Philips Medical Systems
DICOM Conformance Statement

BV Family

Document Number 4522 981 08991
13 April 2001

PHILIPS

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1 Introduction

This chapter provides general information about the purpose, scope and contents of this Conformance Statement.

1.1 Scope and field of application

The scope of this DICOM Conformance Statement is to facilitate data exchange from equipment of Philips Medical Systems. This document specifies the compliance to the DICOM standard (formally called the NEMA PS 3.X standards). It contains a short description of the applications involved and provides technical information about the data exchange capabilities of the equipment. The main elements describing these capabilities are: the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

The field of application is the integration of the Philips Medical Systems equipment into an environment of medical devices.
This Conformance Statement should be read in conjunction with the DICOM standard and its addenda [DICOM].

1.2 Intended audience

This Conformance Statement is intended for:
* (potential) customers,
* system integrators of medical equipment,
* marketing staff interested in system functionality,
* software designers implementing DICOM interfaces.

It is assumed that the reader is familiar with the DICOM standard.

1.3 Contents and structure

The DICOM Conformance Statement is contained in chapter 2 through 7 and follows the contents and structuring requirements of DICOM PS 3.2.

1.4 Used definitions, terms and abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see NEMA PS 3.3 and PS 3.4.
The word Philips in this document refers to Philips Medical Systems.

1.5 References

[DICOM]   The Digital Imaging and Communications in Medicine (DICOM) standard:
            NEMA PS 3.X
            National Electrical Manufacturers Association (NEMA) Publication Sales
            1300 N. 17th Street, Suite 1847
            Rosslyn, Va. 22209, United States of America

1.6 Important note to the reader

This Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
  Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into a networked environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability. It is the user's responsibility to analyse thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

- **Validation**
  Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
  Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery.
  The user should ensure that any non-Philips provider linking to Philips equipment, also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

1.7 General Acronyms and Abbreviations.

The following acronyms and abbreviations are used in the document.

- AE   Application Entity
- ACR   American College of Radiology
- ANSI   American National Standard Institute
- CD-R   CD Recordable
- DICOM   Digital Imaging and Communication in Medicine
- DIMSE   DICOM Message Service Element
- DIMSE-C   DICOM Message Service Element-Composite
- DIMSE-N   DICOM Message Service Element-Normalized
- ELE   Explicit VR Little Endian
- EBE   Explicit VR Big Endian
- GUI   Graphic User Interface
- HIS   Hospital Information System
- HL7   Health Level Seven
- ILE   Implicit VR Little Endian
- IOD   Information Object Definition
- ISIS   Information System - Imaging System
- NEMA   National Electrical Manufacturers Association
- PDU   Protocol Data Unit
- RIS   Radiology Information System
- RWA   Real World Activity
- SC   Secondary Capture
- SCP   Service Class Provider
- SCU   Service Class User
- SOP   Service Object Pair
- TCP/IP   Transmission Control Protocol/Internet protocol
- UID   Unique Identifier
- WLM   Worklist Management
- PACS   Picture Archiving Communication System
- ATR   Automatic Text Recognition

2 Implementation model

The BV Family system of Philips Medical Systems is a mobile image generating system. The BV Family system is installed with an Export function based on the DICOM Image Storage to transfer image data from the system to a remote system and a DICOM print function to print image data. A RIS connection is installed to gain patient/study information.

The BV Family system Export function and the RIS interaction are described in this document.

2.1 Application Data Flow Diagram

The BV Family system defines one DICOM Application Entities (AE) with 4 basic functions; BV Family system DICOM Print (part of BV Family export function), the BV Family system DICOM Image Storage (part of BV Family system export function), DICOM verification and BV Family system DICOM Modality Worklist Query. The related Implementation Model is shown in Figure 2-1 on page 5.

A part of the received BV Family system DICOM modality Worklist data will be shown on the user interface and is used as image attribute values when exporting or printing these images.

When an examination is exported by the BV Family system the images in this examination are automatically grabbed and exported. When printing an examination the formatting of the printed page can be driven by an operator of the BV Family system via manual control.

In the case where the BV Family system DICOM Image Storage is used, the Images in the examination will be transmitted as separate Secondary Capture Images.

