Version | Date of Issue | Software Version | Description |
|------------------|-------------------|------------------|---|
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| | | | Table 8.1-4 modified. (The detail of Patient's Name) |
| | | | Table 8.1-6 modified. (Patient's Age) |
| | | | Table 8.1-13 modified. (Pixel Data) |
| | | | Table 8.1-18 modified. (Window Center, Window Width) |

1.2 Audience

This document is written for the people that need to understand how Rics CX-1, MYD, NM, and NM 2 will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the products. This document contains some basic DICOM definitions so that any reader may understand how these products implement DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the products' functionality, and how that functionality integrates with other devices that support compatible DICOM features.

1.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between Rics CX-1, MYD, NM, or NM 2 and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the products and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

1.4 Terms and Definitions

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.

Abstract Syntax – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class.

Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, and Computed Radiography Image Storage SOP Class.

Application Entity (AE) – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

Application Entity Title – the externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.

Application Context – the specification of the type of communication used between Application Entities.

Example: DICOM network protocol.

Association – a network communication channel set up between Application Entities.

Attribute – a unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements.

Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Information Object Definition (IOD) – the specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C).

Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Joint Photographic Experts Group (JPEG) – a set of standardized image compression techniques, available for use by DICOM applications.

Module – a set of Attributes within an Information Object Definition that are logically related to each other.

Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

Negotiation – first phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.

Presentation Context – the set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.

Protocol Data Unit (PDU) – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Service Class Provider (SCP) – role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User).

Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

Service Class User (SCU) – role of an Application Entity that uses a DICOM network service; typically, a client.

Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU).

Service/Object Pair (SOP) Class – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair (SOP) Instance – an information object; a specific occurrence of information exchanged in a SOP Class.

Examples: a specific x-ray image.

Tag – a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) data element.

Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

Transfer Syntax – the encoding used for exchange of DICOM information objects and messages.

Examples: JPEG compressed (images), little endian explicit value representation.

Unique Identifier (UID) – a globally unique “dotted decimal” string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier.

Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR) – the format type of an individual DICOM data element, such as text, an integer, a person’s name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

1.5 Basics of DICOM Communication

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in **boldface** below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two **Application Entities** (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network “handshake”. One of the two devices must initiate an **Association** (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (**Negotiation**).

DICOM specifies a number of network services and types of information objects, each of which is called an **Abstract Syntax** for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted **Transfer Syntaxes**. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called **Presentation Contexts**. The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on Roles – which one is the **Service Class User** (SCU - client) and which is the **Service Class Provider** (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

The Association Negotiation finally enables exchange of maximum network packet (**PDU**) size, security information, and network service options (called **Extended Negotiation** information).

The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate **Information Object Definition**, and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a **Response Status** indicating success, failure, or that query or retrieve operations are still in process.

1.6 Abbreviations

| | |
|--------|---|
| AE | Application Entity |
| CT | Computed Tomography |
| DHCP | Dynamic Host Configuration Protocol |
| DICOM | Digital Imaging and Communications in Medicine |
| DNS | Domain Name System |
| HIS | Hospital Information System |
| IE | Information Entity |
| IOD | Information Object Definition |
| IPv4 | Internet Protocol version 4 |
| ISO | International Organization for Standardization |
| LDAP | Lightweight Directory Access Protocol |
| LUT | Look-up Table |
| MPPS | Modality Performed Procedure Step |
| MR | Magnetic Resonance Imaging |
| MSPS | Modality Scheduled Procedure Step |
| MWL | Modality Worklist |
| NTP | Network Time Protocol |
| OP | Ophthalmic Photography |
| OSI | Open Systems Interconnection |
| PDU | Protocol Data Unit |
| RIS | Radiology Information System |
| SC | Secondary Capture |
| SCP | Service Class Provider |
| SCU | Service Class User |
| SOP | Service-Object Pair |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| VL | Visible Light |
| VR | Value Representation |

1.7 References

NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available free at <http://medical.nema.org/>

2. Networking

2.1 Implementation Model

2.1.1 Application Data Flow

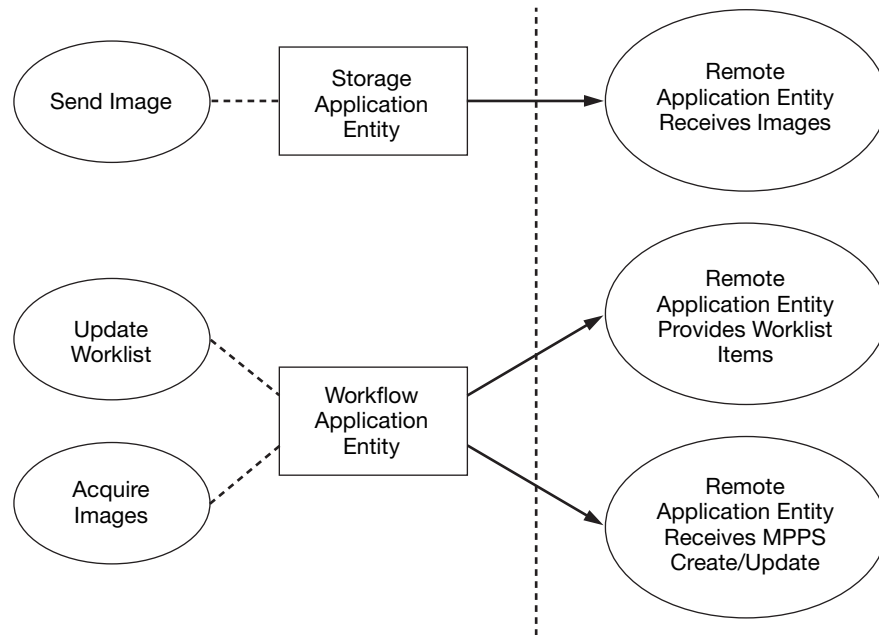


Figure 2.1-1
Application Data Flow Diagram

- The Storage Application Entity sends images. It is associated with the local real-world activity “Send Images”. “Send Images” is performed upon user request for each study completed or for specific images selected. When activated by user’s settings (auto-send), each marked set of images can be immediately stored to a preferred destination whenever a Study is closed by the user.
- The Workflow Application Entity receives Worklist information from a remote AE and sends MPPS information to a remote AE. It is associated with the local real-world activities “Update Worklist” and “Acquire Images”. When the “Update Worklist” local real-world activity is performed the Workflow Application Entity queries a remote AE for worklist items and provides the set of worklist items matching the query request. “Update Worklist” is performed as a result of an operator request or can be performed automatically at specific time intervals. When the “Acquire Images” local real-world activity is performed the Workflow Application Entity creates and updates Modality Performed Procedure Step instances managed by a remote AE. Acquisition of images will result in automated creation of an MPPS Instance. Completion of the MPPS is performed as the result of an operator action.

2.1.2 Functional Definition of AEs

2.1.2.1 Functional Definition of Storage Application Entity

The existence of a send-job queue entry with associated network destination will activate the Storage AE. An association request is sent to the destination AE and upon successful negotiation of a Presentation Context the image transfer is started. If the association cannot be opened, the related send-job is set to an error state and can be restarted by the user via job control interface. By default, the Storage AE will not try to initiate another association for this send-job automatically.

2.1.2.2 Functional Definition of Workflow Application Entity

Worklist Update attempts to download a Worklist from a remote node. If the Workflow AE establishes an Association to a remote AE, it will transfer all worklist items via the open Association. During receiving the worklist response items are counted and the query processing is canceled if the configurable limit of items is reached. The results will be displayed in a list, which will be cleared with the next Worklist Update.

The Workflow AE performs the creation of an MPPS Instance automatically whenever images are acquired. The MPPS "Completed" or "Discontinued" states can only be set from the user interface.

2.1.3 Sequencing of Real-World Activities

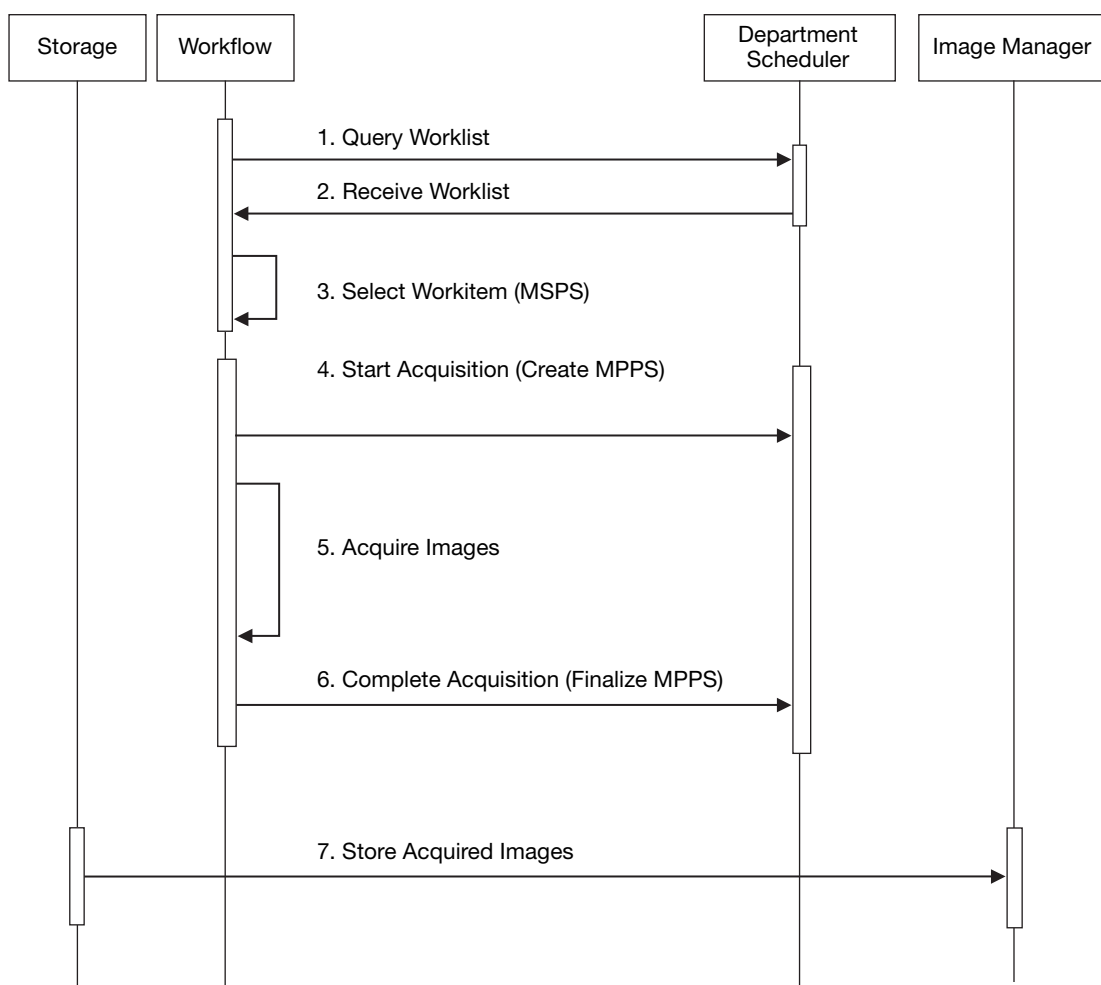


Figure 2.1-2
Sequencing Constraints

Under normal scheduled workflow conditions the sequencing constraints illustrated in Figure 2.1-2 apply:

1. Query Worklist
2. Receive Worklist of Modality Scheduled Procedure Steps (MSPS)
3. Select Workitem (MSPS) from Worklist
4. Start acquisition and create MPPS
5. Acquire Images
6. Complete acquisition and finalize MPPS
7. Store acquired images instances.

