

<b>ProSolv CardioVascular</b> <hr/> <b>FUJIFILM</b>	<b>DICOM Conformance Statement – 4.0</b>	PINT-0000004-A
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# ProSolv CardioVascular

## DICOM Conformance Statement

Version 4.0

Revision 0

June 1, 2008

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### Revision History

Revision	Date	Description of Changes
4.0 0	June 1, 2008	Initial Release

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## Preface

This statement describes the DICOM capabilities of ProSolv CardioVascular DICOM Server. This server allows DICOM Service Class Users to store images in ProSolv Database and query and retrieve images from ProSolv database.

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## 0 Introduction

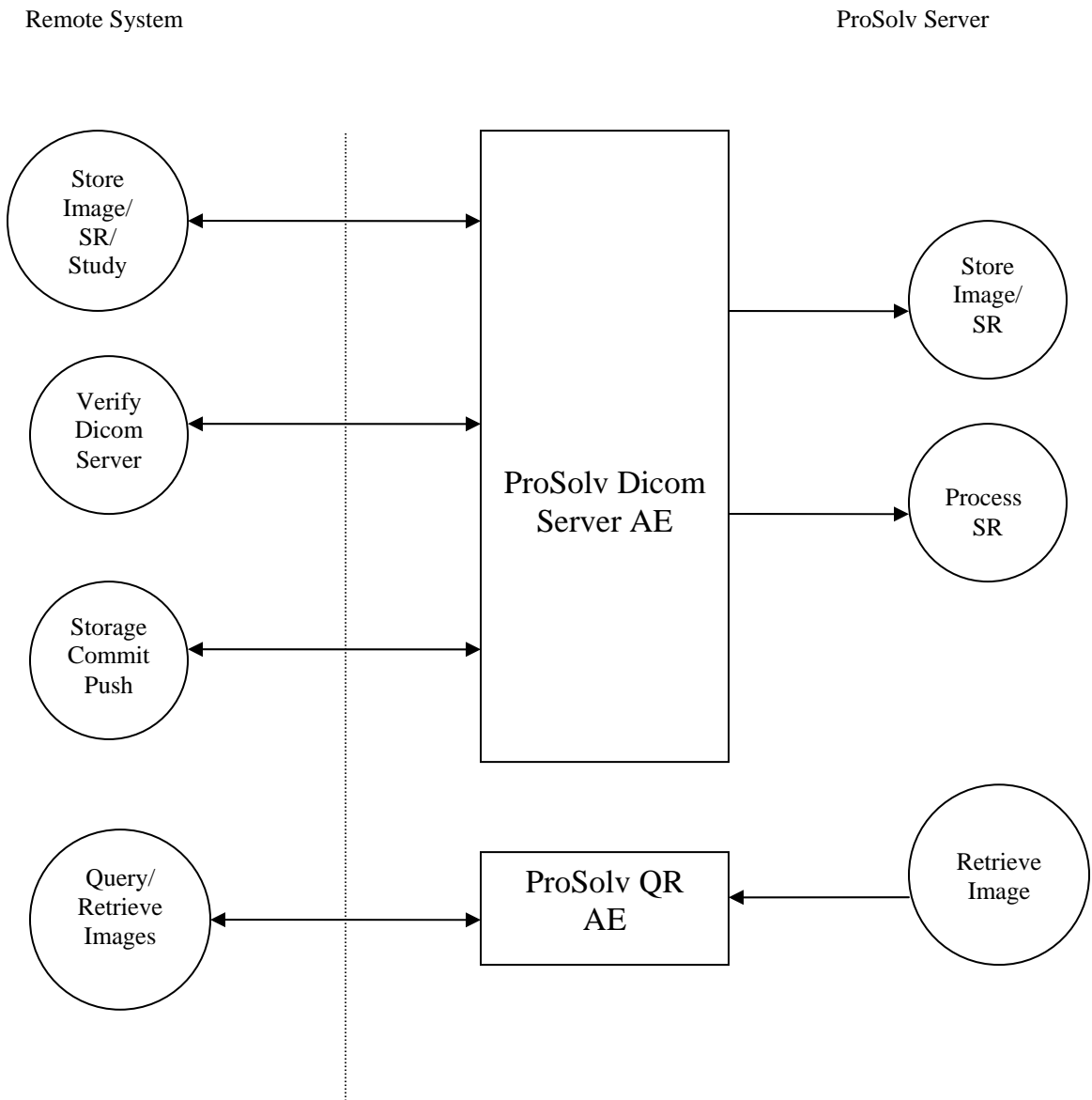
This document is a DICOM Conformance Statement for storage and query/retrieve services of *ProSolv CardioVascular DICOM Server (PROSOLV)*.

