



**Orpheus
DICOM Conformance Statement Document**

PSW-81-006

Rev.: 01

Pg. 1 of 28

Written or Updated by:			
Name	Title	Date	Signature
Tomer Ben-Sira	VP Product Management	20-Mar-2020	<i>Tomer Ben-Sira</i>

Reviewed by:			
Name	Title	Date	Signature
Yaron Frid	Senior System Architect/Engineering	20-Mar-2020	<i>YF</i>

Approved by:			
Name	Title	Date	Signature
Tomer Ben-Sira	VP Product Management	20-Mar-2020	<i>Tomer Ben-Sira</i>

Document Change History

Revision Number	Date	Responsible Person	Description of Change
01	22-Mar-2020	Tomer Ben-Sira	New template and additional capabilities (C-Store SCP, Modality Worklist SCP)



**Orpheus
DICOM Conformance Statement Document**

PSW-81-006

Rev.: 01

Pg. 2 of 28

Contents

1.	Introduction	4
1.1.	Purpose and Audience	4
1.2.	Overview of Scope and Capabilities	4
1.2.1.	Network Services	5
1.3.	Liability	6
1.4.	Acronyms and Abbreviations	6
2.	Implemented Model	8
2.1.	Application Data Flow Diagram	8
2.2.	Functional Definitions and Application Entities	9
2.2.1.	Sender AE	10
2.2.2.	Importer AE	10
2.2.3.	Query/Retrieve Client AE	10
2.2.4.	Modality Worklist Client AE	10
2.2.5.	Modality Worklist Server AE	10
2.3.	Sequencing of Real-World Events	10
3.	AE Specifications	11
3.1.	Sender AE Specifications	11
3.1.1.	SOP Classes	11
3.1.2.	Association Establishment Policies	12
3.1.3.	Association Initiation Policy	12
3.2.	Importer AE Specifications	16
3.2.1.	SOP Classes	16
3.2.2.	Association Establishment Policies	17
3.2.3.	Association Acceptance Policy	18
3.3.	Query/Retrieve Client AE Specification	19
3.3.1.	SOP Classes	19
3.3.2.	Association Establishment Policies	19
3.3.3.	Association Initiation Policy	19
3.4.	Modality Worklist Client AE Specification	21
3.4.1.	SOP Classes	21



**Orpheus
DICOM Conformance Statement Document**

PSW-81-006

Rev.: 01

Pg. 3 of 28

- 3.4.2. Association Establishment Policies 21
- 3.4.3. Association Initiation Policy 21
- 3.5. Modality Worklist Server AE Specification 24
 - 3.5.1. SOP Classes 24
 - 3.5.2. Association Establishment Policies 24
 - 3.5.3. Association Initiation Policy 24
- 4. Network Interfaces 27
 - 4.1. Supported Communication Stacks 27
 - 4.2. TCP/IP Stack 27
 - 4.2.1. Physical Medium Supported 27
- 5. Configuration 27
 - 5.1. AE Title Address Mapping 27
 - 5.1.1. Local AE Titles 27
 - 5.1.2. Remote AE Title Address Mapping 27

1. Introduction

1.1. Purpose and Audience

- This document is the DICOM Conformance Statement for the DICOM Services provided by the Orpheus System.
- The user of this document is involved with system integration and/or software design.
- It is assumed that the reader is familiar with the terminology and concepts that are used in the DICOM standard, HL7 standard and the IHE Technical Framework.
- Readers not familiar with DICOM terminology should first read the appropriate parts of the DICOM standard itself, prior to reading this conformance statement.
- Although the use of this conformance statement in conjunction with the DICOM standard is intended to facilitate communication with Orpheus System, it is not sufficient to guarantee, by itself, the inter-operation of the connection between Orpheus System and the 3rd party DICOM-based system.
- The integration of any device into a system of interconnected devices goes beyond the scope of the HL7 standard and this conformance statement when interoperability is desired.
- The responsibility for analyzing the applications requirements and developing a solution that integrates the Orpheus System with other vendors' systems is the user's responsibility and should not be underestimated.

1.2. Overview of Scope and Capabilities

The Orpheus System provides the following DICOM services and applications as summarized in the table below:

DICOM Service	Explanation
C-Store SCU	Selectively (manual or automatic) send an image or a video file to a pre-defined list of PACS or VNA destinations
C-Store SCP	Provide C-Store server functionality to accept DICOM objects (image, cine clips, etc.) and store them on the Orpheus System.
Query and Retrieve	Selectively, according to predefined rules, query a PACS/VNA system to retrieve DICOM files and store them and present them on the Orpheus System.
Modality Worklist SCU	Query a DICOM Modality provider (RIS, PACS, etc.) to build a list of procedure orders in the Orpheus System to use with the Orpheus CAST capture solutions or other import options (3 rd party interface, etc.)
Modality Worklist SCP	Build a DICOM Modality Worklist object from received patient and procedure details (via HL7) and serve as the Modality Worklist provider to a DICOM modality (e.g. ultrasound machine, fluoroscopy, etc.).
Modality Performed Procedure Step SCU	The Orpheus System sends an MPPS message at the beginning of a procedure and at the end.

1.2.1. Network Services

The following table provides an overview of the network services supported by the Orpheus System v. 2017

DICOM SOP Class Name	SOP Class UID	SCU	SCP
Verification			
Verification	1.2.840.10008.1.1	Yes	Yes
Transfer			
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
MR Image	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
X-Ray Radio-fluoroscopy Image	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes
VL Endoscopic Image	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	No
VL Microscopic	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	No
VL Photographic Image	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	No
Secondary Capture Video	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes
Video Endoscopic Image	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	No
Ultrasound Multi-frame	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
Ultrasound Video	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
X-Ray Angiographic Multi-frame	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
X-Ray Radio-fluoroscopy Multi-frame	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes
Video Photographic Image	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	No
Basic Text Structured Report (SR)	1.2.840.10008.5.1.4.1.1.88.11	Yes	No
Query/Retrieve			



**Orpheus
DICOM Conformance Statement Document**

PSW-81-006

Rev.: 01

Pg. 6 of 28

DICOM SOP Class Name	SOP Class UID	SCU	SCP
Study Root Q/R – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Q/R – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Workflow Management			
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	Yes
Modality Worklist	1.2.840.10008.5.1.4.31	Yes	Yes
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes	No

1.3. Liability

Orpheus Medical is not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this publication. This publication may only be used in connection with the promotion, sales, installation and use of Orpheus Medical equipment by Orpheus Medical personnel.