Other workflow situations (e.g. unscheduled procedure steps) will have other sequencing constraints.

2.2 AE Specifications

2.2.1 Storage Application Entity Specification

2.2.1.1 SOP Classes

Rics CX-1, MYD, NM, and NM 2 provide Standard Conformance to the following SOP Classes:

Table 2.2-1
SOP Classes for Storage AE

| SOP Class Name | SOP Class UID | SCU | SCP |
|--|----------------------------------|-----|-----|
| Ophthalmic Photography 8 Bit Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.5.1 | Yes | No |
| VL Photographic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.4 | Yes | No |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | Yes | No |

2.2.1.2 Association Policies

2.2.1.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

Table 2.2-2
DICOM Application Context for Storage AE

| | |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

2.2.1.2.2 Number of Associations

Rics CX-1, MYD, NM, and NM 2 initiate one Association at a time for each destination to which a transfer request is being processed in the active job queue list. Only one job will be active at a time, the other remains pending until the active job is completed or failed.

Table 2.2-3
Number of Associations Initiated for Storage AE

| | |
|---|---|
| Maximum number of simultaneous Associations | 1 |
|---|---|

2.2.1.2.3 Asynchronous Natures

Rics CX-1, MYD, NM, and NM 2 do not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 2.2-4
Asynchronous Nature as a SCU for Storage AE

| | |
|---|-----|
| Maximum number of outstanding asynchronous transactions | N/A |
|---|-----|

2.2.1.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

Table 2.2-5
DICOM Implementation Class and Version for Storage AE

Rics CX-1

| | |
|-----------------------------|--|
| Implementation Class UID | 1.2.392.200046.100.3.7.xxx* ¹ |
| Implementation Version Name | CANON_CX1_x.xx * ² |

Rics MYD

| | |
|-----------------------------|--|
| Implementation Class UID | 1.2.392.200046.100.3.5.xxx* ¹ |
| Implementation Version Name | CANON_CFX.xx * ² |

Rics NM

| | |
|-----------------------------|--|
| Implementation Class UID | 1.2.392.200046.100.3.3.xxx* ¹ |
| Implementation Version Name | CANON_CRx.xx * ² |

Rics NM 2

| | |
|-----------------------------|--|
| Implementation Class UID | 1.2.392.200046.100.3.8.xxx* ¹ |
| Implementation Version Name | CANON_NM2_x.xx * ² |

*¹ xxx: Actually replaced by the version number

*² x.xx: Actually replaced by the version number

2.2.1.3 Association Initiation Policy

2.2.1.3.1 Activity – Send Images

2.2.1.3.1.1 Description and Sequencing of Activities

A user can select images and request them to be sent to multiple destinations (up to 2). Each request is forwarded to the job queue and processed individually. When the Auto-send option is active, each instance stored in database will be forwarded to the network job queue for a pre-configured auto-send target destination. The destination where the instances are automatically sent to can be configured. The Auto-send is triggered by the Close Study user application.

The Storage AE is invoked by the job control interface that is responsible for processing network archival tasks. The job consists of data describing the instances marked for storage and the destination. An internal daemon process triggered by a job for a specific network destination initiates a C-STORE request to store images. If the process successfully establishes an Association to a remote Application Entity, it will transfer each instance via the open Association. Status of the transfer is reported through the job control interface. Only one job will be active at a time. If the C-STORE Response from the remote Application contains a status other than “Success” or “Warning,” the Association is aborted and the related Job is switched to a failed state. It can be restarted any time by user interaction.

The Storage AE attempts to initiate a new Association in order to issue a C-STORE request.

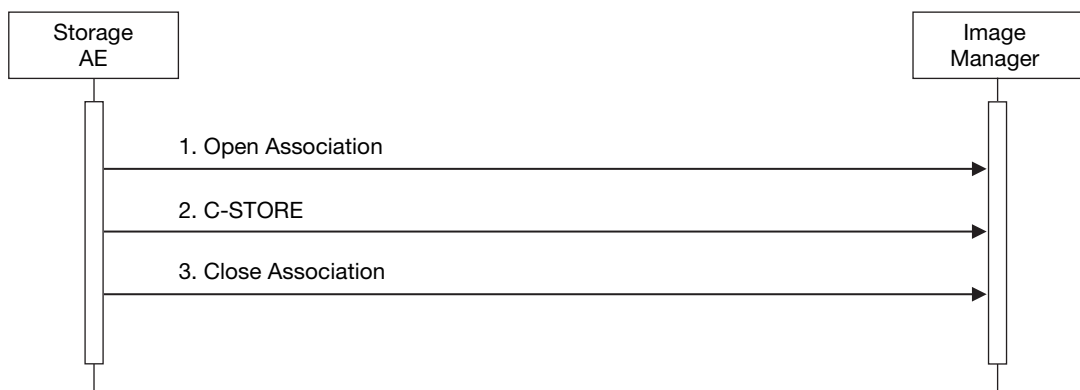


Figure 2.2-1
Sequencing of Activity – Send Images

A possible sequence of interactions between the Storage AE and an Image Manager (e.g. a storage or archive device supporting the Storage SOP Classes as an SCP) is illustrated in **Figure 2.2-1**:

1. The Storage AE opens an association with the Image Manager.
2. An acquired image is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status “Success”).
3. The Storage AE closes the association with the Image Manager.

2.2.1.3.1.2 Proposed Presentation Contexts

Rics CX-1, MYD, NM, and NM 2 are capable of proposing the Presentation Contexts shown in the following table:

**Table 2.2-6
Proposed Presentation Contexts for Activity Send Images**

| Presentation Context Table | | | | | |
|--|----------------------------------|--|------------------------|------|-----------|
| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
| Name | UID | Name List | UID List | | |
| Ophthalmic Photography 8 Bit Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.5.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |
| | | JPEG Baseline (Process 1) | 1.2.840.10008.1.2.4.50 | | |
| | | JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1]) | 1.2.840.10008.1.2.4.70 | | |
| | | JPEG Lossless, Non-Hierarchical (Process 14) | 1.2.840.10008.1.2.4.57 | | |
| VL Photographic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.4 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |
| | | JPEG Baseline (Process 1) | 1.2.840.10008.1.2.4.50 | | |
| | | JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1]) | 1.2.840.10008.1.2.4.70 | | |
| | | JPEG Lossless, Non-Hierarchical (Process 14) | 1.2.840.10008.1.2.4.57 | | |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |
| | | JPEG Baseline (Process 1) | 1.2.840.10008.1.2.4.50 | | |
| | | JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1]) | 1.2.840.10008.1.2.4.70 | | |
| | | JPEG Lossless, Non-Hierarchical (Process 14) | 1.2.840.10008.1.2.4.57 | | |

Presentation Contexts for Ophthalmic Photography 8 Bit Image Storage, VL Photographic Image Storage or Secondary Capture Image Storage will be proposed if the Send Job contains instances for these SOP Classes.

2.2.1.3.1.3 SOP Specific Conformance Image & Pres State Storage SOP Classes

All Image Storage SOP Classes supported by the Storage AE exhibit the same behavior, except where stated, and are described together in this section.

If all Image Storage SOP Instances are included in the Send Job and a corresponding Presentation Context is not accepted then the Association is aborted using AP-ABORT and the send job is marked as failed. The job failure is logged and reported to the user via the job control application.

Table 2.2-7
Storage C-STORE Response Status Handling Behavior

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|-----------------------------------|------------------------|--|
| Success | Success | 0000 | The SCP has successfully stored the SOP Instance. If all SOP Instances in a send job have status "Success" then the job is marked as complete. |
| Refused | Out of Resources | A700-A7FF | The Association is released using A-RELEASE and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. This is a transient failure. |
| Error | Data Set does not match SOP Class | A900-A9FF | The Association is released using A-RELEASE and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. |
| Error | Cannot Understand | C000-CFFF | The Association is released using A-RELEASE and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. |
| Warning | Coercion of Data Elements | B000 | Image transmission is considered successful but the status meaning is logged. |
| Warning | Data Set does not match SOP Class | B007 | Image transmission is considered successful but the status meaning is logged. |
| Warning | Elements Discarded | B006 | Image transmission is considered successful but the status meaning is logged. |
| * | * | Any other status code. | The Association is released using A-RELEASE and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. |

The behavior of Storage AE during communication failure is summarized in the table below:

**Table 2.2-8
Storage Communication Failure Behavior**

| Exception | Behavior |
|--|--|
| Timeout | The Association is aborted using A-ABORT and the send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application. |
| Association aborted by the SCP or network layers | The send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application. |

A failed send job can be restarted by user interaction. The system can be configured to automatically resend failed jobs if a transient status code is received.

