



Digital Ituru Media Design



**WhiteCap**

DICOM Conformance Statement

August 18, 2009  
Revision 2

## INTRODUCTION

### **1.1. Scope and Field of Application**

This document is the DICOM conformance statement for the WhiteCap medical imaging software developed by [Digital Multi-Media Design](#). This document contains details on how various components of the WhiteCap software interfaces with other devices and applications that conform to the DICOM 3.0 standard.

This document is meant for users involved in system design and system integration. It is understood that the user is familiar with the DICOM standard and related concepts.

### **1.2. Theory of operations**

The WhiteCap is a diagnostic quality viewer. It also has its own inbuilt Server component to enable it to receive and send images.

#### **1.2.1. Configuration Information Models**

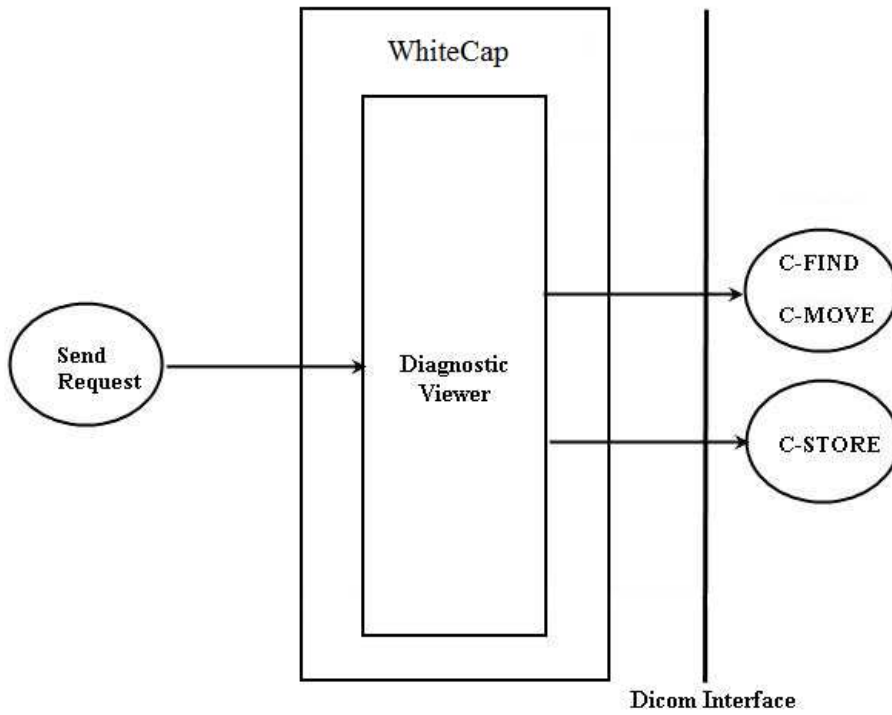
#### **1.2.2. References and Definitions**

All definitions have been taken from the Digital Imaging and Communications in Medicine (DICOM) standard, parts 1 through 18.

## 2. IMPLEMENTATION MODEL

### 2.1. Application Data Flow Diagram

The implementation for the WhiteCap is shown below:



The WhiteCap is currently supported on the following operating systems:

- Windows XP
- Windows Vista
- Windows 7

## 2.2. Functional Definitions of Application Entities

All communications and image transfer with the remote application is accomplished utilizing the DICOM protocol over a network using the TCP/IP protocol stack.

Below is a table of the functions supported by WhiteCap application entities:

SCU	SCP
Storage Worklist and Query/Retrieve	Verification Storage

## 2.3. Sequencing of Real World activities

Not applicable.

### 3. APPLICATION ENTITY SPECIFICATIONS

#### 3.1. AE Specifications for WhiteCap

The WhiteCap AE provides support for the following DICOM SOP Classes as an SCU.

<b>SOP Classes as an SCU</b>	
<b>SOP Class UID</b>	<b>SOP Class Name</b>
<b>Storage</b>	
1.2.840.10008.5.1.4.1.1.1.1	<b>Digital X Ray Image Storage for Presentation</b>
1.2.840.10008.5.1.4.1.1.1.1.1	<b>Digital X Ray Image Storage for Processing</b>
1.2.840.10008.5.1.4.1.1.1.3	<b>Digital Intra Oral X Ray Image Storage for Presentation</b>
1.2.840.10008.5.1.4.1.1.1.3.1	<b>Digital Intra Oral X Ray Image Storage for Processing</b>
1.2.840.10008.5.1.4.1.1.77.1.4	<b>Visible Light Photographic Image Storage</b>
<b>Worklist and Query/Retrieve</b>	
1.2.840.10008.5.1.4.31	<b>Modality Worklist Model – FIND</b>
1.2.840.10008.5.1.4.1.2.1.1	<b>Patient Root Query/Retrieve Model – FIND</b>
1.2.840.10008.5.1.4.1.2.1.2	<b>Patient Root Query/Retrieve Model – MOVE</b>

The WhiteCap AE provides support for the following DICOM SOP Classes as an SCP.

