ClearCanvas RISServer – Modality Worklist Server DICOM Conformance Statement

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Contents

1. Revision History

Date	Author	Document Version	Comments
20 January 2014	Jay Liu	2.3	Update version number
9 September 2013	Jasper Yeh	2.2	Update for Version 10.1
27 February 2013	Jasper Yeh	2.1	Update for Version 10.0
11 October 2012	Jay Liu	2.0	MWL is now part of RISServer. Update supported tags.
6 April 2009	Clinton Chau	1.0	Draft for review

2. Introduction

The ClearCanvas RISServer contains a Modality Worklist Server (MWLS), which responds to queries for work list information. The MWLS employs DICOM connectivity to ensure interoperability with other ClearCanvas products and also with products from other vendors. A particular emphasis is made on interoperability issues defined in the IHE Technical Framework (Revision 3.0).

This Conformance Statement (CS) specifies the compliance of MWLS to DICOM 3.0 Standard. It details the DICOM Service Classes, supported by the product and their roles. Refer to Part 2 of DICOM 3.0 Standard for more information about the structure and terminology in this document.

3. Integration Issues

This DICOM Conformance Statement by itself is not sufficient to guarantee successful interoperability between ClearCanvas and equipment from other vendors. The following considerations should be made:

- The integration of equipment is the responsibility of the user, (or user's agent) who should assess the application requirements and design a working, safe and reliable solution.
- When the comparison of this DICOM Conformance Statement with a DICOM Conformance Statement from another vendor indicates that connectivity should be possible it is the responsibility of the user (or user's agent) to verify this by carrying out validation tests and by checking whether all required functionality is met.
- With regard to the future evolution of the DICOM 3.0 standard ClearCanvas reserves the right to make changes to the ClearCanvas architecture, related to the issues, described in this document. The user (or user's agent) should ensure that any equipment connected via DICOM to ClearCanvas equipment also follows the future evolution of the DICOM 3.0 standard.
- Failure to do so may result in loss of connectivity.

4. Application Data Flow Diagram

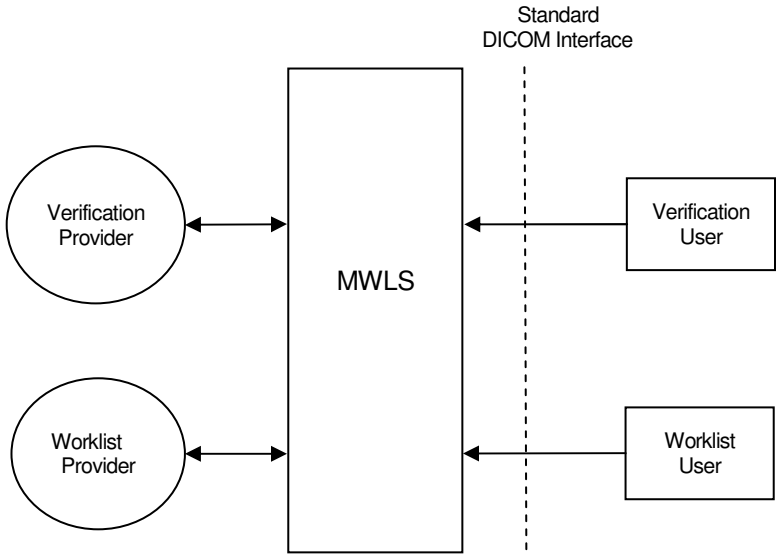

Figure 1

MWLS is always waiting for incoming DICOM connections, and it is possible for MWLS to service multiple simultaneous connections. When a DICOM connection appears the association request is parsed to see if the service being requested is supported. If so, an association is created.

5. AE Functional Definitions

The two services supported by MWLS are:

- Verification, to verify that a DICOM connection can be made to MWLS, and
- Worklist, to provide worklist information to a querying entity.

6. Sequencing of Real World Activities

There are no specific requirements for the sequencing of real world activities. MWLS does not commit changes to database of worklist information, so there is no risk of compromising data integrity. MWLS simply returns information that is in the database the moment that data is committed by other entities.