1.4. Acronyms and Abbreviations

Acronym	Explanation
ACR	American College of Radiology
ADT	An HL7 message group for admission, registration and transfer information at the patient and visit levels.
AE	Application Entity
AIP	Scheduled message segment
AIS	Scheduled message segment
ANSI	American National Standards Institute
DICOM	Digital Imaging and Communications in Medicine
EHR	Electronic Health Record
EMR	Electronic Medical Record
GUI	Graphic User Interface
HIS	Hospital Information System
HL7	Health Level 7
IHE	Integrating the Healthcare Enterprise



**Orpheus
DICOM Conformance Statement Document**

PSW-81-006

Rev.: 01

Pg. 7 of 28

Acronym	Explanation
IOD	Information Object Definition
MSH	Message Header segment
NEMA	National Electrical Manufacturers Association
OBR	Observation Request segment
ORC	Common Order segment
ORM	An HL7 message type for scheduled orders
ORU	An HL7 message type for order results
PACS	Picture Archiving and Communications System
PDU	Protocol Data Unit
PID	Patient ID segment
PV1	Patient Visit segment
RIS	Radiology Information System
SCP	Service Class Provider
SCU	Service Class User
SIU	An HL7 message group for scheduling messages, cancellations, rescheduling and updates.
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
VNA	Vendor Neutral Archive
VR	Value Representation
SR	Structured Report

2. Implemented Model

2.1. Application Data Flow Diagram

The following figure 1 depicts:

- the Image/Video Send Instances to an external system (i.e. PACS)
- the Study Query/Retrieve request from an external system (i.e. PACS)
- the Modality Worklist request from an external system (i.e. RIS)

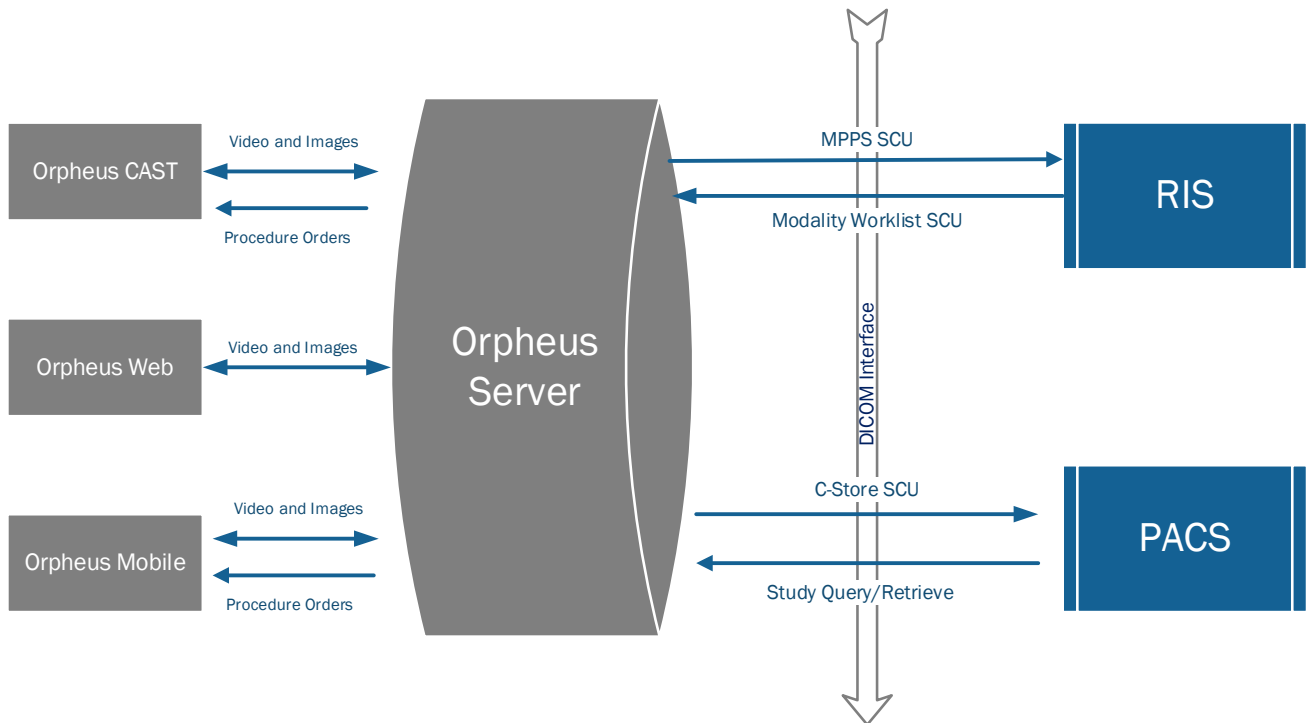


Figure 1 - Application Data Flow #1

The following figure 2 depicts:

- the receiving of scheduled messages, orders or ADT messages to the Orpheus System that are used to build a modality workload.
- the Image Receive Instances from an external system (i.e. a DICOM Modality)
- the Modality Worklist Send instance to an external system (i.e. a DICOM Modality)