**PROSOLV** will store images as both an SCU and an SCP. Query/Retrieve services are implemented as an SCP. Storage commitment is supported for both an SCU and an SCP.

## 1 Implementation Model

**PROSOLV** is a single application entity that will receive images and/or structured reports sent by SCUs and will be responsible for storing the images and/or structured reports. It will also respond to query/retrieve and storage commitment commands.

## 1.1 Application Data Flow Diagram



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## 1.2 Functional Definition of Application Entities

**PROSOLV** is a Windows application that waits for SCUs to connect. **PROSOLV** will accept associations with Presentation Contexts for SOP Classes of the Storage and Query/Retrieve service classes. It will receive images and/or structured reports on these Presentation Contexts and write them to files in the format specified in PS 3.10.

**PROSOLV** also stores information about each image sent in its own internal database that will allow users to query and retrieve the images.

## 1.3 Sequencing of Real World Activity

Not applicable.

## 2 Application Entity Specifications

### 2.1 ProSolv CardioVascular DICOM Server Application Entity

PROSOLV provides Standard Conformance to the following DICOM V3.0 SOP Classes.

Verification	1.2.840.10008.1.1
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**Table 1: Verification SOP Class Supported by ProSolv CardioVascular DICOM Server AE - SCP**

CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
US Multi Image Storage	1.2.840.10008.5.1.4.1.1.3.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
X-Ray Angiographic Bi-Plane Image Storage	1.2.840.10008.5.1.4.1.1.12.3
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33

**Table 2: Storage SOP Classes Supported by ProSolv CardioVascular DICOM Server AE – SCU & SCP**

Patient Root Query/Retrieve Info. Model - FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient/Study Only Query Retrieve Info. Model – FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient/Study Only Query Retrieve Info. Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2

**Table 3: Query/Retrieve SOP Classes Supported by ProSolv CardioVascular DICOM Server AE – SCP**

Storage Commitment – Push Model	1.2.840.10008.1.20.1
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**Table 4: Other Classes Supported by ProSolv CardioVascular DICOM Server AE – SCP**

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## **2.1.1 Association Establishment Policies**

### **2.1.1.1 General**

The maximum accepted PDU size is 16,384 bytes.

### **2.1.1.2 Number of Associations**

Maximum number of simultaneous associations defaults to 25. This is configurable at run time. Although there is no inherent limit to the number of associations, there are limits imposed by the host computers operating system and current available resources on the host computer.

### **2.1.1.3 Asynchronous Nature**

Asynchronous operations are not supported. A request for asynchronous transfer is rejected.

### **2.1.1.4 Implementation Identifying Information**

Currently uses Implementation Class UID “1.2.840.1015” and “ACCUSOFT SCP v1.3”.

## 2.1.2 Association Initiation By Real-World Activity

### 2.1.2.1 Real-World Activity - Storage

#### 2.1.2.1.1 Associated Real-World Activity – Storage

**PROSOLV** will send images that have previously been stored. This send is only initiated by a separate SCU sending **PROSOLV** a MOVE command.