7. AE Specifications – MWLS AE

This Application Entity provides Standard Conformance to the following DICOM 3.0 Standard SOP classes as SCP:

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1

Basic Worklist Management	1.2.840.10008.5.1.4.31

Table 1

8. AE Specifications – Association Establishment Policies

The DICOM Application Context Name, which is always accepted, is:

Application Context Name	1.2.840.10008.3.1.1.1

Table 2

The maximum number of Presentation Contexts accepted is the number present in Table 4. The user info items, sent are:

- Maximum PDU Length
- Implementation Class UID
- Implementation Version Name
- SCU/SCP Role Negotiation

The AE will accept any PDU length, offered on associations initiated by remote applications. In practice it will be limited by the amount of the available system resources. It is, therefore recommended that it does not exceed 64 Kbytes.

MWLS will not release an association unless an abnormal event occurs. The association is always released by the invoking AE. In case of abnormal conditions, occurring during its work, if necessary, MWLS will first try to release the association orderly. If this attempt is not successful, then the association will be aborted. In some extreme critical situations of system and/or protocol errors, MWLS will try to preserve its reliability by closing down the network connection without the association being first released or aborted in an orderly manner.

9. AE Specifications – Number of Associations

The number of simultaneous associations supported by MWLS is theoretically unlimited. In practice the number of simultaneous associations will be limited by the kernel parameters of the underlying transport protocol and the resources available (CPU, memory and network interfaces).

10. AE Specifications – Asynchronous Nature

MWLS AE does not support asynchronous operations (multiple concurrent operations on one association) and all operations are performed synchronously.

11. AE Specifications – Implementation Identifying Information

The Implementation UID for this implementation is:

MWLS Implementation Class UID	1.3.6.1.4.1.25403.1.1.1
MWLS Implementation Class Version	DICOM 0.1

Table 3

12. Association Initiation by Real-World Activity

MWLS does not initiate DICOM connections with other AE's.

13. Association Acceptance Policy

MWLS accepts associations when a real world activity MWLS REQUEST takes place. The MWLS REQUEST activity is defined as any activity, involving:

- Verification of the connection from another AE (C-ECHO)
- A request from a modality, or other entity, for queering the work list (MWL C-FIND)

MWLS will accept an association request from any AE title.

MWLS will not release an association unless an abnormal event occurs. In such a case, when needed, MWLS will first try to release the association orderly. If this attempt is not successful, then the association will be aborted. In some extreme critical situations of system and/or protocol errors, MWLS will try to preserve its reliability by closing down the network connection without the association been first released or aborted orderly.

14. Real-World Activity MWLS Request

The associated real-world activity is one or a combination of:

- MWLS Verification
- Work List Query

MWLS will return a status of SUCCESS after successful execution of the command, sent in the request. It will return an error status if the request cannot be satisfied because of resource limitations or if a system error occurs during the execution process.

15. Presentation Context Table

MWLS will accept any of the presentation contexts shown below (Table 4):

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Basic Worklist Management FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

Table 4

16. SOP Verification Class

MWLS provides standard conformance to this class.