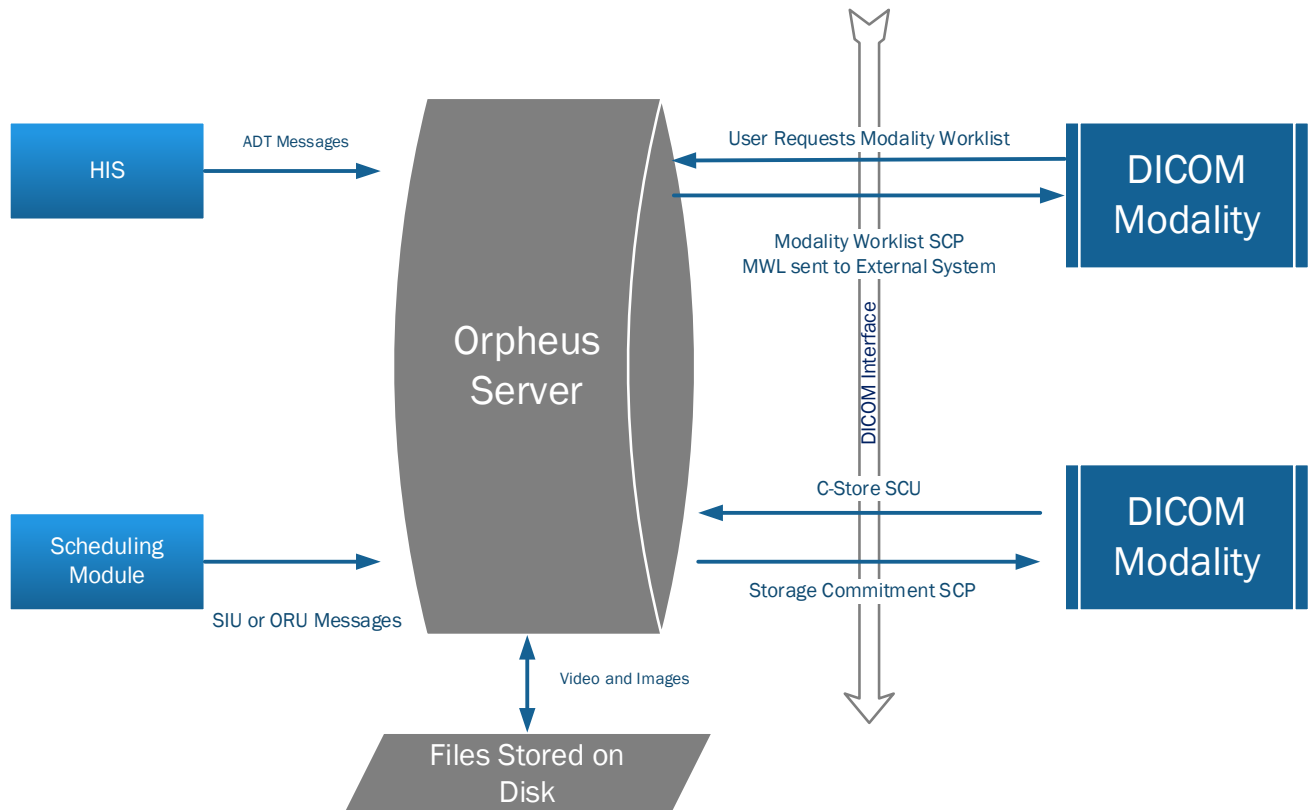


Figure 2 - Application Data Flow #2

2.2. Functional Definitions and Application Entities

The Orpheus System contains the following local AE and Service Providers:

1. Sender
2. Importer
3. Query/Retrieve Client
4. Modality Worklist Client
5. Modality Worklist Server

2.2.1. Sender AE

The Sender AE acts as an SCU and implements the Storage Service Class operation. It can transmit images that have been received from prior external DICOM transmissions. It also acts as an SCU for the Storage Commitment Push Model SOP Class.

2.2.2. Importer AE

The Importer AE acts as an SCP and implements the Storage Service Class operation. It can receive unsolicited image storage requests from external DICOM storage SCUs. It also acts as an SCP for the Storage Commitment Push Model SOP Class.

2.2.3. Query/Retrieve Client AE

The Query/Retrieve Client AE implements the Query/Retrieve Service Class as an SCU. It can act as an SCU to query remote AEs for patient, study and series information. It can also request the retrieval of Composite SOP Instances from remote AEs using C-MOVE Requests. When doing so, it always specifies the Importer AE running on the same Orpheus System as the C-MOVE Destination AE.

2.2.4. Modality Worklist Client AE

The Modality Worklist Client AE implements the Modality Worklist SOP Class as an SCU. It cannot be triggered through the user interface. Instead it will repeatedly query for the latest Modality Worklist, with a configurable delay period between each query.

2.2.5. Modality Worklist Server AE

The Modality Worklist Server AE implements the Modality Worklist SOP Class as an SCP. It cannot be triggered through the Orpheus user interface. Instead it will respond to a Modality Worklist request sent from an External System (i.e. an imaging modality).

2.3. Sequencing of Real-World Events

No sequencing of Real-World activities is required. An association is opened at the beginning of each activity and the association is ended when the activity is completed.

3. AE Specifications

3.1. Sender AE Specifications

3.1.1. SOP Classes

The Orpheus System Sender AE provides standard conformance to the following DICOM v 3.0 SOP Class as SCU/SCP

DICOM SOP Class Name	SOP Class UID	SCU	SCP
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No

The following table specifies the SOP Classes that are supported for the Sender AE

DICOM SOP Class Name	SOP Class UID	SCU
Verification		
Verification	1.2.840.10008.1.1	Yes
Transfer		
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	Yes
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Yes
MR Image	1.2.840.10008.5.1.4.1.1.4	Yes
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	Yes
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	Yes
X-Ray Radio-fluoroscopy Image	1.2.840.10008.5.1.4.1.1.12.2	Yes
VL Endoscopic Image	1.2.840.10008.5.1.4.1.1.77.1.1	Yes
VL Microscopic	1.2.840.10008.5.1.4.1.1.77.1.2	Yes
VL Photographic Image	1.2.840.10008.5.1.4.1.1.77.1.4	Yes
Secondary Capture Video	1.2.840.10008.5.1.4.1.1.7.4	Yes
Video Endoscopic Image	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes
Ultrasound Multi-frame	1.2.840.10008.5.1.4.1.1.3.1	Yes
Ultrasound Video	1.2.840.10008.5.1.4.1.1.3.1	Yes
X-Ray Angiographic Multi-frame	1.2.840.10008.5.1.4.1.1.12.1	Yes

DICOM SOP Class Name	SOP Class UID	SCU
X-Ray Radio-fluoroscopy Multi-frame	1.2.840.10008.5.1.4.1.1.12.2	Yes
Video Photographic Image	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes
Basic Text Structured Report (SR)	1.2.840.10008.5.1.4.1.1.88.11	Yes
Workflow Management		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes

3.1.2. Association Establishment Policies

The AE specifications contains a description of the General Association Establishment and Acceptance policies of the Application Entity.