BV Family system is configured for a function to perform Automatic Text Recognition (ATR) that allows required DICOM attribute values that are annotated on the image to be extracted from the Pixel Data and communicated as part of the DICOM SC Image. ATR is also used to provide useful information to narrow down a query to the modality worklist server so that the user does not need to interact with the BV Family system and reconcile every page to a work-list entry.
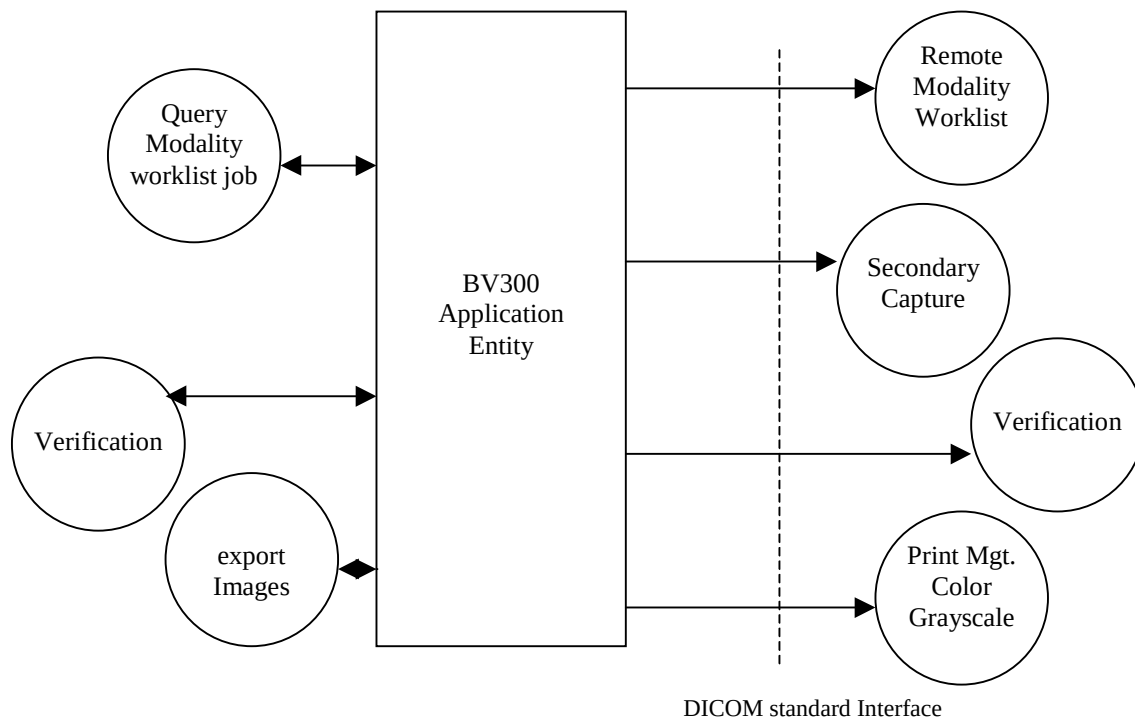
Figure 2-1: Implementation Model

2.2 Functional definition of application Entities

The BV Family system DICOM Image Storage function acts as a Service Class User (SCU) of the Storage Service Class

The BV Family system DICOM Print function acts as a Service Class User (SCU) of the print Service Class.

The BV Family system DICOM Worklist function acts as a Service class User (SCU) of the Basic Worklist Management Service Class. When the user uses the BV Family system Export, a request for the next examination is done, it will receive the examination data from the RIS and displays this data on the user interface and stores this data in resulting images of the examination.

The BV Family system does not support Service Classes as a Service Class Provider.

2.3 Sequences of Real World Activities

Figure 2-2 on page 6 gives an overview of the BV Family system (The ExamWorks Merge Box is part of the system) in a DICOM network.
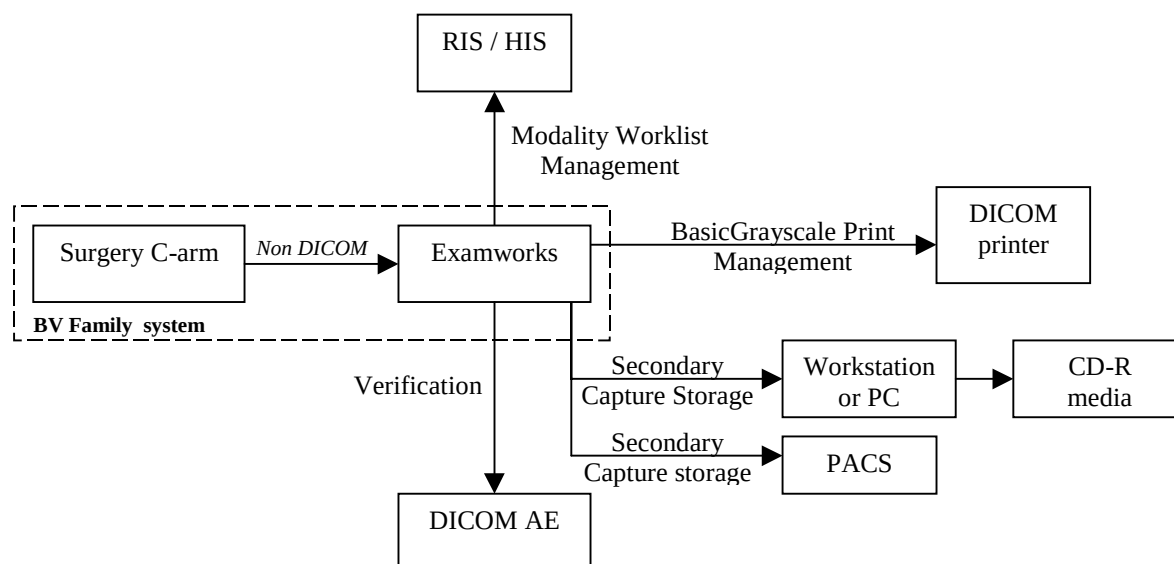
Figure 2-2: The BV Family system in a DICOM network