#### 2.1.2.1.2 Presentation Context Table – Storage

Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Little Endian	1.2.840.10008.1.2.1
Explicit VR Big Endian	1.2.840.10008.1.2.2
JPEG Baseline	1.2.840.10008.1.2.4.50
JPEG Lossy Extended Huffman Encoding	1.2.840.10008.1.2.4.51
JPEG Lossless Huffman Encoding	1.2.840.10008.1.2.4.57
JPEG Lossless, First Order Prediction, Huffman Encoding	1.2.840.10008.1.2.4.70
RLE Lossless	1.2.840.10008.1.2.5

**Table 5: Transfer Syntaxes for Storage**

All Table 2	All Table 5	SCU	None
-------------	-------------	-----	------

**Table 6: Acceptable Presentation Contexts for Storage**

#### 2.1.2.1.2.1 SOP Specific Conformance – Storage

**PROSOLV** conforms to Storage Service Class as SCU.

#### 2.1.2.1.3 Transfer Syntax Selection Policies – Storage

Currently, **PROSOLV** will only initiate an association for the specific SOP class and transfer syntax of the particular image/ SR file to be stored.

### 2.1.3 Association Acceptance Policy

When **PROSOLV** accepts an association, it will receive any images/SR documents transmitted on that association and store the images/SR documents on disk in the NT file system in the format specified by PS 3.10. **PROSOLV** places no limitation on who may connect to it.

#### 2.1.3.1 Real-World Activity - Verification

##### 2.1.3.1.1 Associated Real-World Activity - Verification

**PROSOLV** will respond to Verification requests to provide an SCU with the ability to determine if **PROSOLV** is receiving requests.

##### 2.1.3.1.2 Presentation Context Table - Verification

The following Presentation Context in Table 8 is accepted for Verification.

Implicit VR Little Endian	1.2.840.10008.1.2

**Table 7: Default Transfer Syntax**

All Table 1	All Table 5	SCP	None

**Table 8: Acceptable Presentation Contexts for Verification**

##### 2.1.3.1.2.1 SOP Specific Conformance - Verification

**PROSOLV** provides standard conformance to DICOM V3.0 Verification Service Class.

##### 2.1.3.1.3 Presentation Context Acceptance Criterion - Verification

**PROSOLV** will always accept a Presentation Context for the Verification SOP Class with the DICOM Default Transfer Syntax.

##### 2.1.3.1.4 Transfer Syntax Selection Policies - Verification

**PROSOLV** supports only the Implicit VR Little Endian transfer syntax for Verification.

#### 2.1.3.2 Real-World Activity - Storage

##### 2.1.3.2.1 Associated Real-World Activity - Storage

When a C-Store operation is invoked, the image/SR document will be stored on the disk in the working directory of **PROSOLV**. **PROSOLV** will also store some header information about each image/SR in a

database that will be used by another process running on the same server. **PROSOLV** will issue a failure status if it is unable to store the image/SR on the disk.

### 2.1.3.2.2 Presentation Context Table - Storage

Any of the Presentation Contexts shown in Table 9 are acceptable for **PROSOLV** to receive images.

All Table 2	All Table 5	SCP	None
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**Table 9: Acceptable Presentation Contexts for Storage**

#### 2.1.3.2.2.1 SOP Specific Conformance - Storage

**PROSOLV** conforms to the SOP’s of the Service Class at Level 2(Full). No elements are discarded or coerced by **PROSOLV**. In the event of a successful C-STORE operation, the image/SR has successfully been written to disk as standard Windows NT file. As such, it may be accessed in the same manner as any other Windows file. **PROSOLV** will never delete a file which it has received.

A successful C-STORE response does not mean that **PROSOLV** has stored a valid DICOM Composite Information Object. **PROSOLV** does not perform any validation of the data beyond the DICOM Command.

If the C-STORE was unsuccessful, then **PROSOLV** will return C000 as the status code.