3.1.2.1. General

- The application context name: 1.2.840.10008.3.1.1.1
- Maximum PDU size offered: no limit
- Maximum PDU size accepted: no limit

3.1.2.2. Number of Associations

Not configured. The Orpheus System establishes one association at a time for each destination for a transfer request that is being processed in the active queue. Only a single job is active and the other remaining jobs in the queue are pending until the active job is either completed or has failed.

3.1.2.3. Asynchronous Nature

The Orpheus System does not support asynchronous communication. The maximum number of outstanding asynchronous transactions is one (1).

3.1.2.4. Implementation Identifying Information

Instance Creator UID Prefix	1.2.826.0.1.3680043.9.6362
Implementation Class UID	2.16.124.113543.6021.1
Implementation Version Name	RZDCX 2 0 8 4

3.1.3. Association Initiation Policy

3.1.3.1. Activity – Send Files

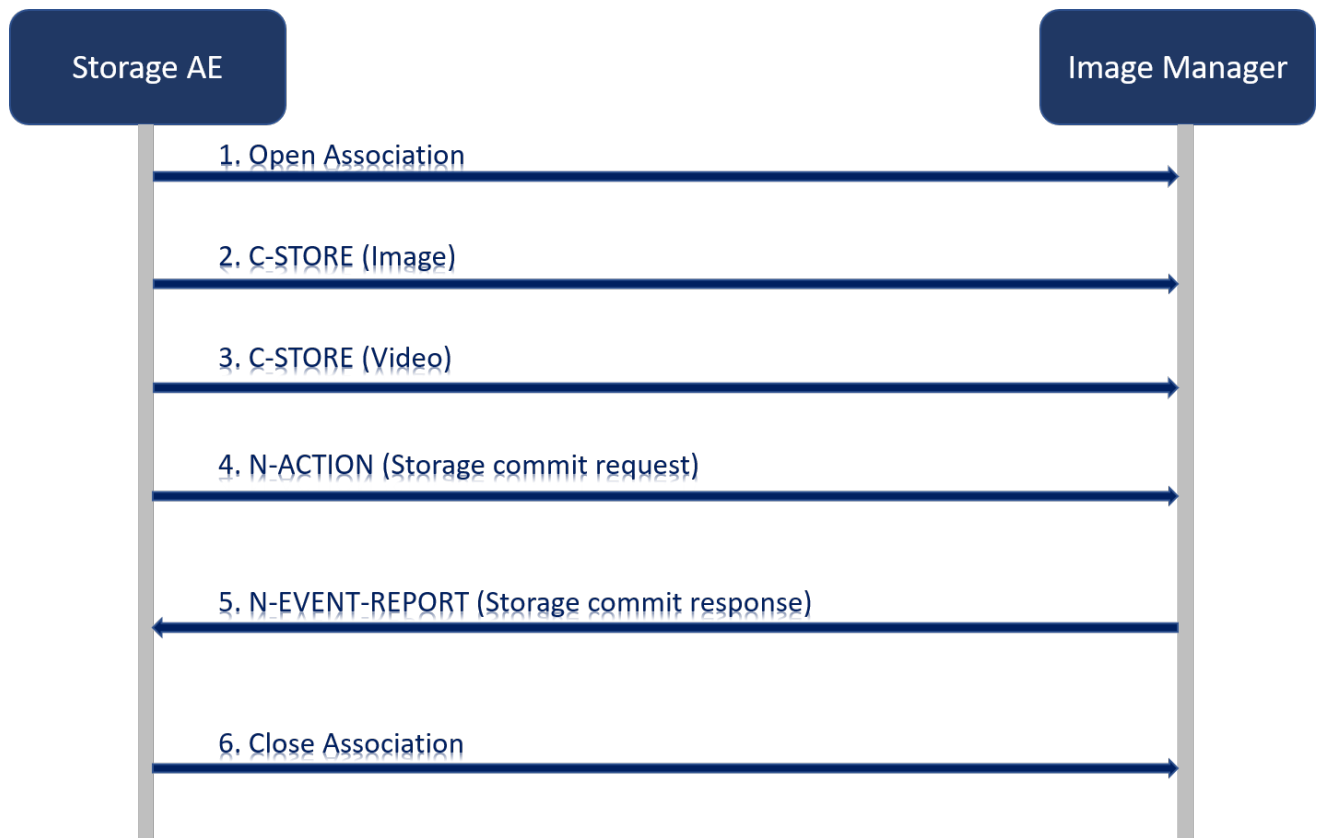
Description and Sequencing Activity

The Orpheus System will selectively (automatically according to specific workflow rules or manually by the user) send (C-Store) files to a remote system, which will consist of the images, videos or file (i.e. PDF) in the study content (series).

If the process establishes an association to a remote AE, the Orpheus System will send each instance in sequence, one at a time, via the open association. The status of transfer is reported through the job control interface. If the C-STORE Response from the remote association is of status other than Success or Warning, the association is terminated and the related job is in failed state.

The Sender AE attempts to establish a new association to send a C-STORE request, and if there are multiple files, it will perform the job for each file (i.e. multiple C-STORE requests) over the same association.

1. Image - the image is a JPEG Lossy image and is a representation of the snapshot taken by the Orpheus CAST device in the procedure/operating room.
2. The video is sent over as one of the following options:
 - a. An embedded MP4 video file.
 - b. A link of the video to the Orpheus Web application in the Results Comments tag (4008,4000).
3. The PDF file is encapsulated in the DICOM.
4. DICOM SR – a text DICOM Structured Report object is sent containing all study meta-data and file information and meta-data for each file (series and instance) in the study.



Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID	Class	
Study case	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR little endian	1.2.840.10008.1.2	SCU	None
Patient Identification	Patient Name				(0010,0010)
	Patient ID				(0010,0020)
	Patient Address				(0010,1040)
	Patient Phone				(0010,2154)
	Patient Age				(0010,1010)
Patient Demographic	Patient Birth Date				(0010,0030)
	Patient Sex				(0010,0040)
Study Reference	Accession Number				(0008,0050)
	ScheduledStationAETitle				(0040,0001)
	Modality				(0008,0060)
	StudyInstanceUID				(0020,000D)
	StudyDescription				(0008,1030)
	Results Comments				(4008,4000)
Series Reference	SeriesInstanceUID				(0020,000E)
	SeriesNumber				(0020,0011)
Data Reference	MimeTypeOfEncasulatedDocument				(0012,0042)
	ConversionType				(0064,0008)
Manufacturer Information	ManufacturerModelName				(1090,0008)



Note: The conversion types are:

1. DV – for video
2. DRW – for image
3. WSD – for PDF document



Note: The ManufacturerModelName will be:

1. MedicVOD-VIDEO – for video
2. MedicVOD-IMAGE – for image
3. MedicVOD-PDF – for a PDF file.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
SC Image Capture	1.2.840.10008.5.1.4.1.1.7	JPEG Baseline	1.2.840.10008.1.2.4.50	SCU	None
SC Video Capture	1.2.840.10008.5.1.4.1.1.7.4	MPEG-4	1.2.840.10008.1.2.4.102	SCU	



**Orpheus
DICOM Conformance Statement Document**

PSW-81-006

Rev.: 01

Pg. 15 of 28

Presentation Context Table					
Storage Commit Push Model	1.2.840.10008.1.20	Implicit VR little endian	1.2.840.10008.1.2	SCU	

3.2. Importer AE Specifications

3.2.1. SOP Classes

The Orpheus System Sender AE provides standard conformance to the following DICOM v 3.0 SOP Class as SCP

DICOM SOP Class Name	SOP Class UID	SCP
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes

The following table specifies the SOP Classes that are supported for the Importer AE

DICOM SOP Class Name	SOP Class UID	SCP
Verification		
Verification	1.2.840.10008.1.1	Yes
Transfer		
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	Yes
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Yes
MR Image	1.2.840.10008.5.1.4.1.1.4	Yes
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	Yes
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	Yes
X-Ray Radio-fluoroscopy Image	1.2.840.10008.5.1.4.1.1.12.2	Yes
VL Endoscopic Image	1.2.840.10008.5.1.4.1.1.77.1.1	Yes
VL Microscopic	1.2.840.10008.5.1.4.1.1.77.1.2	Yes
VL Photographic Image	1.2.840.10008.5.1.4.1.1.77.1.4	Yes
Secondary Capture Video	1.2.840.10008.5.1.4.1.1.7.4	Yes
Video Endoscopic Image	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes
Ultrasound Multi-frame	1.2.840.10008.5.1.4.1.1.3.1	Yes
Ultrasound Video	1.2.840.10008.5.1.4.1.1.3.1	Yes
X-Ray Angiographic Multi-frame	1.2.840.10008.5.1.4.1.1.12.1	Yes
X-Ray Radio-fluoroscopy	1.2.840.10008.5.1.4.1.1.12.2	Yes

DICOM SOP Class Name	SOP Class UID	SCP
Multi-frame		
Video Photographic Image	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes
Basic Text Structured Report (SR)	1.2.840.10008.5.1.4.1.1.88.11	Yes
Workflow Management		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes

3.2.2. Association Establishment Policies

The AE specifications contains a description of the General Association Establishment and Acceptance policies of the Application Entity.

3.2.2.1. General

- The application context name: 1.2.840.10008.3.1.1.1
- Maximum PDU size offered: no limit
- Maximum PDU size accepted: no limit

3.2.2.2. Number of Associations

Not configured. The Orpheus System does not initiate an association but establishes one association at a time for each request that is being processed in the active queue. Only a single job is active and the other remaining jobs in the queue are pending until the active job is either completed or has failed.

3.2.2.3. Asynchronous Nature

The Orpheus System does not support asynchronous communication. The maximum number of outstanding asynchronous transactions is one (1).

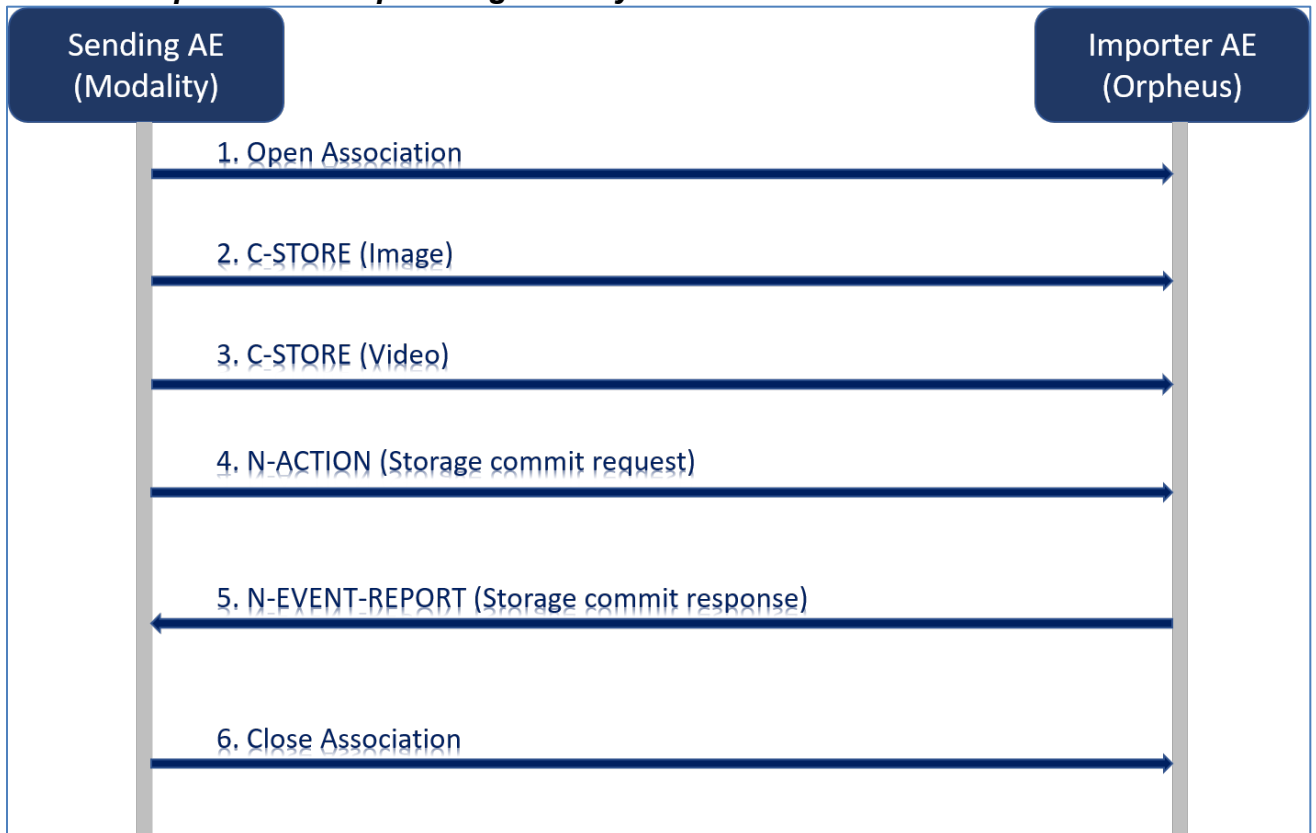
3.2.2.4. Implementation Identifying Information