The contents of Ophthalmic Photography 8 Bit Image Storage SOP Instances created by Rics CX-1, MYD, NM, or NM 2 conform to the DICOM Ophthalmic Photography 8 Bit Image IOD definition and are described in section 6.1.

The contents of VL Photographic Image Storage SOP Instances created by Rics CX-1, MYD, NM, or NM 2 conform to the DICOM VL Photographic Image IOD definition and are described in section 6.1.

The contents of Secondary Capture Image Storage SOP Instances created by Rics CX-1, MYD, NM, or NM 2 conform to the DICOM Secondary Capture Image IOD definition and are described in section 6.1.

2.2.2 Workflow Application Entity Specification

2.2.2.1 SOP Classes

Rics CX-1, MYD, NM, and NM 2 provide Standard Conformance to the following SOP Classes:

**Table 2.2-9
SOP Classes for Workflow AE**

| SOP Class Name | SOP Class UID | SCU | SCP |
|--|-------------------------|-----|-----|
| Modality Worklist Information Model – FIND | 1.2.840.10008.5.1.4.31 | Yes | No |
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | Yes | No |

2.2.2.2 Association Policies

2.2.2.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 2.2-10
DICOM Application Context for Workflow AE**

| | |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

2.2.2.2.2 Number of Associations

Rics CX-1, MYD, NM, and NM 2 initiate one Association at a time for a Worklist request.

Table 2.2-11
Number of Associations Initiated for Workflow AE

| | |
|---|---|
| Maximum number of simultaneous Associations | 1 |
|---|---|

2.2.2.2.3 Asynchronous Nature

Rics CX-1, MYD, NM, and NM 2 do not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 2.2-12
Asynchronous Nature as a SCU for Workflow AE

| | |
|---|-----|
| Maximum number of outstanding asynchronous transactions | N/A |
|---|-----|

2.2.2.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

Table 2.2-13
DICOM Implementation Class and Version for Workflow AE

Rics CX-1

| | |
|-----------------------------|--|
| Implementation Class UID | 1.2.392.200046.100.3.7.xxx* ¹ |
| Implementation Version Name | CANON_CX1_x.xx * ² |

Rics MYD

| | |
|-----------------------------|--|
| Implementation Class UID | 1.2.392.200046.100.3.5.xxx* ¹ |
| Implementation Version Name | CANON_CFX.xx * ² |

Rics NM

| | |
|-----------------------------|--|
| Implementation Class UID | 1.2.392.200046.100.3.3.xxx* ¹ |
| Implementation Version Name | CANON_CRX.xx * ² |

Rics NM 2

| | |
|-----------------------------|--|
| Implementation Class UID | 1.2.392.200046.100.3.8.xxx* ¹ |
| Implementation Version Name | CANON_NM2_x.xx * ² |

*¹ xxx: Actually replaced by the version number

*² x.xx: Actually replaced by the version number

2.2.2.3 Association Initiation Policy

2.2.2.3.1 Activity – Worklist Update

2.2.2.3.1.1 Description and Sequencing of Activities

The request for a Worklist Update is initiated by user interaction, i.e. pressing the button “Search”. With “Search” a dialog to enter search criteria is opened and an interactive query can be performed.

The interactive Patient Worklist Query will display a dialog for entering data as search criteria. When the Query is started on user request, only the data from the dialog will be inserted as matching keys into the query.

Upon initiation of the request, the Rics CX-1, MYD, NM, and NM 2 will build an Identifier for the C-FIND request, will initiate an Association to send the request and will wait for Worklist responses. After retrieval of all responses, Rics CX-1, MYD, NM, and NM 2 will access the local database to update patient demographic data. To protect the system from overflow, the Rics CX-1, MYD, NM, and NM 2 will limit the number of processed worklist responses to a configurable maximum. During receiving the worklist response items are counted and the query processing is canceled by issuing a C-FIND-CANCEL if the configurable limit of items is reached. The results will be displayed in a list, which will be cleared with the next worklist update.

Rics CX-1, MYD, NM, and NM 2 will initiate an Association in order to issue a C-FIND request according to the Modality Worklist Information Model.

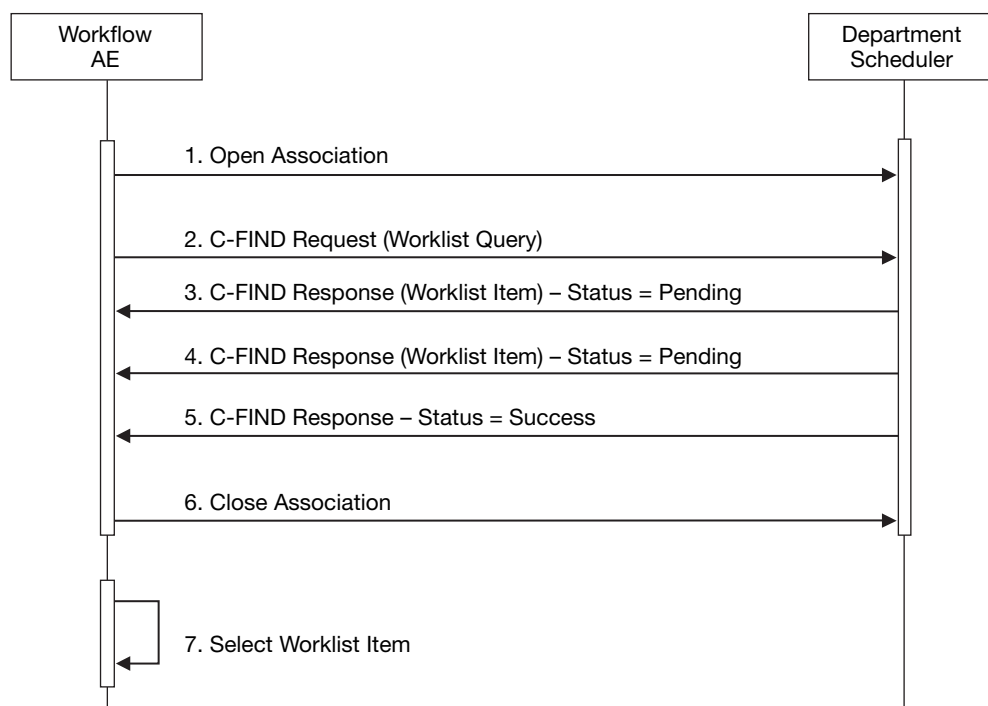


Figure 2.2-2
Sequencing of Activity – Worklist Update

A possible sequence of interactions between the Workflow AE and a Department Scheduler (e.g. a device such as a RIS or HIS which supports the Modality Worklist SOP Class as an SCP) is illustrated in the Figure above:

1. The Worklist AE opens an association with the Department Scheduler.

2. The Worklist AE sends a C-FIND request to the Department Scheduler containing the Worklist Query attributes.
3. The Department Scheduler returns a C-FIND response containing the requested attributes of the first matching Worklist Item.
4. The Department Scheduler returns another C-FIND response containing the requested attributes of the second matching Worklist Item.
5. The Department Scheduler returns another C-FIND response with status “Success” indicating that no further matching Worklist Items exist. This example assumes that only 2 Worklist items match the Worklist Query.
6. The Worklist AE closes the association with the Department Scheduler.
7. The user selects a Worklist Item from the Worklist and prepares to acquire new images.

2.2.2.3.1.2 Proposed Presentation Contexts

Rics CX-1, MYD, NM, and NM 2 will propose Presentation Contexts as shown in the following table:

**Table 2.2-14
Proposed Presentation Contexts for Activity Worklist Update**

| Presentation Context Table | | | | | |
|--|------------------------|---------------------------|---------------------|------|-----------|
| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
| Name | UID | Name List | UID List | | |
| Modality Worklist Information Model – FIND | 1.2.840.10008.5.1.4.31 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

2.2.2.3.1.3 SOP Specific Conformance for Modality Worklist

The behavior of Rics CX-1, MYD, NM, and NM 2 when encountering status codes in a Modality Worklist C-FIND response is summarized in the Table below. If Rics CX-1, MYD, NM, or NM 2 receives any other SCP response status than “Success” or “Pending”, an error message will appear on the user interface.

**Table 2.2-15
Modality Worklist C-FIND Response Status Handling Behavior**

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|---|-------------|---|
| Success | Matching is complete | 0000 | The SCP has completed the matches. Worklist items are available for display or further processing. |
| Refused | Out of Resources | A700 | The Association is released using A-RELEASE. The status meaning is logged and reported to the user. |
| Failed | Identifier does not match SOP Class | A900 | The Association is released using A-RELEASE. The status meaning is logged and reported to the user. |
| Failed | Unable to Process | C000 – CFFF | The Association is released using A-RELEASE. The status meaning is logged and reported to the user. |
| Cancel | Matching terminated due to Cancel request | FE00 | The Association is released using A-RELEASE. The status meaning is logged and reported to the user. |

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|--|------------------------|---|
| Pending | Matches are continuing | FF00 | The worklist item contained in the Identifier is collected for later display or further processing. |
| Pending | Matches are continuing – warning that one or more Optional Keys were not supported | FF01 | The worklist item contained in the Identifier is collected for later display or further processing. The status meaning is logged only once for each C-FIND operation. |
| * | * | Any other status code. | The Association is released using A-RELEASE. The status meaning is logged and reported to the user. |

The behavior of Rics CX-1, MYD, NM, and NM 2 during communication failure is summarized in the Table below.

Table 2.2-16
Modality Worklist Communication Failure Behavior

| Exception | Behavior |
|--|--|
| Timeout | The Association is aborted using A-ABORT and the worklist query marked as failed. The reason is logged and reported to the user if an interactive query. |
| Association aborted by the SCP or network layers | The worklist query is marked as failed. The reason is logged and reported to the user if an interactive query. |

Acquired images will always use the Study Instance UID specified for the Scheduled Procedure Step (if available). If an acquisition is unscheduled, a Study Instance UID will be generated locally.

The Table below provides a description of the Worklist Request Identifier for Rics CX-1, MYD, NM, and NM 2 and specifies the attributes that are copied into the images. Unexpected attributes returned in a C-FIND response are ignored.

Requested return attributes not supported by the SCP are set to have no value. Non-matching responses returned by the SCP due to unsupported optional matching keys are ignored.