Structured Reports are supported only for “Echocardiography Procedure Reports” templates as defined by Dicom Supplement 72. Retrieved measurements, however, are not always grouped as specified by the Supplement.

#### 2.1.3.2.3 Presentation Context Acceptance Criterion - Storage

**PROSOLV** will accept multiple Presentation Contexts on an association, provided that all of these Presentation Contexts specify the same Abstract Syntax. The acceptable Presentation Contexts that **PROSOLV** may accept are specified in Tables 3 & 6. The first acceptable Presentation Context (other than Verification) determines the Abstract Syntax which will be used for the association. Later Proposed Presentation Contexts may be accepted if they have the same Abstract Syntax and allow a different Transfer Syntax.

#### 2.1.3.2.4 Transfer Syntax Selection Policies - Storage

**PROSOLV** supports all transfer syntaxes listed in Table 6. The selection policy is user configurable. The default order for selecting the transfer syntax is JPEG Compression, RLE Compression, and Uncompressed.

### 2.1.3.3 Real-World Activity - Find

**2.1.3.3.1 Associated Real-World Activity - Find**

Will respond to query requests sent to it from an SCU.

**2.1.3.3.2 Presentation Context Table - Find**

The Presentation Contexts shown in Table 10 will be accepted by **PROSOLV**.

All Table 3 FIND	All Table 5	SCP	None
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**Table 10: Acceptable Presentation Contexts for FIND**

**2.1.3.3.2.1 SOP Specific Conformance - Find**

**SOP** classes are implemented via DIMSE C-FIND service as defined in PS 3.7.

Patient Name	(0x0010,0x0010)
Patient ID	(0x0010,0x0020)

**Table 11: Patient level attributes**

Study Instance UID	(0x0020,0x000D)
Study Date	(0x0008,0x0020)
Study Time	(0x0008,0x0030)
Modalities In Study	(0x0008, 0x0061)

**Table 12: Study level attributes**

Series Instance UID	(0x0020,0x000E)
---------------------	-----------------

**Table 13: Series level attributes**

SOP Instance UID	(0x0008,0x0018)
Image Number	(0x0020,0x0013)

**Table 14: Patient level attributes**

Refused	Out of resources	A700
Failed	Unable to process	C001
Cancel	Terminated by Cancel Request	FE00
Success	Success	0000

**Table 15: FIND status codes**

**2.1.3.3.3 Presentation Context Acceptance Criterion - Find**

**PROSOLV** will accept multiple Presentation Contexts on an association, provided that all of these Presentation Contexts specify the same Abstract Syntax. The acceptable Presentation Contexts that **PROSOLV** may accept are specified in Table 10. The first acceptable Presentation Context determines the Abstract Syntax, which will be used for the association. Later Proposed Presentation Contexts may be accepted if they have the same Abstract Syntax and allow a different Transfer Syntax.

**2.1.3.3.4 Transfer Syntax Selection Policies - Find**

**PROSOLV** supports all only the default transfer syntax of Implicit VR Little Endian.

**2.1.3.4 Real-World Activity - Move**

**2.1.3.4.1 Associated Real-World Activity - Move**

Will respond to retrieve requests sent to it from an SCU.

**2.1.3.4.2 Presentation Context Table - Move**

The Presentation Contexts shown in Table 16 will be accepted by **PROSOLV**.

All Table 3 MOVE	All Table 5	SCP	None
------------------	-------------	-----	------

**Table 16: Acceptable Presentation Contexts for FIND**

**2.1.3.4.2.1 SOP Specific Conformance - Move**

**PROSOLV** will attempt to establish an association with the move destination specified in the Move request. One or more of the Presentation Contexts listed in Table 6.