Instance Creator UID Prefix	1.2.826.0.1.3680043.9.6362
Implementation Class UID	2.16.124.113543.6021.1
Implementation Version Name	RZDCX_2_0_8_4

3.2.3. Association Acceptance Policy

3.2.3.1. Activity

Description and Sequencing Activity



Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
See table in section 3.2.1 above	See table in section 3.2.1 above	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

3.3. Query/Retrieve Client AE Specification

3.3.1. SOP Classes

The Orpheus System Query/Retrieve Client AE provides standard conformance to the following DICOM v 3.0 SOP Class as SCU/SCP

DICOM SOP Class Name	SOP Class UID	SCU
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes

3.3.2. Association Establishment Policies

3.3.2.1. General

The Orpheus System AE will initiate Associations. The DICOM standard Application Context Name for DICOM is always accepted:

- The application context name: 1.2.840.10008.3.1.1.1
- Maximum PDU size offered: no limit
- Maximum PDU size accepted: no limit

3.3.2.2. Number of Associations

Not configured. The Orpheus System establishes one association at a time for each job for a find/move request that is being processed in the active queue. Only a single job is active and the other remaining jobs in the queue are pending until the active job is either completed or has failed.

3.3.2.3. Asynchronous Nature

The Orpheus System does not support asynchronous communication. The maximum number of outstanding asynchronous transactions is one (1).

3.3.2.4. Implementation Identifying Information

Implementation Class UID	2.16.124.113543.6021.1
Implementation Version Name	RZDCX_2_0_8_4

3.3.3. Association Initiation Policy

3.3.3.1. Activity C-FIND and C-MOVE

The Orpheus System will send a query command (C-FIND) in order to facilitate a subsequent C-MOVE command from a remote system into the Orpheus System. The results are on the “STUDY” level and will contain all study information in order to retrieve these studies within a C-MOVE command.

The Orpheus System will send a query/retrieve command (C-MOVE) in order to facilitate a C-MOVE command from a remote system into the Orpheus Server. The study cases are only image series for a patient that has a procedure scheduled in the Orpheus System.



**Orpheus
DICOM Conformance Statement Document**

PSW-81-006

Rev.: 01

Pg. 20 of 28

Description and Sequencing Activity

Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study case FIND	x.y.z.w	Implicit VR Little Endian	1.2.840.10008.1.2	FIND	None
Study case MOVE	x.y.z.w	Implicit VR Little Endian	1.2.840.10008.1.2	MOVE	

SOP Specific Conformance as an Association Requestor

FIND Query		
Module	Description	TAG
Query	Query Retrieve Level = "STUDY"	(0052,0008)
Patient Identification	Patient Name = "*"	(0010,0010)
	Patient ID = "*"	(0010,0020)
Study Reference	Study Date	(0020,0008)
	Modality	(0008,0060)
	StudyInstanceUID	(0020,000D)

3.4. Modality Worklist Client AE Specification

3.4.1. SOP Classes

The Orpheus Modality Worklist Client AE provides standard conformance to the following DICOM v 3.0 SOP Class as SCU/SCP

DICOM 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

3.4.2. Association Establishment Policies

3.4.2.1. General

The AE specifications contains a description of the General Association Establishment and Acceptance policies of the Application Entity.

3.4.2.2. General

- The application context name: 1.2.840.10008.3.1.1.1
- Maximum PDU size offered: no limit
- Maximum PDU size accepted: no limit

3.4.2.3. Number of Associations

Not configured. The Orpheus System establishes one association at a time for each modality worklist request being processed in the active queue. Only a single job is active and the other remaining jobs in the queue are pending until the active job is either completed or has failed.

3.4.2.4. Asynchronous Nature

The Orpheus System does not support asynchronous communication.
The maximum number of outstanding asynchronous transactions is one (1).