<b>SOP Classes as an SCP</b>	
<b>SOP Class UID</b>	<b>SOP Class Name</b>
<b>Verification</b>	
1.2.840.10008.1.1	<b>Verification</b>
<b>Storage</b>	
1.2.840.10008.5.1.4.1.1.1.1	<b>Digital X Ray Image Storage for Presentation</b>
1.2.840.10008.5.1.4.1.1.1.1.1	<b>Digital X Ray Image Storage for Processing</b>
1.2.840.10008.5.1.4.1.1.1.3	<b>Digital Intra Oral X Ray Image Storage for Presentation</b>
1.2.840.10008.5.1.4.1.1.1.3.1	<b>Digital Intra Oral X Ray Image Storage for Processing</b>
1.2.840.10008.5.1.4.1.1.1.1	<b>Digital X Ray Image Storage for Presentation</b>
1.2.840.10008.5.1.4.1.1.1.1.1	<b>Digital X Ray Image Storage for Processing</b>
1.2.840.10008.5.1.4.1.1.1.3	<b>Digital Intra Oral X Ray Image Storage for Presentation</b>
1.2.840.10008.5.1.4.1.1.1.3.1	<b>Digital Intra Oral X Ray Image Storage for Processing</b>
1.2.840.10008.5.1.4.1.1.1	<b>Computed Radiography Image Storage</b>
1.2.840.10008.5.1.4.1.1.1.2	<b>Digital Mammography X Ray Image Storage For Presentation</b>
1.2.840.10008.5.1.4.1.1.1.2.1	<b>Digital Mammography X Ray Image Storage For Processing</b>
1.2.840.10008.5.1.4.1.1.6.1	<b>Ultrasound Image Storage</b>
1.2.840.10008.5.1.4.1.1.3.1	<b>Ultrasound Multiframe Image Storage</b>
1.2.840.10008.5.1.4.1.1.77.1.1	<b>VL Endoscopic Image Storage</b>
1.2.840.10008.5.1.4.1.1.77.1.2	<b>VL Microscopic Image Storage</b>
1.2.840.10008.5.1.4.1.1.77.1.4	<b>VL Photographic Image Storage</b>
1.2.840.10008.5.1.4.1.1.12.1	<b>X Ray Angiographic Image Storage</b>
1.2.840.10008.5.1.4.1.1.12.2	<b>X Ray Fluoroscopy Image Storage</b>

### **3.1.1. Association establishment policies**

#### **3.1.1.1. General**

The default PDU size for an outgoing association is 16 KB.  
The maximum PDU size for any association establishment is 128 KB.

#### **3.1.1.2. Number of associations**

The WhiteCap AE will accept a single association both as SCP and SCU.

#### **3.1.1.3. Asynchronous nature**

WhiteCap does not support asynchronous operations.

#### **3.1.1.4. Implementation identifying information**

The implementation identifying information for the WhiteCap is  
**Implementation class UID:** 1.2.276.0.7230010.3

### 3.1.2. Association Initiation Policy

Any WhiteCap component will initiate an association for the following activities:

- DICOM communication verification between WhiteCap and a remote system.
- Sending images from WhiteCap to a remote system.
- Retrieval of images from a remote location to WhiteCap database.

#### 3.1.2.1. Real world activity – Verification

##### 3.1.2.1.1. Associated real world activity

The Verification User AE provides standard conformance to the Verification class as SCU. No extended negotiation is used. The Verification User AE will request an association any time the user initiates a verification operation.

##### 3.1.2.1.2. Proposed presentation contexts

Abstract Syntax Name	UID	Transfer Syntax	Role
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	SCU

**3.1.2.2. Real world activity – Send images to a remote system**

**3.1.2.2.1. Associated real world activity**

A WhiteCap user requests that a set of objects be sent to a remote DICOM AE and an association is initiated to perform a C-STORE sub operation.