**PROSOLV** will return of the following status codes to a Move request.

Refused	Out of resources	A701
Refused	Unable to perform storage	A702
Failed	Unknown destination	A801
Failed	SOP Class does not match identifier	
Cancel	Terminated by Cancel Request	FE00
Success	Success	0000

**Table 17: MOVE status codes**

**2.1.3.4.3 Presentation Context Acceptance Criterion - Move**

**PROSOLV** will accept multiple Presentation Contexts on an association, provided that all of these Presentation Contexts specify the same Abstract Syntax. The acceptable Presentation Contexts that **PROSOLV** may accept are specified in Table 16. The first acceptable Presentation Context determines the Abstract Syntax, which will be used for the association. Later Proposed Presentation Contexts may be accepted if they have the same Abstract Syntax and allow a different Transfer Syntax.

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**2.1.3.4.4 Transfer Syntax Selection Policies - Move**

By default, **PROSOLV** sends the images using the transfer syntax that was used when the image was originally stored.

### 2.1.3.5 Real-World Activity – Storage Commitment Push Model

#### 2.1.3.5.1 Associated Real-World Activity – Storage Commitment

PSD will respond to a request for safekeeping of images/SR documents (N-ACTION-REQUEST) sent by SCU. PSD will send N-ACTION-RESPONSE acknowledging storage commitment request. On the same association that was used to receive N-ACTION-REQUEST PSD will send N-EVENT-REPORT containing Referenced sequence of all SOP instances that were committed for storage. Any SOP instances not found in the server database will be returned as part of Failed sequence of N-EVENT-REPORT. Failure reason for failed SOP instances will be set to 0x0112 (“No such object instance” as defined in PS3.7). PSD will wait for N-EVENT-RESPONSE from SCU for at most 200 seconds by default or as configured by the user during run-time. Files committed for storage will not be deleted unless deleted by the user explicitly. In case SCU releases association before receiving N-EVENT-REPORT, PSD will initiate association with client as an SCP and release this association upon completion of transmittal of N-EVENT-REPORT and N-EVENT-RESPONSE.

#### 2.1.3.5.2 Presentation Context Table – Storage Commitment

The Presentation Contexts shown in Table 18 will be accepted by **PROSOLV**.

Storage Commitment – Push Model	All Table 5	SCP	None
---------------------------------	-------------	-----	------

**Table 18: Acceptable Presentation Contexts for Storage Commitment**

#### 2.1.3.5.2.1 SOP Specific Conformance – Storage Commitment

**PROSOLV** provides standard conformance to DICOM V3.0 Storage Commitment – Push Model service class. **PROSOLV** does not currently support Storage Commitment – Pull Model service class.

#### 2.1.3.5.3 Presentation Context Acceptance Criterion – Storage Commitment

**PROSOLV** will accept multiple Presentation Contexts on an association, provided that all of these Presentation Contexts specify the same Abstract Syntax. The acceptable Presentation Contexts that **PROSOLV** may accept are specified in Table 18. The first acceptable Presentation Context determines the Abstract Syntax, which will be used for the association. Later Proposed Presentation Contexts may be accepted if they have the same Abstract Syntax and allow a different Transfer Syntax.

#### 2.1.3.5.4 Transfer Syntax Selection Policies - Storage Commitment

**PROSOLV** supports all transfer syntaxes listed in Table 18.

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## 3 Communication Profiles

### 3.1 Supported Communication Stacks (parts 8, 9)

**PROSOLV** provides DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8.

### 3.2 TCP/IP Stack

TCP/IP stack is inherited from the operating system.

#### 3.2.1 Physical Media Support

**PROSOLV** is indifferent to the physical medium over which TCP/IP executes; it inherits this from the operating system upon which it executes.

## 4 Extensions / Specializations / Privatizations

Not applicable.

## 5 Configuration

### 5.1 AE Title / Presentation Address Mapping

Local AE title is configurable. This information is easily entered when first executing **PROSOLV**.

TCP/IP port is configurable. The port is easily entered when first executing **PROSOLV**.

## 6 Support of Extended Character Sets

No extended character sets are supported.