3.4.2.5. Implementation Identifying Information

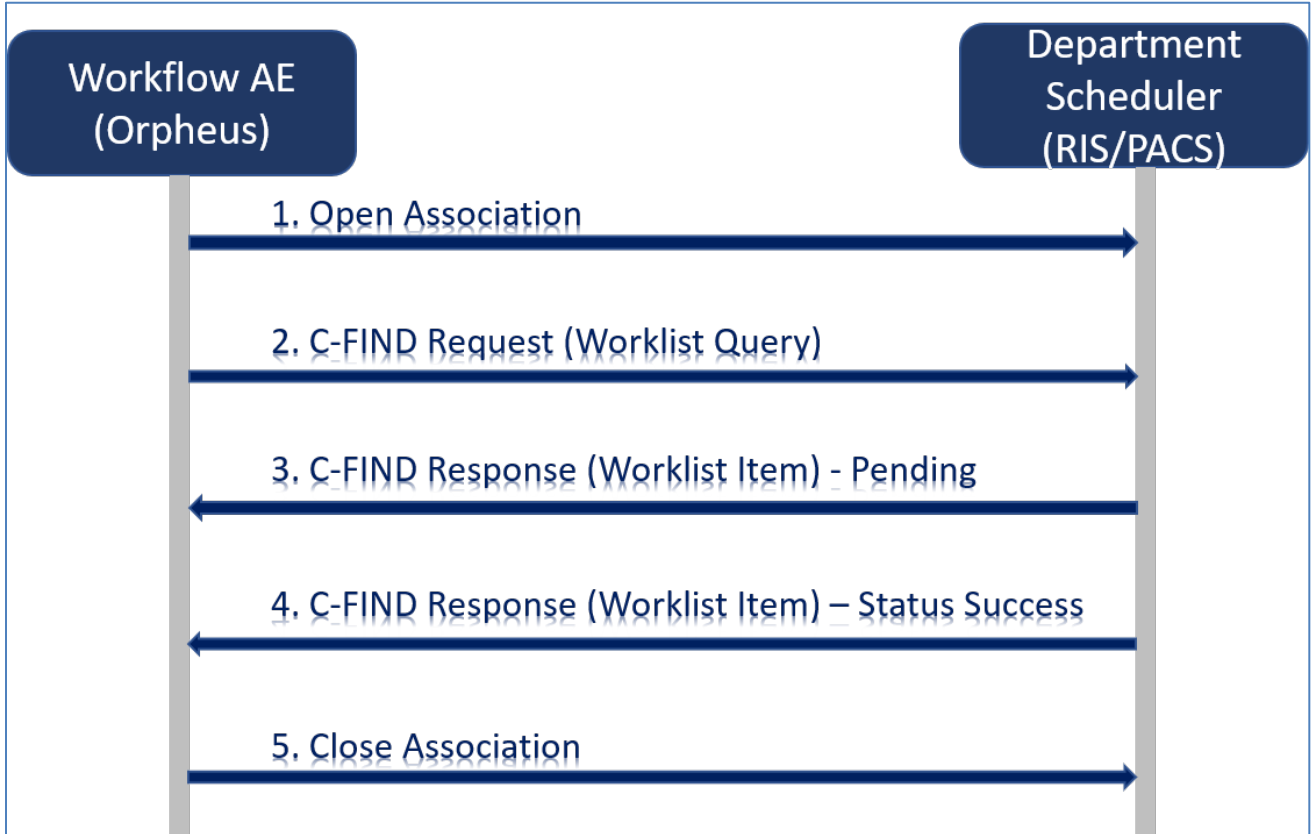
Instance Creator UID Prefix	1.2.826.0.1.3680043.9.6362
Implementation Class UID	
Implementation Version Name	RZDCX_2_0_8_4

3.4.3. Association Initiation Policy

3.4.3.1. Activity

The request for a Worklist Update is initiated by the Orpheus System automatically at specific configurable time intervals. The Orpheus System uses predefined sets of parameters to automatically query the worklist provider: modality type and time interval for the Scheduled Procedure Step Start Date.

Upon initiation of the request (automatic trigger), the Orpheus System 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, the Orpheus System will access the local database to add or update patient demographic data. The results will be displayed in a separate list, which will be cleared with the next worklist update.



Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information Model – FIND	1.2.84.0.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2.	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

SOP Specific Conformance as a Modality Worklist Requestor

The following table specifies the fields included in the query request to return them for each response.

Modality Worklist Query		
Module	Description	TAG
Scheduled Procedure Step	Schedule Procedure Step Sequence	(0040,0100)
	• Schedule Procedure Step Start Time	(0040,0002)
	• Schedule Procedure Step Stop Time	(0040,0003)
	• Modality	(0008,0060)
	• ScheduledStationAETitle	(0040,0001)
Patient Identification	Patient Name	(0010,0010)
	Patient ID	(0010,0020)
	Patient Address	(0010,1040)



Orpheus DICOM Conformance Statement Document

PSW-81-006

[] []

Rev.: 01

Pg. 23 of 28

	Patient Phone	(0010,2154)
	Patient Age	(0010,1010)
Patient Demographic	Patient Birth Date	(0010,0030)
	Patient SEX	(0010,0040)
Study Reference	Accession Number	(0008,0050)
	ScheduledStationAETitle	(0040,0001)
	Modality	(0008,0060)
	StudyInstanceUID	(0020,000D)

The following table specifies the 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 aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Failed	Identifier does not match SOP Class	A900	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Failed	Unable to Process	C000-CFFF	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Cancel	Matching terminated due to cancel request	FE00	If the query was canceled due to too many worklist items then the SCP has completed the matches. Worklist items are available for display or further processing. Otherwise, the Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query.
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.

3.5. Modality Worklist Server AE Specification

3.5.1. SOP Classes

The Orpheus Modality Worklist Server AE provides standard conformance to the following DICOM v 3.0 SOP Class as SCU/SCP

DICOM SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Yes	Yes

3.5.2. Association Establishment Policies

3.5.2.1. General

The AE specifications contains a description of the General Association Establishment and Acceptance policies of the Application Entity.

3.5.2.2. General

- The application context name: 1.2.840.10008.3.1.1.1
- Maximum PDU size offered: no limit
- Maximum PDU size accepted: no limit

3.5.2.3. Number of Associations

Not configured. The Orpheus System does not initiate an association but establishes one association at a time for each request that is being processed in the active queue. Only a single job is active and the other remaining jobs in the queue are pending until the active job is either completed or has failed.

3.5.2.4. Asynchronous Nature

The Orpheus System does not support asynchronous communication.
The maximum number of outstanding asynchronous transactions is one (1).