First the user Acquires Images on the Surgery C-arm.

The user initiates the export function to export the images in an examination on the BV Family system.

Through a non-DICOM interface a grab can be made by the Examworks.

Automatically the worklist request is send when a RIS is available (Query for WLM), the query data is derived from the ATR function.

When there is a mismatch between the RIS data and the ATR data the user can export the data with either the RIS data or the ATR data.

The BV Family system Automatically exports the selected images. The BV Family system DICOM Print Function Prints a film conform the selected Layout or a Storage of each individually picture is done with the BV Family system DICOM Image storage function.

3 AE Specifications

3.1 BV Family system DICOM AE Specification

The BV Family system provides Standard Conformance to the following DICOM 3.0 SOP class as SCU:

Table 3-1: Supported SOP Classes as SCU

SOP Class Name	UID
Verification SOP Class	1.2.840.10008.1.1
Basic Grayscale Print Management Meta SOP	1.2.840.10008.5.1.1.9
> Printer SOP Class	1.2.840.10008.5.1.1.16
> Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
> Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
> Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31

The BV Family system Export Application Entity does not support DICOM 3.0 SOP Classes as SCP.

3.1.1 Association Establishment Policies

3.1.1.1 General

The maximum length negotiation is included in all association establishment requests. The maximum length PDU for an association is 16 Kbytes.

3.1.1.2 Number of Associations

The BV Family system export will attempt to establish one to ten association at a time.

3.1.1.3 Asynchronous Nature

The BV Family system export does not support asynchronous operations and will not perform asynchronous window negotiation.

3.1.1.4 Implementation Identifying Information

The Implementation Class UID is: "1.3.46.670589.15.1.2.1".
The implementation version name is: "BV Family R1.1".

3.1.2 Association Initiation Policy

On boot up, BV Family system will attempt to open an Association with any of the configured DICOM export (Print and Storage) targets. When an association failed the BV Family systems Retries. This association is held open unless the SCP aborts it or a Time Out is reached. If an association is not open, an attempt will be made to reopen the association when an Export operation is requested.

When the BV Family system Export function is called the BV Family system will initiate a Modality Worklist Information Query via the BV Family system DICOM Modality Worklist Query.

3.1.2.1 Verify Application Level Communication

3.1.2.1.1   Associated Real-World Activity

In the service mode of the BV Family system an association can be made to verify application level communication using the C-ECHO command.

3.1.2.1.2   Proposed Presentation Contexts

The BV Family system Verify will propose the following presentation contexts:

Table 1: Proposed Presentation Contexts for the BV Family system Verification

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

3.1.2.1.3   SOP Specific Conformance to Verify

The BV Family system provides standard conformance.

3.1.2.2 The BV Family system DICOM Image Storage Request

3.1.2.2.1   Associated Real-World Activity

The BV Family system transmits images via the DICOM Secondary Capture Image Storage Service Class using the Presentation Contexts defined in the Table shown in Table 3-2, to all of the selected storage target device(s).

3.1.2.2.2   Proposed Presentation Contexts

The BV Family system Storage will propose the following presentation contexts:

Table 3-2: Proposed Presentation Contexts for the BV Family system Storage

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

3.1.2.2.3   SOP Specific Conformance to Storage SOP Classes

The BV Family system DICOM Image Storage transmits the images from the examination from a specific patient on the user interface to all selected target device(s) via the DICOM Secondary Capture Image Storage Service Class.

Images are transferred according to the real world activity described earlier. Each image will be sent individually with a C-STORE request.