Table 2.2-17
Worklist Request Identifier

| Module Name Attribute Name | Tag | VR | M | R | Q | D | IOD |
|---------------------------------------|-------------|----|---|---|---|---|-----|
| SOP Common | | | | | | | |
| Specific Character Set | (0008,0005) | CS | | x | | | |
| Scheduled Procedure Step | | | | | | | |
| Scheduled Procedure Step Sequence | (0040,0100) | SQ | | x | | | |
| > Scheduled Station AE Title | (0040,0001) | AE | S | x | x | x | |
| > Scheduled Procedure Step Start Date | (0040,0002) | DA | R | x | x | x | |
| > Scheduled Procedure Step Start Time | (0040,0003) | TM | R | x | x | x | |
| > Modality | (0008,0060) | CS | S | x | x | x | |

| Module Name | Tag | VR | M | R | Q | D | IOD |
|--|-------------|----|----|---|---|---|-----|
| Attribute Name | | | | | | | |
| > Scheduled Performing Physician's Name | (0040,0006) | PN | S* | x | x | x | |
| > Scheduled Procedure Step Description | (0040,0007) | LO | | x | | x | x |
| > Scheduled Station Name | (0040,0010) | SH | S | x | x | x | |
| > Scheduled Procedure Step Location | (0040,0011) | SH | S | x | x | x | |
| > Scheduled Protocol Code Sequence | (0040,0008) | SQ | | x | | | |
| >> Code Value | (0008,0100) | SH | | x | | | |
| >> Coding Scheme Version | (0008,0103) | SH | | x | | | |
| >> Coding Scheme Designator | (0008,0102) | SH | | x | | | |
| >> Code Meaning | (0008,0104) | LO | | x | | | |
| > Pre-Medication | (0040,0012) | LO | | x | | | x |
| > Scheduled Procedure Step ID | (0040,0009) | SH | | x | | | |
| > Requested Contrast Agent | (0032,1070) | LO | | x | | | |
| > Scheduled Procedure Step Status | (0040,0020) | CS | | x | | | |
| > Comments on the Scheduled Procedure Step | (0040,0400) | LT | | x | | | |
| Requested Procedure | | | | | | | |
| Requested Procedure ID | (0040,1001) | SH | S | x | x | x | |
| Requested Procedure Description | (0032,1060) | LO | | x | | | |
| Requested Procedure Code Sequence | (0032,1064) | SQ | | x | | | |
| > Code Value | (0008,0100) | SH | | x | | | |
| > Coding Scheme Designator | (0008,0102) | SH | | x | | | |
| > Coding Scheme Version | (0008,0103) | SH | | x | | | |
| > Code Meaning | (0008,0104) | LO | | x | | | |
| Study Instance UID | (0020,000D) | UI | | x | | | x |
| Referenced Study Sequence | (0008,1110) | SQ | | x | | | |
| > Referenced SOP Class UID | (0008,1150) | UI | | x | | | |
| > Referenced SOP Instance UID | (0008,1155) | UI | | x | | | |
| Requested Procedure Priority | (0040,1003) | SH | | | | | |
| Patient Transport Arrangements | (0040,1004) | LO | | | | | |
| Reason for the Requested Procedure | (0040,1002) | LO | | x | | | |
| Requested Procedure Location | (0040,1005) | LO | | | | | |
| Requested Procedure Comments | (0040,1400) | LT | | x | | | |
| Imaging Service Request | | | | | | | |
| Accession Number | (0008,0050) | SH | S | x | x | x | x |
| Requesting Physician | (0032,1032) | PN | | x | | x | |
| Referring Physician's Name | (0008,0090) | PN | | x | | x | x |
| Requesting Service | (0032,1033) | LO | | x | | | |
| Order Entered By | (0040,2008) | PN | | | | | |
| Order Enterer's Location | (0040,2009) | SH | | | | | |

| Module Name Attribute Name | Tag | VR | M | R | Q | D | IOD |
|---|-------------|----|----|---|---|---|-----|
| Order Callback Phone Number | (0040,2010) | SH | | | | | |
| Placer Order Number / Imaging Service Request | (0040,2016) | LO | | | | | |
| Filler Order Number / Imaging Service Request | (0040,2017) | LO | | | | | |
| Imaging Service Request Comments | (0040,2400) | LT | | | | | |
| Visit Identification | | | | | | | |
| Admission ID | (0038,0010) | LO | | | | | |
| Institution Name | (0008,0080) | LO | | | | | |
| Institution Address | (0008,0081) | LO | | | | | |
| Issuer of Admission ID | (0038,0011) | LO | | | | | |
| Visit Status | | | | | | | |
| Current Patient Location | (0038,0300) | LO | | | | | |
| Visit Status ID | (0038,0008) | CS | | | | | |
| Patient's Institution Residence | (0038,0400) | LO | | | | | |
| Visit Comments | (0038,4000) | LT | | | | | |
| Visit Admission | | | | | | | |
| Admitting Diagnosis Description | (0008,1080) | LO | | | | | |
| Referring Physician's Address | (0008,0092) | ST | | | | | |
| Referring Physician's Telephone Numbers | (0008,0094) | SH | | | | | |
| Route of Admissions | (0038,0016) | LO | | | | | |
| Patient Identification | | | | | | | |
| Patient Name | (0010,0010) | PN | S* | x | x | x | x |
| Patient ID | (0010,0020) | LO | S | x | x | x | x |
| Issuer of Patient ID | (0010,0021) | LO | | | | | |
| Other Patient IDs | (0010,1000) | LO | | x | | x | |
| Patient's Birth Name | (0010,1005) | PN | | | | | |
| Patient's Mother's Birth Name | (0010,1060) | PN | | | | | |
| Medical Record Locator | (0010,1090) | LO | | | | | |
| Patient Demographic | | | | | | | |
| Patient's Birth Date | (0010,0030) | DA | | x | | x | x |
| Patient's Sex | (0010,0040) | CS | | x | | x | x |
| Patient's Weight | (0010,1030) | DS | | x | | x | x |
| Confidentiality Constraint on Patient Data | (0040,3001) | LO | | | | | |
| Patient's Age | (0010,1010) | AS | | x | | x | x |
| Patient's Size | (0010,1020) | DS | | x | | x | x |
| Military Rank | (0010,1080) | LO | | | | | |
| Branch of Service | (0010,1081) | LO | | | | | |
| Country of Residence | (0010,2150) | LO | | | | | |
| Region of Residence | (0010,2152) | LO | | | | | |

| Module Name Attribute Name | Tag | VR | M | R | Q | D | IOD |
|--------------------------------|-------------|----|---|---|---|---|-----|
| Patient's Telephone Numbers | (0010,2154) | SH | | | | | |
| Ethnic Group | (0010,2160) | SH | | x | | x | x |
| Patient's Religious Preference | (0010,21F0) | LO | | | | | |
| Patient Comments | (0010,4000) | LT | | | | | |
| Patient Medical | | | | | | | |
| Patient State | (0038,0500) | LO | | | | | |
| Pregnancy Status | (0010,21C0) | US | | x | | x | |
| Medical Alerts | (0010,2000) | LO | | x | | x | |
| Allergies | (0010,2110) | LO | | x | | x | |
| Special Needs | (0038,0050) | LO | | | | | |
| Smoking Status | (0010,21A0) | CS | | | | | |
| Additional Patient History | (0010,21B0) | LT | | | | | |

The above table should be read as follows:

Module Name: The name of the associated module for supported worklist attributes.

Attribute Name: Attributes supported to build a Worklist Request Identifier for Rics CX-1, MYD, NM, or NM 2.

Tag: DICOM tag for this attribute.

VR: DICOM VR for this attribute.

M: Matching keys for Worklist Update. An "S" will indicate that Rics CX-1, MYD, NM, and NM 2 will supply an attribute value for Single Value Matching, an "R" will indicate Range Matching and an "*" will denote wildcard matching.

R: Return keys. An "x" will indicate that Rics CX-1, MYD, NM, and NM 2 will supply this attribute as Return Key with zero length for Universal Matching.

Q: Interactive Query Key. An "x" will indicate that Rics CX-1, MYD, NM, and NM 2 will supply this attribute as matching key, if entered in the query patient worklist dialog. For example, the Patient Name can be entered thereby restricting Worklist responses to Procedure Steps scheduled for the patient.

D: Displayed keys. An "x" indicates that this worklist attribute is displayed to the user during a patient registration dialog. For example, Patient Name will be displayed when registering the patient prior to an examination.

IOD: An "x" indicates that this Worklist attribute is included into all Object Instances created during performance of the related Procedure Step.

2.2.2.3.2 Activity – Acquire Images

2.2.2.3.2.1 Description and Sequencing of Activities

After Patient registration, the Rics CX-1, MYD, NM, and NM 2 are awaiting the 1st exposure to the patient. The trigger to create a MPPS SOP Instance is derived from this event. An Association to the configured MPPS SCP system is established immediately and the related MPPS SOP Instance will be created. An MPPS Instance that has been sent with a state of “COMPLETED” or “DISCONTINUED” can no longer be updated.

Rics CX-1, MYD, NM, and NM 2 will initiate an Association to issue an:

- N-CREATE request according to the CREATE Modality Performed Procedure Step SOP Instance operation or a
- N-SET request to update the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.