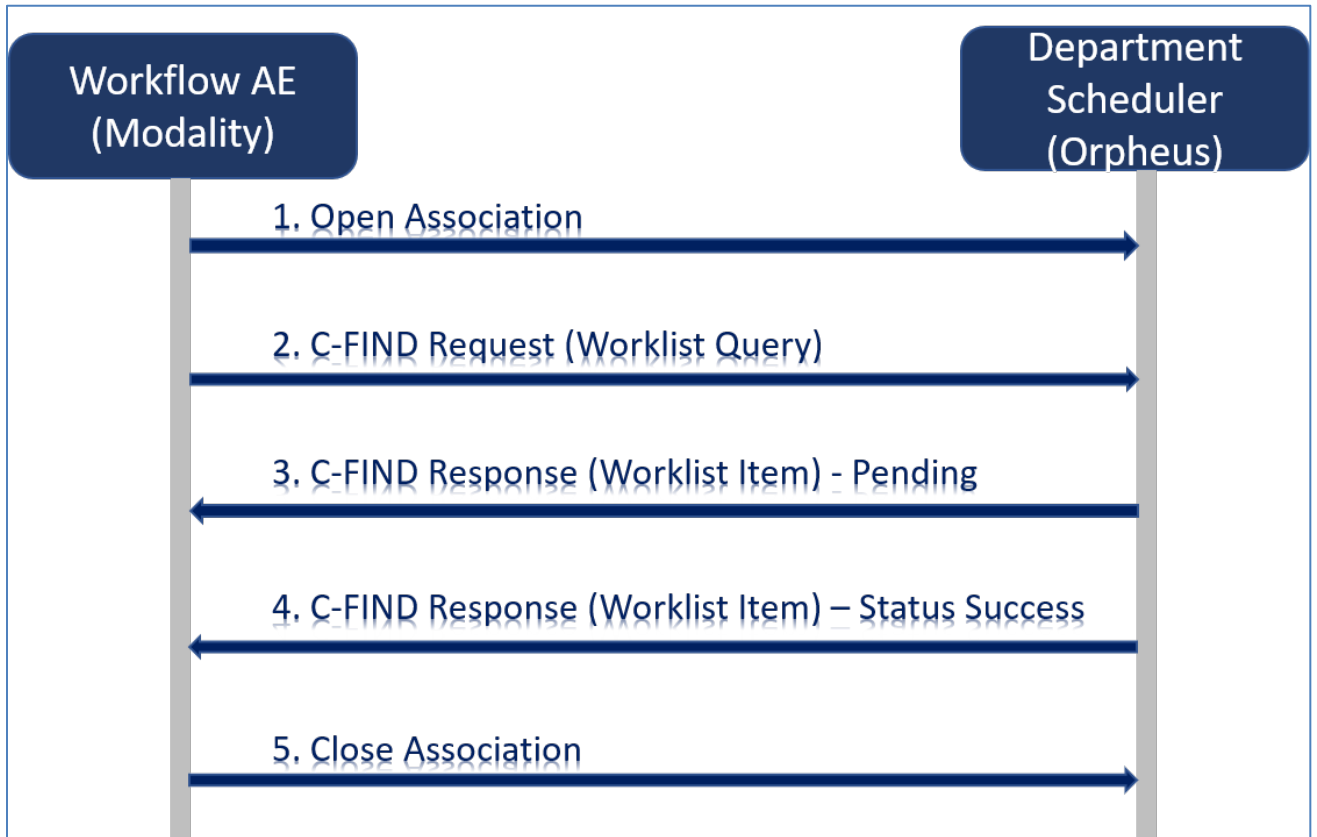
3.5.2.5. Implementation Identifying Information

Instance Creator UID Prefix	
Implementation Class UID	
Implementation Version Name	RZDCX_2_0_8_4

3.5.3. Association Initiation Policy

3.5.3.1. Activity

The request for a Worklist Update is initiated by the requesting modality and an association with the Orpheus System is established. The Orpheus System uses the set of parameters to find the universal service ID contained in the HL7 message (SIU, Order or ADT).
The relation between Accession Number (0008,0050) and Requested Procedure ID (0040,1001) is 1-to-1 and these attributes have the same value in all MWL responses.



Description and Sequencing Activity

The figure above is a possible sequence of messages between a Modality Worklist SCU and DICOMSRV.

1. The Modality opens an Association with The Orpheus Server for the purpose of querying for a Modality Worklist
2. The Modality sends an MWL C-FIND query to The Orpheus Server.
3. The Orpheus Server queries its database using the attributes from the C-FIND Request and returns 0 to N C-FIND responses depending on matches returned from the database. The Orpheus Server checks for a C-FIND Cancel Request after a configured number of responses are sent. If a Cancel is received, no further Pending responses are sent.
4. The Orpheus Server sends the final C-FIND response
5. The Modality closes the Association.

Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information	1.2.84.0.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2.	SCP	None
		Explicit VR Little	1.2.840.10008.1.2.1		



**Orpheus
DICOM Conformance Statement Document**

PSW-81-006

Rev.: 01

Pg. 26 of 28

Presentation Context Table			
Model – FIND		Endian	

SOP Specific Conformance as a Modality Worklist Provider

The following table specifies the 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 aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Failed	Identifier does not match SOP Class	A900	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Failed	Unable to Process	C000-CFFF	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Cancel	Matching terminated due to cancel request	FE00	If the query was canceled due to too many worklist items then the SCP has completed the matches. Worklist items are available for display or further processing. Otherwise, the Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query.
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.

4. Network Interfaces

4.1. Supported Communication Stacks

The Orpheus System supports provides the DICOM v3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.2. TCP/IP Stack

The Orpheus System utilizes the TCP/IP stack from the Microsoft Windows OS platform.

4.2.1. Physical Medium Supported

The Orpheus System is independent of the physical medium over which the TCP/IP executes. Any device listed in the Microsoft Windows Hardware compatibility list may be used.

5. Configuration

5.1. AE Title Address Mapping

5.1.1. Local AE Titles

All Orpheus System Application Entities use configured AE Titles and TCP/IP Ports. These are assigned default values at the time of installation. However, these can be modified. The AE Title used by each individual application can be configured independently of the AE Title used by other applications on an individual Orpheus System.

By default, all Application Entities that only act as an Association Requestor are given the same AE Title, whereas those that can act as an Association Acceptor are all given unique AE Titles. It is possible to assign all Orpheus System applications the same AE Title. However, this is not recommended as a single Orpheus System has multiple DICOM TCP/IP listening ports and associating multiple listening ports with a single AE Title can result in connectivity problems with other systems.

5.1.2. Remote AE Title Address Mapping

The AE Title, host names and port numbers of remote applications can be configured in the Orpheus System configuration files by Orpheus Medical Service or Installation personnel.

5.1.2.1. Sender AE

The AE Title, host names and port numbers for the remote Storage SCP's must be defined in the Orpheus System configuration files by Orpheus Medical Service or Installation personnel.

5.1.2.2. Importer AE

The AE Title, host names and port numbers for the remote Storage SCU's must be defined in the Orpheus System configuration files by Orpheus Medical Service or Installation personnel.

5.1.2.3. Q/R Client AE

The AE Title, host names and port numbers for the remote Modality Worklist SCP must be defined in the Orpheus System configuration files by Orpheus Medical Service or Installation personnel.

5.1.2.4. Modality Worklist Client AE

The AE Title, host names and port numbers for the remote Modality Worklist SCP must be defined in the Orpheus System configuration files by Orpheus Medical Service or Installation personnel.

5.1.2.5. Modality Worklist Server AE

The AE Title, host names and port numbers for the remote Modality Worklist SCU must be defined in the Orpheus System configuration files by Orpheus Medical Service or Installation personnel.