**3.1.2.2.2. Proposed Presentation Contexts**

<b>Presentation Context Table for sending images to a remote AET</b>				
<b>Abstract Syntax</b>		<b>Transfer Syntax</b>	<b>Role</b>	<b>Extended Negotiation</b>
<b>UID</b>	<b>Name</b>			
1.2.840.10008.5.1.4.1.1.1.1	Digital X Ray Image Storage for Presentation	See table	SCU	<b>None</b>
1.2.840.10008.5.1.4.1.1.1.1.1	Digital X Ray Image Storage for Processing	See table	SCU	<b>None</b>
1.2.840.10008.5.1.4.1.1.1.3	Digital Intra Oral X Ray Image Storage for Presentation	See table	SCU	<b>None</b>
1.2.840.10008.5.1.4.1.1.1.3.1	Digital Intra Oral X Ray Image Storage for Processing	See table	SCU	<b>None</b>
1.2.840.10008.5.1.4.1.1.77.1.4	Visible Light Photographic Image Storage	See table	SCU	<b>None</b>

<b>Transfer syntaxes for send to remote system</b>	
<b>Name</b>	<b>UID</b>
Explicit VR, Little Endian	1.2.840.10008.1.2.1
JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51
JPEG Lossless	1.2.840.10008.1.2.4.70

**3.1.2.3. Real world activity – Query a remote database**

**3.1.2.3.1. Associated real world activity**

The user clicks on the query button in the search window after entering the search criteria.

**3.1.2.3.2. Proposed Presentation Contexts**

Abstract Syntax Name	UID	Transfer Syntax	Role
Patient Root Query Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	SCU

**3.1.2.3.3. SOP specific conformance statement for SOP query class**

The viewer supports C-FIND response values as defined in DICOM 3.0 Part 4. All Required and Unique keys are supported. The following optional keys are supported.

Data Level	Description	Tag
Patient	Additional Patient History	(0010, 21b0)
Study	Study Description	(0008, 1030)
Series	Series Description	(0008, 103e)
Image	SOP Class UID	(0008,0016)
Image	Patients Name	(0010, 0010)
Image	Patient Species Description	(0010, 2201)
Image	Patient Breed Description	(0010, 2292)
Image	Referring Physicians Name	(0008, 0090)
Image	Icon Image Sequence	(0088, 0200)

**3.1.2.4. Real world activity – Retrieve from a remote system**

**3.1.2.4.1. Associated real world activity**

The user selects a study or a series from the tree control or one item from the list control and clicks on Retrieve Selection. Upon retrieval the images are automatically populated into a local folder based on the user's preference.

**3.1.2.4.2. Accepted Presentation Contexts**

<b>Presentation Context Table for retrieve from remote system</b>				
<b>Abstract Syntax</b>		<b>Transfer Syntax</b>	<b>Role</b>	<b>Extended Negotiation</b>
<b>UID</b>	<b>Name</b>			
1.2.840.10008.5.1.4.1.2.2.2	Patient Root Query Retrieve Information Model – MOVE	See table	SCU	<b>None</b>

<b>Transfer syntaxes for query</b>	
<b>Name</b>	<b>UID</b>
Explicit VR, Little Endian	1.2.840.10008.1.2.1
Implicit VR, Little Endian	1.2.840.10008.1.2
Explicit VR, Big Endian	1.2.840.10008.1.2.2

**3.1.2.5. Real world activity – Modality Worklist**

**3.1.2.5.1. Associated real world activity**

WhiteCap can be configured to automatically get a worklist from a remote AET.

**3.1.2.5.2. Accepted Presentation Contexts**

<b>Presentation Context Table for retrieving worklists from a remote AET</b>				
<b>Abstract Syntax</b>		<b>Transfer Syntax</b>	<b>Role</b>	<b>Extended Negotiation</b>
<b>UID</b>	<b>Name</b>			
1.2.840.10008.5.1.4.31	Modality Worklist Information Model – FIND	Implicit VR, Little Endian	SCU	None

**3.1.2.5.3. SOP specific conformance statement for SOP modality worklist query**

The viewer supports C-FIND response values as defined in DICOM 3.0 Part 4. All Required and Unique keys are supported. The following optional keys are supported.

<b>Description</b>	<b>Tag</b>
Patients Telephone Numbers	(0010, 2154)
Patients Address	(0010, 1040)
Region Of Residence	(0010, 2152)
Patients Birth Date	(0010, 0030)
Patient Species Description	(0010, 2201)
Patient Breed Description	(0010, 2292)
Responsible Person	(0010, 2297)

### 3.1.3. Association acceptance policies

WhiteCap accepts associations for the activities listed below:

- DICOM communication between WhiteCap and a remote system.
- Image transfer from a remote system to WhiteCap.

#### 3.1.3.1. Real world activity – Verify communications with a remote system

##### 3.1.3.1.1. Associated real world activity

WhiteCap will send an echo response to verification requests made by remote systems.