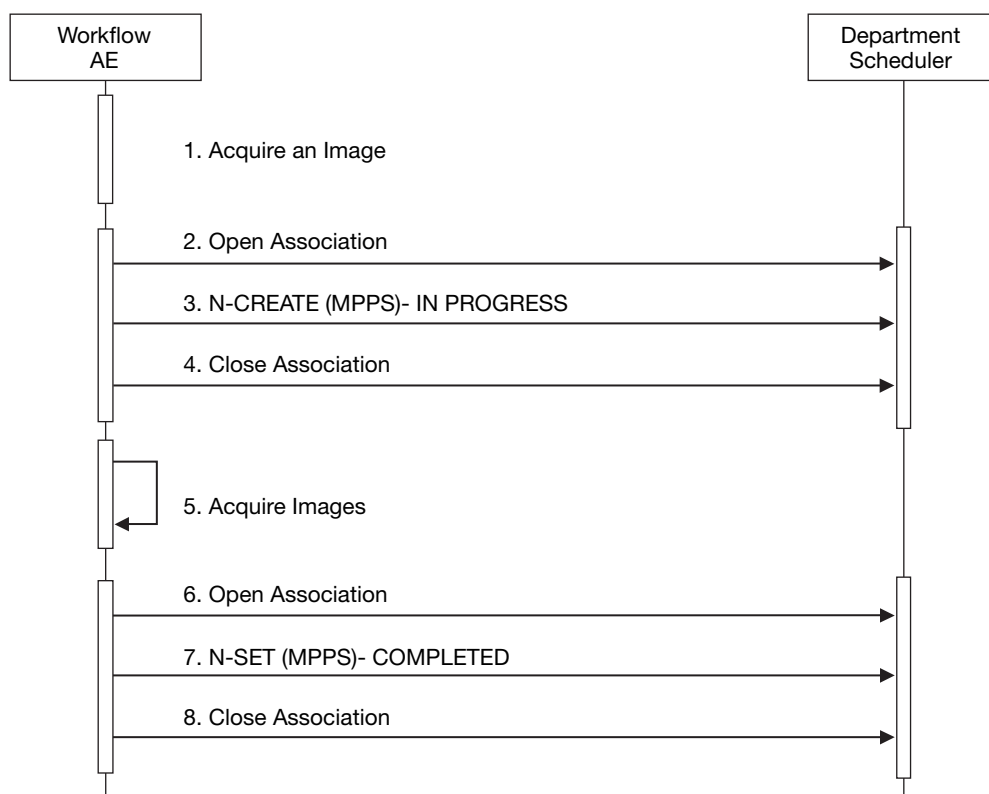


Figure 2.2-3
Sequencing of Activity – Acquire Images

A possible sequence of interactions between the Workflow AE and a Department Scheduler (e.g. a device such as a RIS or HIS which supports the MPPS SOP Class as an SCP) is illustrated in **Figure 2.2-3**:

1. An image is acquired and stored in the local database.
2. The Worklist AE opens an association with the Department Scheduler.
3. The Worklist AE sends an N-CREATE request to the Department Scheduler to create an MPPS instance with status of "IN PROGRESS" and create all necessary attributes. The Department Scheduler acknowledges the MPPS creation with an N-CREATE response (status "Success").
4. The Worklist AE closes the association with the Department Scheduler.
5. All images are acquired and stored in the local database.
6. The Worklist AE opens an association with the Department Scheduler.
7. The Worklist AE sends an N-SET request to the Department Scheduler to update the MPPS instance with status of "COMPLETED" and set all necessary attributes. The Department Scheduler acknowledges the MPPS update with an N-SET response (status "Success").
8. The Worklist AE closes the association with the Department Scheduler.

2.2.2.3.2 Proposed Presentation Contexts

Rics CX-1, MYD, NM, and NM 2 will propose Presentation Contexts as shown in the following table:

**Table 2.2-18
Proposed Presentation Contexts for Real-World Activity Acquire Images**

| Presentation Context Table | | | | | |
|-----------------------------------|-------------------------|---------------------------|---------------------|------|-----------|
| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
| Name | UID | Name List | UID List | | |
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

2.2.2.3.2.3 SOP Specific Conformance for MPPS

The behavior of Rics CX-1, MYD, NM, and NM 2 when encountering status codes in an MPPS N-CREATE or N-SET response is summarized in **Table 2.2-19**. If Rics CX-1, MYD, NM, or NM 2 receives any other SCP response status than "Success" or "Warning", an error message will appear on the user interface.

**Table 2.2-19
MPPS N-CREATE/N-SET Response Status Handling Behavior**

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|-----------------|------------|---|
| Success | Success | 0000 | The SCP has completed the operation successfully. |

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|---|------------------------|--|
| Failure | Processing Failure – Performed Procedure Step Object may no longer be updated | 0110 | The Association is released using A-RELEASE and the MPPS is marked as failed. The status meaning is logged and reported to the user. |
| Warning | Attribute Value Out of Range | 0116 | The MPPS operation is considered successful but the status meaning is logged. |
| * | * | Any other status code. | The Association is released using A-RELEASE and the MPPS is marked as failed. The status meaning is logged and reported to the user. |

The behavior of Rics CX-1, MYD, NM, and NM 2 during communication failure is summarized in the Table below:

Table 2.2-20
MPPS Communication Failure Behavior

| Exception | Behavior |
|--|--|
| Timeout | The Association is aborted using A-ABORT and MPPS marked as failed. The reason is logged and reported to the user. |
| Association aborted by the SCP or network layers | The MPPS is marked as failed. The reason is logged and reported to the user. |

Table 2.2-21 provides a description of the MPPS N-CREATE and N-SET request identifiers sent by Rics CX-1, MYD, NM, or NM 2. Empty cells in the N-CREATE and N-SET columns indicate that the attribute is not sent. An “x” indicates that an appropriate value will be sent. A “Zero length” attribute will be sent with zero length.

Table 2.2-21
MPPS N-CREATE/N-SET Request Identifier

| Attribute Name | Tag | VR | N-CREATE | N-SET |
|---------------------------------------|-------------|----|---|-------|
| SOP Common | | | | |
| Specific Character Set | (0008,0005) | CS | ISO_IR 100, ISO_IR 101, ISO_IR 144, ISO_IR 126, ISO_IR 148, ISO_IR 13, \ISO 2022 IR 13, \ISO 2022 IR87, ISO 2022 IR 13\ISO 2022 IR87 \ISO 2022 IR 13\ISO 2022 IR87, GB18030 or ISO_IR 192 | |
| Performed Procedure Step Relationship | | | | |
| Scheduled Step Attributes Sequence | (0040,0270) | SQ | 1st exposure applied results in an Instance | |
| > Study Instance UID | (0020,000D) | UI | From Modality Worklist | |
| > Referenced Study Sequence | (0008,1110) | SQ | From Modality Worklist | |
| >> Referenced SOP Class UID | (0008,1150) | UI | From Modality Worklist | |
| >> Referenced SOP Instance UID | (0008,1155) | UI | From Modality Worklist | |
| > Accession Number | (0008,0050) | SH | From Modality Worklist | |

| Attribute Name | Tag | VR | N-CREATE | N-SET |
|--|-------------|----|------------------------|---------------------------|
| > Requested Procedure ID | (0040,1001) | SH | From Modality Worklist | |
| > Requested Procedure Description | (0032,1060) | LO | From Modality Worklist | |
| > Scheduled Procedure Step ID | (0040,0009) | SH | From Modality Worklist | |
| > Scheduled Procedure Step Description | (0040,0007) | LO | From Modality Worklist | |
| > Scheduled Protocol Code Sequence | (0040,0008) | SQ | From Modality Worklist | |
| >> Code Value | (0008,0100) | SH | From Modality Worklist | |
| >> Coding Scheme Designator | (0008,0102) | SH | From Modality Worklist | |
| >> Coding Scheme Version | (0008,0103) | SH | From Modality Worklist | |
| >> Code Meaning | (0008,0104) | LO | From Modality Worklist | |
| Patient's Name | (0010,0010) | PN | From Modality Worklist | |
| Patient ID | (0010,0020) | LO | From Modality Worklist | |
| Patient's Birth Date | (0010,0030) | DA | From Modality Worklist | |
| Patient's Sex | (0010,0040) | CS | From Modality Worklist | |
| Referenced Patient Sequence | (0008,1120) | SQ | Zero length | |
| Performed Procedure Step Information | | | | |
| Performed Procedure Step ID | (0040,0253) | SH | Automatically created | |
| Performed Station AE Title | (0040,0241) | AE | From configuration | |
| Performed Station Name | (0040,0242) | SH | From configuration | |
| Performed Location | (0040,0243) | SH | From configuration | |
| Performed Procedure Step Start Date | (0040,0244) | DA | Actual start date | |
| Performed Procedure Step Start Time | (0040,0245) | TM | Actual start time | |
| Performed Procedure Step Status | (0040,0252) | CS | IN PROGRESS | DISCONTINUED or COMPLETED |
| Performed Procedure Step Description | (0040,0254) | LO | Zero length | |
| Performed Procedure Type Description | (0040,0255) | LO | Zero length | |
| Procedure Code Sequence | (0008,1032) | SQ | Zero length | |
| Performed Procedure Step End Date | (0040,0250) | DA | Zero length | Actual end date |

| Attribute Name | Tag | VR | N-CREATE | N-SET |
|--|-------------|----|---|---|
| Performed Procedure Step End Time | (0040,0251) | TM | Zero length | Actual end time |
| Image Acquisition Results | | | | |
| Modality | (0008,0060) | CS | From configuration (OP, XC or OT). | |
| Study ID | (0020,0010) | SH | Automatically created | |
| Performed Protocol Code Sequence | (0040,0260) | SQ | Zero length | |
| Performed Series Sequence | (0040,0340) | SQ | 1st exposure applied results in an instance | One or more items |
| > Performing Physician's Name | (0008,1050) | PN | x | x |
| > Protocol Name | (0018,1030) | LO | x | x |
| > Operator's Name | (0008,1070) | PN | x | x |
| > Series Instance UID | (0020,000E) | UI | Generated by device | Generated by device |
| > Series Description | (0008,103E) | LO | x | x |
| > Retrieve AE Title | (0008,0054) | AE | From configuration | From configuration |
| > Referenced Image Sequence | (0008,1140) | SQ | Zero length | One or more items when N-SET value for (0040,0252) is COMPLETED Zero length when the value is DISCONTINUED |
| >> Referenced SOP Class UID | (0008,1150) | UI | | x |
| >> Referenced SOP Instance UID | (0008,1155) | UI | | x |
| > Referenced Non-Image Composite SOP Instance Sequence | (0040,0220) | SQ | Zero length | Zero length |

2.2.2.4 Association Acceptance Policy

The Workflow Application Entity does not accept Associations.

2.3 Network Interfaces

2.3.1 Physical Network Interface

Rics CX-1, MYD, NM, and NM 2 support a single network interface. One of the following physical network interfaces will be available depending on installed hardware options:

Table 2.3-1
Supported Physical Network Interfaces

| |
|---------------------|
| Ethernet 1000BASE-T |
| Ethernet 100BASE-TX |
| Ethernet 10BASE-T |

2.3.2 Additional Protocols

Rics CX-1, MYD, NM, and NM 2 conform to the System Management Profiles listed in the Table below. All requested transactions for the listed profiles and actors are supported.