Figure 3-1 on page 10 gives an overview of the DICOM data flow model. Also an overview of the real life situation is given. The BV Families database contains several examinations (not patients). This means that when the patient information is changed it is only changed in one examination, in other examination based on the same patient the patient information isn't changed.

Images in an examination contains information for only one patient. An Examination has several runs, a run is a series of images. When Images are exported with the Export function information such as Patient name, study ID are the same for each individual image, series ID and series UID vary per run.

Dicom model

Patient
↓ 1
Is the Subject of
↓ 1,n
Study
↓ 1
Contains
↓ 1,n
Series
↓ 1
Contains
↓ 1,n
Image

Real World

Patient
↓ 1
Is the Subject of
↓ 1,n
Examination
↓ 1
Contains
↓ 1,n
Run
↓ 1
Contains
↓ 1,n
Image
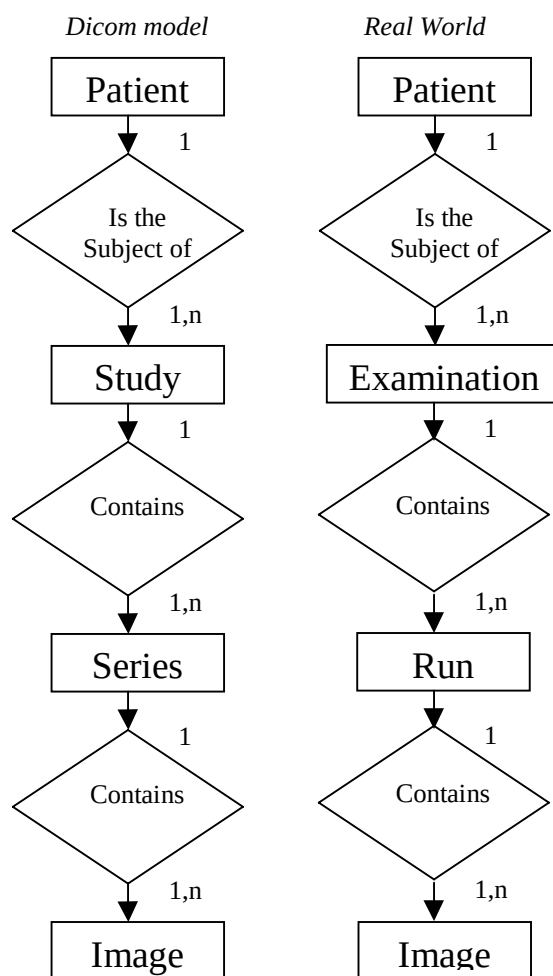
Figure 3-1: DICOM data model and BV Family data model

Upon receiving a C-STORE response containing an Error or a Refused status the implementation will release the association. All of the selected images generated of that examination will be considered by the BV Family system to have failed to transfer. The BV Family system Image Storage AE has the ability to automatically recover from this situation and will attempt to send all the images at a later time. This retry mechanism will continue until the transfer of all images is successful.

Table 3-3 lists the applied optional and conditional attributes of the SC IOD.

Table 3-1: Applied optional Modules and Attributes of the applied SC IOD as standard configuration

IE	Module	Used Optional Attributes	Used Conditional Attributes
Patient	Patient	-	-
Study	General Study	-	-
Series	General Series	Laterality	-
Equipment	General Equipment	-	Institution Name, Station Name, Institutional Department Name, Manufacturer's Model Name, Software Vesion(s)
	SC Equipment	-	Secondary Capture Device Manufacturer, Secondary Capture Device Manufacturer's Model Name, Secondary Capture Device Software Version(s)
Image	General Image	Patient Orientation	Image Type
	SC Image	-	-
	Image Pixel	Pixel Aspect Ratio	-
	VOI LUT	Windows Center	Window Width
	SOP Common	-	-

A detailed overview of the applied SC Image IOD is given in section 8 on page 19.
In Table 3-2 on page 11 an overview is given of the possible errors that can occur.

Table 3-2: C-STORE STATUS

Table 3-3:

Service Status	Codes	Further Meaning Status
Refused	A7xx	Out of Resources, status logged in system file.
Error	A9xx	Data Set does not match SOP Class, status logged in system file.
	Cxxx	Cannot understand
Warning	B000	Coercion of Data Elements, status logged in system file.
	B007	Data Set does not match SOP Class
	B006	Elements Discarded
Success	0000	

Errors that occur are logged in a system file, no information is given to the user trough user interface.

The modules selected from the SC Image IOD module table of DICOM 3.0 modules are given in the table below.