Abstract Syntax Name	UID	Transfer Syntax	Role
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	SCP

**3.1.3.2. Real world activity – Receive images from a remote system**

**3.1.3.2.1. Associated real world activity**

A remote system pushes images to WhiteCap in a response to a C-MOVE request made by the user.

**3.1.3.2.2. Accepted Presentation Contexts**

<b>Presentation Context Table for receiving images from a remote AET</b>				
<b>Abstract Syntax</b>		<b>Transfer Syntax</b>	<b>Role</b>	<b>Extended Negotiation</b>
<b>UID</b>	<b>Name</b>			
1.2.840.10008.5.1.4.1.1.1.1	Digital X Ray Image Storage for Presentation	See table	SCP	None
1.2.840.10008.5.1.4.1.1.1.1.1	Digital X Ray Image Storage for Processing	See table	SCP	None
1.2.840.10008.5.1.4.1.1.1.3	Digital Intra Oral X Ray Image Storage for Presentation	See table	SCP	None
1.2.840.10008.5.1.4.1.1.1.3.1	Digital Intra Oral X Ray Image Storage for Processing	See table	SCP	None
1.2.840.10008.5.1.4.1.1.1.1	Digital X Ray Image Storage for Presentation	See table	SCP	None
1.2.840.10008.5.1.4.1.1.1.1.1	Digital X Ray Image Storage for Processing	See table	SCP	None
1.2.840.10008.5.1.4.1.1.1.3	Digital Intra Oral X Ray Image Storage for Presentation	See table	SCP	None
1.2.840.10008.5.1.4.1.1.1.3.1	Digital Intra Oral X Ray Image Storage for Processing	See table	SCP	None
1.2.840.10008.5.1.4.1.1.1	Computed Radiography Image Storage	See table	SCP	None
1.2.840.10008.5.1.4.1.1.1.2	Digital Mammography X Ray Image Storage For Presentation	See table	SCP	None
1.2.840.10008.5.1.4.1.1.1.2.1	Digital Mammography X Ray Image Storage For Processing	See table	SCP	None
1.2.840.10008.5.1.4.1.1.6.1	Ultrasound Image Storage	See table	SCP	None
1.2.840.10008.5.1.4.1.1.3.1	Ultrasound Multiframe Image Storage	See table	SCP	None
1.2.840.10008.5.1.4.1.1.77.1.1	VL Endoscopic Image Storage	See table	SCP	None
1.2.840.10008.5.1.4.1.1.77.1.2	VL Microscopic Image Storage	See table	SCP	None
1.2.840.10008.5.1.4.1.1.77.1.4	VL Photographic Image Storage	See table	SCP	None
1.2.840.10008.5.1.4.1.1.12.1	X Ray Angiographic Image Storage	See table	SCP	None
1.2.840.10008.5.1.4.1.1.12.2	X Ray Fluoroscopy Image Storage	See table	SCP	None

Transfer syntaxes for receive from remote system	
Name	UID
Explicit VR, Little Endian	1.2.840.10008.1.2.1
JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51
JPEG Lossless	1.2.840.10008.1.2.4.70

**3.1.3.2.3. SOP specific conformance for SOP storage class**

WhiteCap conforms to the SOP's of the storage SOP class at level 2 (full). No elements are discarded or coerced by the WhiteCap AE. In case of a successful C-STORE operation the object will be saved to the designated storage volume. If an image with the same SOP Instance UID (0008, 0018) already exists in the database, the new image will overwrite the existing image.

## COMMUNICATION PROFILE

### 3.2. Supported communication stacks

DICOM Part 8 is supported by WhiteCap through TCP/IP.

### 3.3. TCP/IP Stack

The TCP/IP stack supported by WhiteCap is inherited from the host operating system.

#### 3.3.1. Physical Media Support

Any host operating system supported physical media.

## 4. EXTENSIONS/SPECIALIZATIONS/PRIVATIZATIONS

### 4.1. Standard extended/specialized/private SOPs

Not applicable

### 4.2. Private Transfer Syntaxes

Not applicable

## 5. CONFIGURATION

Local AE titles are configurable.

### 5.1. Standard extended/specialized/private SOPs

The local AE title can be configured by authorized users using the administration tool provided.

### 5.2. Configuration parameters

The following fields are configurable for remote AE

- Local AE Title
- Listening port

The following fields are configurable for remote AE

- AE Title
- Port number
- IP Address

## 6. CONFIGURATION

No support of extended character sets is offered by WhiteCap at this time.

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