Table 2.3-2
Supported System Management Profiles

| Profile Name | Actor | Protocols Used |
|----------------------------|-------------|----------------|
| Network Address Management | DHCP Client | DHCP |
| | DNS Client | DNS |
| Time Synchronization | NTP Client | NTP |
| | DHCP Client | DHCP |

2.3.3 IPv4 and IPv6 Support

These products only support IPv4 connections.

2.4 Configuration

2.4.1 AE Title/Presentation Address Mapping

2.4.1.1 Local AE Titles

All local applications use the AE Titles and TCP/IP Ports configured via the Settings user interface for Rics CX-1, MYD, NM, or NM 2. The Field Service Engineer can configure the TCP Port via the Settings user interface. The default AE Titles are both for Storage and Workflow. The local AE Title used by each individual application can be configured independently of the AE Title used by other local applications. If so configured, all local AEs are capable of using the same AE Title.

Table 2.4-1
AE Title Configuration Table

Rics CX-1

| Application Entity | Default AE Title | Default TCP/IP Port |
|--------------------|------------------|---------------------|
| Storage | CANON_CX1 | Not Applicable |
| Workflow | CANON_CX1 | Not Applicable |

Rics MYD

| Application Entity | Default AE Title | Default TCP/IP Port |
|--------------------|------------------|---------------------|
| Storage | CANON_CF | Not Applicable |
| Workflow | CANON_CF | Not Applicable |

Rics NM

| Application Entity | Default AE Title | Default TCP/IP Port |
|--------------------|------------------|---------------------|
| Storage | CANON_CR | Not Applicable |
| Workflow | CANON_CR | Not Applicable |

Rics NM 2

| Application Entity | Default AE Title | Default TCP/IP Port |
|--------------------|------------------|---------------------|
| Storage | CANON_NM2 | Not Applicable |
| Workflow | CANON_NM2 | Not Applicable |

2.4.1.2 Remote AE Title/Presentation Address Mapping

The AE Title, host names and port numbers of remote applications are configured using the user interface for Rics CX-1, MYD, NM, or NM 2.

2.4.1.2.1 Storage

The Settings user interface for Rics CX-1, MYD, NM, and NM 2 must be used to set the AE Titles, port-numbers, host-names and capabilities for the remote Storage SCPs. Associations will only be accepted from known AE Titles and associations from unknown AE Titles will be rejected (an AE Title is known if it can be selected within the Settings user interface). Multiple remote Storage SCPs can be defined.

2.4.1.2.2 Workflow

The Settings user interface for Rics CX-1, MYD, NM, and NM 2 must be used to set the AE Title, port-number, host-name and capabilities of the remote Modality Worklist SCP. Only a single remote Modality Worklist SCP can be defined.

2.4.2 Parameters

A large number of parameters related to acquisition and general operation can be configured using the Settings user interface. The Table below only shows those configuration parameters relevant to DICOM communication. See the Operation Manual and New Features Guide for Rics CX-1, MYD, NM, or NM 2 for details on general configuration capabilities.

**Table 2.4-2
Configuration Parameters Table**

| Parameter | Configurable (Yes/No) | Default Value |
|--|-----------------------|---|
| Storage Parameters | | |
| Supported Transfer Syntaxes (separately configurable for each remote AE) | Yes | Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian JPEG Baseline (Process 1) JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1]) JPEG Lossless, Non-Hierarchical (Process 14) |
| Max PDU Length | No | 16384 Bytes |
| ARTIM timeout | Yes | 30 s |
| Send timeout | Yes | 60 s |
| Receive timeout | Yes | 60 s |
| Modality Worklist Parameters | | |
| Supported Transfer Syntaxes (separately configurable for each remote AE) | No | Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian |
| Max PDU Length | No | 16384 Bytes |
| ARTIM timeout | No | 30 s |
| Send timeout | No | 60 s |
| Receive timeout | No | 60 s |
| MPPS Parameters | | |
| Supported Transfer Syntaxes | No | Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian |
| Max PDU Length | No | 16384 Bytes |
| ARTIM timeout | No | 30 s |
| Send timeout | No | 60 s |
| Receive timeout | No | 60 s |

3. Media Interchange

Rics CX-1, MYD, NM, and NM 2 do not support media interchange.

4. Support of Character Sets

All DICOM applications for Rics CX-1, MYD, NM, and NM 2 support the

ISO_IR 6 (ISO 646)

ISO_IR 100 (ISO 8859-1 Latin Alphabet No. 1 supplementary set)

ISO_IR 101 (ISO 8859-2 Latin Alphabet No. 2 supplementary set)

ISO_IR 144 (ISO 8859-5 Latin/Cyrillic alphabet supplementary set)

ISO_IR 126 (ISO 8859-7 Latin/Greek alphabet supplementary set)

ISO_IR 148 (ISO 8859-9 Latin Alphabet No. 5 supplementary set)

ISO_IR 13 (JIS X 0201: Romaji, Katakana)

ISO 2022 IR 6 (ISO 646)

ISO 2022 IR 13 (JIS X 0201: Romaji, Katakana)

ISO 2022 IR 87 (JIS X 0208: Kanji)

GB18030 (GB18030)

ISO_IR 192 (Unicode in UTF-8)

5. Security

Rics CX-1, MYD, NM, and NM 2 do not support any specific security measures.

It is assumed that Rics CX-1, MYD, NM, and NM 2 are used within a secured environment. It is assumed that a secured environment includes at a minimum:

- a. Firewall or router protections to ensure that only approved external hosts have network access to Rics CX-1, MYD, NM, or NM 2.
- b. Firewall or router protections to ensure that Rics CX-1, MYD, NM, or NM 2 only has network access to approved external hosts and services.
- c. Any communication with external hosts and services outside the locally secured environment which uses appropriate secure network channels (e.g. such as a Virtual Private Network (VPN)).

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

6. Annexes

6.1 IOD Contents

6.1.1 Created SOP Instances

Table 6.1-1 specifies the attributes of an Ophthalmic Photography 8 Bit Image transmitted by the storage application for Rics CX-1, MYD, NM, and NM 2.

Table 6.1-2 specifies the attributes of a VL Photographic Image transmitted by the storage application for Rics CX-1, MYD, NM, and NM 2.

Table 6.1-3 specifies the attributes of a Secondary Capture Image transmitted by the storage application for Rics CX-1, MYD, NM, and NM 2.

The following tables use a number of abbreviations. The abbreviations used in the “Presence of ...” column are:

| | |
|---------------|---|
| VNAP | Value Not Always Present (attribute sent zero length if no value is present) |
| ANAP | Attribute Not Always Present |
| ALWAYS | Always Present |
| EMPTY | Attribute is sent without a value |

The abbreviations used in the “Source” column:

| | |
|---------------|--|
| MWL | the attribute value source Modality Worklist |
| USER | the attribute value source is from User input |
| AUTO | the attribute value is generated automatically |
| MPPS | the attribute value is the same as that use for Modality Performed Procedure Step |
| CONFIG | the attribute value source is a configurable parameter |

NOTE: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the Windows Date and Time.

6.1.1.1 Ophthalmic Photography 8 Bit Image IOD

Table 6.1-1
IOD of Created Ophthalmic Photography 8 Bit Image SOP Instances

| IE | Module | Reference | Presence of Module |
|--------------------|---|--------------|--|
| Patient | Patient | Table 6.1-4 | ALWAYS |
| Study | General Study | Table 6.1-5 | ALWAYS |
| | Patient Study | Table 6.1-6 | ALWAYS |
| Series | General Series | Table 6.1-7 | ALWAYS |
| | Ophthalmic Photography Series | Table 6.1-8 | ALWAYS |
| Frame of Reference | Synchronization | Table 6.1-9 | ALWAYS |
| Equipment | General Equipment | Table 6.1-10 | ALWAYS |
| Image | General Image | Table 6.1-12 | ALWAYS |
| | Image Pixel | Table 6.1-13 | ALWAYS |
| | Enhanced Contrast/Bolus | Table 6.1-14 | Rics CX-1 and MYD: Only if contrast was administered |
| | Multi-Frame | Table 6.1-15 | ALWAYS |
| | Ophthalmic Photography Image | Table 6.1-19 | ALWAYS |
| | Ocular Region Imaged | Table 6.1-22 | ALWAYS |
| | Ophthalmic Photography Acquisition Parameters | Table 6.1-21 | ALWAYS |
| | Ophthalmic Photographic Parameters | Table 6.1-20 | ALWAYS |
| SOP Common | Table 6.1-24 | ALWAYS | |

6.1.1.2 VL Photographic Image IOD

**Table 6.1-2
IOD of Created VL Photographic Image SOP Instances**

| IE | Module | Reference | Presence of Module |
|-----------|---------------------|---------------------|--------------------|
| Patient | Patient | Table 6.1-4 | ALWAYS |
| Study | General Study | Table 6.1-5 | ALWAYS |
| | Patient Study | Table 6.1-6 | ALWAYS |
| Series | General Series | Table 6.1-7 | ALWAYS |
| Equipment | General Equipment | Table 6.1-10 | ALWAYS |
| Image | General Image | Table 6.1-12 | ALWAYS |
| | Image Pixel | Table 6.1-13 | ALWAYS |
| | Acquisition Context | Table 6.1-16 | ALWAYS |
| | VL Image | Table 6.1-18 | ALWAYS |
| | SOP Common | Table 6.1-24 | ALWAYS |

6.1.1.3 Secondary Capture Image IOD

**Table 6.1-3
IOD of Created Secondary Capture Image SOP Instances**

| IE | Module | Reference | Presence of Module |
|-----------|-------------------|---------------------|--------------------|
| Patient | Patient | Table 6.1-4 | ALWAYS |
| Study | General Study | Table 6.1-5 | ALWAYS |
| | Patient Study | Table 6.1-6 | ALWAYS |
| Series | General Series | Table 6.1-7 | ALWAYS |
| Equipment | General Equipment | Table 6.1-10 | ALWAYS |
| | SC Equipment | Table 6.1-11 | ALWAYS |
| Image | General Image | Table 6.1-12 | ALWAYS |
| | Image Pixel | Table 6.1-13 | ALWAYS |
| | SC Image | Table 6.1-17 | ALWAYS |
| | Modality LUT | Table 6.1-23 | ALWAYS |
| | SOP Common | Table 6.1-24 | ALWAYS |