SOP Specific Conformance to Query/Retrieve Class

Module	Description	Tag	Matching Support	Return Support
Scheduled Procedure Step	Scheduled Procedure Step Sequence	(0040,0100)	R / Yes	1 / Yes
	>Scheduled Station AE Title	(0040,0001)	R / Yes	1 / Yes
	>Scheduled Procedure Step Start Date	(0040,0002)	R / Yes	1 / Yes
	>Scheduled Procedure Step Start Time	(0040,0003)	R / No	1 / Yes
	>Modality	(0008,0060)	R / Yes	1 / Yes
	>Scheduled Performing Physician's Name	(0040,0006)	R / No	2 / Null
	>Scheduled Procedure Step Description	(0040,0007)	O / No	1C / Yes
	>Scheduled Station Name	(0040,0010)	O / No	2 / No
	>Scheduled Procedure Step Location	(0040,0011)	O / No	2 / No
	>Scheduled Protocol Code Sequence	(0040,0008)	O / No	1C / No
	>Pre-Medication	(0040,0012)	O / No	2C / No
	>Scheduled Procedure Step ID	(0040,0009)	O / No	1 / Yes
	>Requested Contrast Agent	(0032,1070)	O / No	2C / No
	>Scheduled Procedure Step Status	(0040,0020)	O / No	3 / No
Requested Procedure	Requested Procedure ID	(0040,1001)	O / No	1 / Yes
	Requested Procedure Description	(0032,1060)	O / No	1C / Yes
	Requested Procedure Code Sequence	(0032,1064)	O / No	1C / Yes
	>Code Value	(0008,0100)	O / No	1 / Yes
	>Coding Scheme Designator	(0008,0102)	O / No	1 / Yes
	>Code Meaning	(0008,0104)	O / No	3 / Yes
	Study Instance UID	(0020,000D)	O / No	1 / Yes
	Referenced Study Sequence	(0008,1110)	O / No	2 / No
	Requested Procedure Priority	(0040,1003)	O / No	2 / No
	Patient Transport Arrangements	(0040,1004)	O / No	2 / No
Imaging Service Request	Accession Number	(0008,0050)	O / No	2 / Yes
	Requesting Physician	(0032,1032)	O / No	2 / No
	Referring Physician's Name	(0008,0090)	O / No	2 / Yes
	Imaging Service Request Comments	(0040,2400)	O / No	3 / Yes
Visit Identification	Admission ID	(0038,0010)	O / No	2 / Yes
Visit Status	Current Patient Location	(0038,0300)	O / No	2 / Yes
Visit Relationship	Referenced Patient Sequence	(0008,1120)	O / No	2 / No

Module	Description	Tag	Matching Support	Return Support
Patient Identification	Patient's Name	(0010,0010)	R / Yes	1 / Yes
	Patient ID	(0010,0020)	R / Yes	1 / Yes
	Issuer of Patient ID	(0010,0021	O / No	3 / Yes
Patient Demographic	Patient's Birth Date	(0010,0030)	O / No	2 / Yes
	Patient's Sex	(0010,0040)	O / No	2 / Yes
	Patient's Primary Language Code Sequence	(0010,0101)	O / No	3 / No
	Patient's Weight	(0010,1030)	O / No	2 / No
	Confidentiality Constraint on Patient Data	(0040,3001)	O / No	2 / No
Patient Medical	Patient State	(0038,0500)	O / No	2 / No
	Pregnancy Status	(0010,21C0)	O / No	2 / No
	Medical Alerts	(0010,2000)	O / No	2 / No
	Allergies	(0010,2110)	O / No	2 / No
	Special Needs	(0038,0050)	O / No	2 / No
Non Standard	Filler Order Number Imaging Service Request	(0040,2017)	O / No	3 / Yes
	Institution Name	(0008,0080)	O / No	3 / Yes

Table 5

MWLS will possibly return the following status codes:

Status Code (hex)	Related Fields	Status Type	Meaning	Data Set (Identifier)
0000	None	Success	Operation has been successfully completed	No
A900	(0000,0902)	Failed	Identifier does not match SOP Class (Invalid Identifier received from SCU)	No
0101	(0000,0902)	Failed	Processing failure (System Failure)	No

17. Presentation Context Acceptance Criterion

MWLS will accept any context presentations specified in Table 4.

18. Transfer Syntax Selection Policies

MWLS prefers Explicit VR Little Endian, but will accept any transfer syntaxes that are specified in Table 4, and will also accept more than transfer syntax if more than one Presentation Context is proposed.

19. Communication Profiles – Supported Communication Stacks

MWLS provides DICOM V3.0 Standard TCP/IP network communication support as defined in PS3.8 of the DICOM standard.

MWLS inherits the TCP/IP stack from the Windows operating system on which MWLS is executing.

20. API

MWLS uses the ClearCanvas DICOM Toolkit as the interface to the Microsoft .NET Framework's interfaces to the Windows Sockets library and the TCP/IP stack.

21. Physical Media Support

MWLS makes no assumptions and has no limitation pertaining to the physical media over which the TCP/IP stack is implemented, nor to the actual data-link control protocol, used between the nodes of the PACS.

22. Configuration

The AE Title that MWLS uses for associations and the listening port for DICOM associations is configurable in the application configuration file.

23. Support of Extended Character Sets

MWLS supports the full range of character sets specified in the DICOM standard.

24. Extensions, Specializations and Privatizations

Not applicable.