6.1.1.4 Modules

Table 6.1-4
Patient

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------|-------------|----|--|-------------------|--------------|
| Patient's Name | (0010,0010) | PN | From Modality Worklist or user input. Values supplied via Modality Worklist will be entered as received. Values supplied via user input will contain all 5 components or components in 3 groups (some possibly empty). | VNAP | MWL/ USER |
| Patient ID | (0010,0020) | LO | From Modality Worklist or user input. | VNAP | MWL/ USER |
| Patient's Birth Date | (0010,0030) | DA | From Modality Worklist or user input | VNAP | MWL/ USER |
| Patient's Sex | (0010,0040) | CS | From Modality Worklist or user input | VNAP | MWL/ USER |
| Other Patient IDs | (0010,1000) | LO | From Modality Worklist | ANAP | MWL |
| Ethnic Group | (0010,2160) | SH | From Modality Worklist or user input | ANAP | MWL/ USER |

Table 6.1-5
General Study

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------------|-------------|----|--|-------------------|--------------|
| Study Instance UID | (0020,000D) | UI | From Modality Worklist or generated by device | ALWAYS | MWL/ AUTO |
| Study Date | (0008,0020) | DA | <yyyyMMdd> | ALWAYS | AUTO |
| Study Time | (0008,0030) | TM | <HHmmss> | ALWAYS | AUTO |
| Referring Physician's Name | (0008,0090) | PN | From Modality Worklist | VNAP | MWL |
| Study ID | (0020,0010) | SH | Generated by device | ALWAYS | AUTO |
| Accession Number | (0008,0050) | SH | From Modality Worklist or user input | VNAP | MWL/ USER |
| Study Description | (0008,1030) | LO | User input. Add Scheduled Procedure Step Description (0040,0007) Value. | ANAP | MWL/ USER |

**Table 6.1-6
Patient Study**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|------------------|-------------|----|--|-------------------|--------------|
| Patient's Age | (0010,1010) | AS | Calculated from Patient's Birth Date input on base of actual Date. From Modality Worklist, if Patient's Birth Date is not input. | ANAP | MWL/ AUTO |
| Patient's Size | (0010,1020) | DS | From Modality Worklist | ANAP | MWL |
| Patient's Weight | (0010,1030) | DS | From Modality Worklist | ANAP | MWL |

**Table 6.1-7
General Series**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------------|-------------|----|------------------------------------|-------------------|--------|
| Modality | (0008,0060) | CS | From Configuration (OP, XC or OT) | ALWAYS | CONFIG |
| Series Instance UID | (0020,000E) | UI | Generated by device | ALWAYS | AUTO |
| Series Number | (0020,0011) | IS | Generated by device | ALWAYS | AUTO |
| Laterality | (0020,0060) | CS | Generated by device | VNAP | AUTO |
| Series Date | (0008,0021) | DA | <yyyyMMdd> | ALWAYS | AUTO |
| Series Time | (0008,0031) | TM | <HHmmss> | ALWAYS | AUTO |
| Performed Physician's Name | (0008,1050) | PN | From Configuration | ANAP | CONFIG |
| Protocol Name | (0018,1030) | LO | Generated by device or application | ALWAYS | AUTO |
| Series Description | (0008,103E) | LO | Generated by device or application | ALWAYS | AUTO |
| Operator's Name | (0008,1070) | PN | From Configuration | ANAP | CONFIG |

**Table 6.1-8
Ophthalmic Photography Series**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------|-------------|----|-------|-------------------|--------|
| Modality | (0008,0060) | CS | OP | ALWAYS | AUTO |

**Table 6.1-9
Synchronization**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--|-------------|-----------|---------------------|--------------------------|---------------|
| Synchronization Frame of Reference UID | (0020,0200) | UI | Generated by device | ALWAYS | AUTO |
| Synchronization Trigger | (0018,106A) | CS | NO TRIGGER | ALWAYS | AUTO |
| Acquisition Time Synchronized | (0018,1800) | CS | N | ALWAYS | AUTO |

**Table 6.1-10
General Equipment**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-----------------------------|-------------|-----------|---------------------|--------------------------|---------------|
| Manufacturer | (0008,0070) | LO | Canon Inc. | ALWAYS | AUTO |
| Institution Name | (0008,0080) | LO | From Configuration | ANAP | CONFIG |
| Station Name | (0008,1010) | SH | From Configuration | ANAP | CONFIG |
| Institution Department Name | (0008,1040) | LO | From Configuration | ANAP | CONFIG |
| Manufacturer's Model Name | (0008,1090) | LO | Generated by device | ANAP | AUTO |
| Device Serial Number | (0018,1000) | LO | Generated by device | ANAP | AUTO |
| Software Version | (0018,1020) | LO | Generated by device | ANAP | AUTO |

**Table 6.1-11
SC Equipment**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-----------------------|-------------|-----------|--------------|--------------------------|---------------|
| Conversion Type | (0008,0064) | CS | DI | ALWAYS | AUTO |

**Table 6.1-12
General Image**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-----------------------------|-------------|----|--|-------------------|-----------------|
| Instance Number | (0020,0013) | IS | Generated by device | ALWAYS | AUTO |
| Patient Orientation | (0020,0020) | CS | L\F | ALWAYS | AUTO |
| Content Date | (0008,0023) | DA | <yyyyMMdd> | ALWAYS | AUTO |
| Content Time | (0008,0033) | TM | <HHmmss> | ALWAYS | AUTO |
| Image Type | (0008,0008) | CS | ORIGINAL or DERIVED\PRIMARY | ALWAYS | AUTO |
| Acquisition Number | (0020,0012) | IS | 1 | ALWAYS | AUTO |
| Derivation Description | (0008,2111) | ST | From configurations | ANAP | AUTO |
| Source Image Sequence | (0008,2112) | SQ | | ANAP | AUTO |
| Referenced SOP Class UID | (0008,1150) | UI | From the images that were used to derive this image. | ANAP | AUTO |
| Referenced SOP Instance UID | (0008,1155) | UI | From the images that were used to derive this image. | ANAP | AUTO |
| Image Comments | (0020,4000) | LT | User input and from configuration | ANAP | USER/ CONFIG |

**Table 6.1-13
Image Pixel**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------------|-------------|----------------|---|-------------------|--------|
| Sample Per Pixel | (0028,0002) | US | 1 or 3 | ALWAYS | AUTO |
| Photometric Interpretation | (0028,0004) | CS | MONOCHROME2 or RGB | ALWAYS | AUTO |
| Rows | (0028,0010) | US | Vertical pixel number | ALWAYS | AUTO |
| Columns | (0028,0011) | US | Horizontal pixel number | ALWAYS | AUTO |
| Bits Allocated | (0028,0100) | US | 8 | ALWAYS | AUTO |
| Bits Stored | (0028,0101) | US | 8 | ALWAYS | AUTO |
| High Bit | (0028,0102) | US | 7 | ALWAYS | AUTO |
| Pixel Representation | (0028,0103) | US | 0 | ALWAYS | AUTO |
| Pixel Data | (7FE0,0010) | OW or OB | Pixel Data | ALWAYS | AUTO |
| Planar Configuration | (0028,0006) | US | 0: Only if Samples per Pixel (0028,0002) has a value 3. | ANAP | AUTO |

**Table 6.1-14
Enhanced Contrast/Bolus**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--|--------------|----|-----------------------------------|-------------------|--------|
| Contrast/Bolus Agent Sequence | (0018,0012) | SQ | Only if contrast was administered | ANAP | AUTO |
| > Code Value | (0008,0100) | SH | C-B02CC or C-B0156 | ANAP | AUTO |
| > Coding Scheme Designator | (0008,0102) | SH | SRT | ANAP | AUTO |
| > Code Meaning | (0008,0104) | LO | Fluorescein or Indocyanin green | ANAP | AUTO |
| > Contrast/Bolus Agent Number | (0018,9337) | US | 1 | ANAP | AUTO |
| > Contrast/Bolus Administration Route Sequence | (0018, 0014) | SQ | | ANAP | AUTO |
| >> Code Value | (0008,0100) | SH | G-D101 | ANAP | AUTO |
| >> Coding Scheme Designator | (0008,0102) | SH | SRT | ANAP | AUTO |
| >> Code Meaning | (0008,0104) | LO | Intravenous route | ANAP | AUTO |
| > Contrast/Bolus Ingredient Code Sequence | (0018,9338) | SQ | Zero length | EMPTY | AUTO |
| > Contrast/Bolus Volume | (0018,1041) | DS | Zero length | EMPTY | AUTO |
| > Contrast/Bolus Ingredient Concentration | (0018,1049) | DS | Zero length | EMPTY | AUTO |

**Table 6.1-15
Multi-Frame**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------------|-------------|----|-------------|-------------------|--------|
| Number of Frames | (0028,0008) | IS | 1 | ALWAYS | AUTO |
| Frame Increment Pointer | (0028,0009) | AT | <0008,002A> | ALWAYS | AUTO |

**Table 6.1-16
Acquisition Context**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|------------------------------|-------------|----|-------------|-------------------|--------|
| Acquisition Context Sequence | (0040,0555) | SQ | Zero length | EMPTY | AUTO |

**Table 6.1-17
SC Image**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------|-----|----|-------|-------------------|--------|
| | | | | | |

The Rics CX-1, MYD, NM, and NM 2 do not output any SC Image tag. Therefore, the table is empty.

**Table 6.1-18
VL Image**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------------|-------------|----|-----------------------------|-------------------|--------|
| Image Type | (0008,0008) | CS | ORIGINAL or DERIVED\PRIMARY | ALWAYS | AUTO |
| Lossy Image Compression | (0028,2110) | CS | Zero length | EMPTY | AUTO |
| Window Center | (0028,1050) | DS | From configurations | ANAP | AUTO |
| Window Width | (0028,1051) | DS | From configurations | ANAP | AUTO |

**Table 6.1-19
Ophthalmic Photography Image**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------|-------------|----|---|-------------------|--------|
| Image Type | (0008,0008) | CS | The value depends on the model of device. Rics CX-1 and MYD: ORIGINAL\PRIMARY\COLOR, ORIGINAL\PRIMARY\REDFREE, ORIGINAL\PRIMARY\BLUE, ORIGINAL\PRIMARY\FA, ORIGINAL\PRIMARY, DERIVED\PRIMARY\COLOR, DERIVED\PRIMARY\REDFREE, DERIVED\PRIMARY\BLUE, DERIVED\PRIMARY\RED, or DERIVED\PRIMARY Rics NM and NM 2: ORIGINAL\PRIMARY\COLOR, ORIGINAL\PRIMARY, DERIVED\PRIMARY\COLOR, DERIVED\PRIMARY\REDFREE, DERIVED\PRIMARY\BLUE, DERIVED\PRIMARY\RED, or DERIVED\PRIMARY | ALWAYS | AUTO |
| Acquisition Datetime | (0008,002A) | DT | <yyyyMMddHHmmss.fffff> | ALWAYS | AUTO |
| Burned In Annotation | (0028,0301) | CS | NO | ALWAYS | AUTO |

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--------------------------------|-------------|----|--|-------------------|--------|
| Lossy Image Compression | (0028,2110) | CS | 00 = Image has NOT been subjected to lossy compression. 01 = Image has been subjected to lossy compression. | ALWAYS | AUTO |
| Lossy Image Compression Ratio | (0028,2112) | DS | Generated by device: Only if Lossy Images Compression (0028,2110) is "01". | ANAP | AUTO |
| Lossy Image Compression Method | (0028,2114) | CS | ISO_10918_1: Only if Lossy Images Compression (0028,2110) is "01". | ANAP | AUTO |
| Presentation LUT Shape | (2050,0020) | CS | IDENTITY: Only if Photometric Interpretation (0028,0004) = MONOCHROME2 | ANAP | AUTO |
| Pixel Spacing | (0028,0030) | DS | Generated by device | ALWAYS | AUTO |

Table 6.1-20
Ophthalmic Photographic Parameters

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--|-------------|----|--|-------------------|--------|
| Acquisition Device Type Code Sequence | (0022,0015) | SQ | | ALWAYS | AUTO |
| > Code Value | (0008,0100) | SH | R-1021A | ALWAYS | AUTO |
| > Coding Scheme Designator | (0008,0102) | SH | SRT | ALWAYS | AUTO |
| > Code Meaning | (0008,0104) | LO | Fundus Camera | ALWAYS | AUTO |
| Illumination Type Code Sequence | (0022,0016) | SQ | Zero length | EMPTY | AUTO |
| Light Path Filter Type Stack Code Sequence | (0022,0017) | SQ | | VNAP | AUTO |
| > Code Value | (0008,0100) | SH | The value depends on the model of device. Rics CX-1 and MYD: 111601, 111603 or 111609 Rics NM and NM 2: 111601 | ANAP | AUTO |
| > Coding Scheme Designator | (0008,0102) | SH | DCM | ANAP | AUTO |
| > Code Meaning | (0008,0104) | LO | Green filter, Blue filter or No filter | ANAP | AUTO |
| Image Path Filter Type Stack Code Sequence | (0022,0018) | SQ | | VNAP | AUTO |
| > Code Value | (0008,0100) | SH | The value depends on the model of device. Rics CX-1 and MYD: 111604, 111606 or 111609 Rics NM and NM 2: 111601 | ANAP | AUTO |

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------------|-------------|----|---|-------------------|--------|
| > Coding Scheme Designator | (0008,0102) | SH | DCM | ANAP | AUTO |
| > Code Meaning | (0008,0104) | LO | The value depends on the model of device. Rics CX-1 and MYD: Green filter, Infrared filter or No filter Rics NM and NM 2: No filter | ALWAYS | AUTO |
| Lenses Code Sequence | (0022,0019) | SQ | Zero length | EMPTY | AUTO |
| Detector Type | (0018,7004) | CS | CMOS | VNAP | AUTO |

Table 6.1-21
Ophthalmic Photography Acquisition Parameters

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|---------------------------------|-------------|----|---|-------------------|--------------|
| Patient Eye Movement Commanded | (0022,0005) | CS | Zero length | EMPTY | AUTO |
| Refractive State Sequence | (0022,001B) | SQ | Zero length | EMPTY | AUTO |
| Emmetropic Magnification | (0022,000A) | FL | Zero length | EMPTY | AUTO |
| Intra Ocular Pressure | (0022,000B) | FL | Zero length | EMPTY | AUTO |
| Horizontal Field of View | (0022,000C) | FL | Zero length | EMPTY | AUTO |
| Pupil Dilated | (0022,000D) | CS | YES, NO or Zero length | VNAP | CONFIG |
| Mydriatic Agent Sequence | (0022,0058) | SQ | Only if Pupil Dilated (0022,000D) is YES. | ANAP | CONFIG |
| > Mydriatic Agent Code Sequence | (0022,001C) | SQ | | ANAP | CONFIG |
| >> Code Value | (0008,0100) | SH | C-677B9, C-677C0, C-97520, C-68165 or C-97580 | ANAP | USER /CONFIG |
| >> Coding Scheme Designator | (0008,0102) | SH | SRT | ANAP | USER /CONFIG |
| >> Code Meaning | (0008,0104) | LO | Atropine, Homatropine, Cyclopentolate, Phenylephrine or Tropicamide | ANAP | USER /CONFIG |
| Degree of Dilatation | (0022,000E) | FL | User input. Only if Pupil Dilated (0022,000D) is YES. | ANAP | USER /CONFIG |

**Table 6.1-22
Ocular Region Imaged**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------------|-------------|----|---|-------------------|--------|
| Image Laterality | (0020,0062) | CS | R, L or B | ALWAYS | AUTO |
| Anatomic Region Sequence | (0008,2218) | SQ | | ALWAYS | AUTO |
| > Code Value | (0008,0100) | SH | The value depends on the model of device. Rics CX-1, MYD, and NM: T-AA610 Rics NM 2: T-AA610 or T-AA000 | ALWAYS | AUTO |
| > Coding Scheme Designator | (0008,0102) | SH | SRT | ALWAYS | AUTO |
| > Code Meaning | (0008,0104) | LO | The value depends on the model of device. Rics CX-1, MYD, and NM: Retina Rics NM 2: Retina or Eye | ALWAYS | AUTO |

**Table 6.1-23
Modality LUT**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------|-------------|----|-------|-------------------|--------|
| Rescale Intercept | (0028,1052) | DS | 0 | ALWAYS | AUTO |
| Rescale Slope | (0028,1053) | DS | 1 | ALWAYS | AUTO |
| Rescale Type | (0028,1054) | LO | US | ALWAYS | AUTO |

**Table 6.1-24
SOP Common**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|------------------------|-------------|----|---|-------------------|--------|
| SOP Class UID | (0008,0016) | UI | 1.2.840.10008.5.1.4.1.1.77.1.5.1(OP8), 1.2.840.10008.5.1.4.1.1.77.1.4(VL) or 1.2.840.10008.5.1.4.1.1.7(SC) | ALWAYS | AUTO |
| SOP Instance UID | (0008,0018) | UI | Generated by device | ALWAYS | AUTO |
| Specific Character Set | (0008,0005) | CS | ISO_IR 100, ISO_IR 101, ISO_IR 144, ISO_IR 126, ISO_IR 148, ISO_IR 13, \ISO 2022 IR 13, \ISO 2022 IR87, ISO 2022 IR 13\ISO 2022 IR87, \ISO 2022 IR 13\ISO 2022 IR87, GB18030 or ISO_IR 192 | ANAP | CONFIG |

6.1.2 Used Fields in Received IOD by Application

The storage application of Rics CX-1, MYD, NM, or NM 2 does not receive SOP Instances. The usage of attributes received via Modality Worklist is described in section **2.2.2.3.1.3**.

6.1.3 Attribute Mapping

The relationships between attributes received via Modality Worklist, stored in acquired images and communicated via MPPS are summarized in **Table 6.1-25**.

Table 6.1-25
Attribute Mapping between Modality Worklist, Image and MPPS

| Modality Worklist | Image IOD | MPPS IOD |
|--------------------------------------|----------------------------|---------------------------------------|
| Patient Name | Patient Name | Patient Name |
| Patient ID | Patient ID | Patient ID |
| Other Patient IDs | Other Patient IDs | |
| Ethnic Group | Ethnic Group | |
| Patient's Birth Date | Patient's Birth Date | Patient's Birth Date |
| Patient's Sex | Patient's Sex | Patient's Sex |
| Patient's Weight | Patient's Weight | |
| Patient's Age | Patient's Age* | |
| Patient's Size | Patient's Size | |
| Referring Physician's Name | Referring Physician's Name | |
| — | — | Scheduled Step Attributes Sequence |
| Study Instance UID | Study Instance UID | >Study Instance UID |
| Referenced Study Sequence | | >Referenced Study Sequence |
| Accession Number | Accession Number | >Accession Number |
| Scheduled Procedure Step ID | — | >Scheduled Procedure Step ID |
| Scheduled Procedure Step Description | Study Description | >Scheduled Procedure Step Description |
| — | Study ID | Study ID |
| — | Protocol Name | Protocol Name |
| — | Operators' Name | Operators' Name |
| — | Series Instance UID | Series Instance UID |
| — | Series Description | Series Description |

6.1.4 Coerced/Modified Fields

The Modality Worklist AE will reject attribute values received in the response to a Modality Worklist Query if the value length is longer than the maximum length permitted by the attribute's VR.

6.2 Data Dictionary of Private Attributes

Rics CX-1, MYD, NM, and NM 2 do not support private attributes.

6.3 Coded Terminology and Templates

Rics CX-1, MYD, NM, and NM 2 do not support coded terminology and templates.

6.4 Grayscale Image Consistency

Rics CX-1, MYD, NM, and NM 2 do not support grayscale image consistency.

6.5 Standard Extended/Specialized/Private SOP Classes

Rics CX-1, MYD, NM, and NM 2 do not claim conformance to any extended, specialized or private SOP classes.

6.6 Private Transfer Syntaxes

Rics CX-1, MYD, NM, and NM 2 do not support private transfer syntaxes.



*L-IE-5185 *

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