Table 3-4: Applied Modules in the Extended SC IOD

IE	Module	Reference
Patient	Patient	Table 3-5
Study	General Study	Table 3-6
	Patient Study **	Table 3-7
Series	General Series	Table 3-8
Equipment	General Equipment	Table 3-9
	SC General Equipment	Table 3-10
Image	General Image	Table 3-11
	Image Pixel	Table 3-12
	SC Image	Empty
	VOI LUT	Table 3-14
	SOP Common	Table 3-15

The details of these applied modules are given in the tables below. The list of possible attribute values are given. The situation that an attribute is present conditionally/optionally is indicated too.

NOTE:
- The shaded attributes are the ones which are imported from the RIS
- * these attributes are obtained with ATR.
- ** only send if data is received from RIS.

Table 3-5: Secondary Capture Image Storage SOP Class - Patient Module

Attribute Name	Tag	Note
Patient's Name *	0010,0010	Can not handle "\"
Patient ID *	0010,0020	
Patient's Birth Date *	0010,0030	
Patient's Sex *	0010,0040	

Table 3-6: Secondary Capture Image Storage SOP Class - General Study Module

Attribute Name	Tag	Note
Study Date *	0008,0020	
Study Time *	0008,0030	
Accession Number	0008,0050	
Referring Physician's Name **	0008,0090	
Study Instance UID	0020,000D	From RIS or generated by Examworks.
Study ID	0020,0010	Value is generated by Examworks.
Study description *	0008,1030	Only send if value from ATR function.

Table 3-7: Secondary Capture Image Storage SOP Class - Patient Study Module

Attribute Name	Tag	Note
Patient's Weight **	0010,1030	

Table 3-8: Secondary Capture Image Storage SOP Class - General Series Module

Attribute Name	Tag	Note
Modality	0008,0060	Applied value(s): OT
Performing Physicians' Name *	0008,1050	
Series Instance UID	0020,000E	Value is generated by Examworks.
Series Number	0020,0011	

Table 3-9: Secondary Capture Image Storage SOP Class - General Equipment Module

Attribute Name	Tag	Note
Manufacturer	0008,0070	Applied Value(s): Philips Medical Systems
Institution Name *	0008,0080	
Manufacturer's Model Name	0008,1090	Applied Value(s): BV Family

Table 3-10: Secondary Capture Image Storage SOP Class - SC Equipment Module

Attribute Name	Tag	Note
Conversion Type	0008,0064	Applied value(s): DV
Secondary Capture Device Manufacturer	0018,1016	Applied value(s): Merge Technologies Inc.
Secondary Capture Device Manufacturer's Model Name	0018,1018	Applied value(s): Merge VPI
Secondary Capture Device Software Version(s)	0018,1019	Applied value(s): Version 1.15 IB 65

Table 3-11: Secondary Capture Image Storage SOP Class - General Image Module

Attribute Name	Tag	Note
Image Type	0008,0008	Applied value(s): DERIVED \ SECONDARY
Instance Number	0020,0013	Image Number reflects the Image Position in the selected export.
Patient Orientation	0020,0020	Always Empty

Table 3-12: Secondary Capture Image Storage SOP Class - Image Pixel Module

Attribute Name	Tag	Note
Samples per Pixel	0028,0002	Applied value(s): 1
Photometric Interpretation	0028,0004	Applied value(s):MONOCHROME2
Rows	0028,0010	Applied value(s): See Table 3-13
Columns	0028,0011	Applied value(s): See Table 3-13
Pixel Aspect Ratio	0028,0034	Applied value(s): See Table 3-13
Bits Allocated	0028,0100	Applied value(s): 8
Bits Stored	0028,0101	Applied value(s): 8
High Bit	0028,0102	Applied value(s): 7
Pixel Representation	0028,0103	Applied value(s): 0
Pixel Data	7FE0,0010	

Table 3-13 gives an overview of the applied value(s) for Rows, Columns and Pixel Aspect Ratio.

Table 3-13: Overview applied value(s) for Rows, Columns and Pixel Aspect Ratio

Monitor type	Rows	Columns	Pixel Aspect Ratio horizontal

Table 3-15: Secondary Capture Image Storage SOP Class - SOP Common Module

Attribute Name	Tag	Note
SOP Class UID	0008,0016	Applied value(s): 1.2.840.10008.5.1.4.1.1.7
Specific Character Set	0008,0005	Applied values(s): ISO_IR 100
SOP Instance UID	0008,0018	

3.1.2.3 The BV Family system DICOM Print Request

3.1.2.3.1   Associated Real-World Activity

The BV Family system DICOM Print has the capability to print images via the DICOM Basic Print services using the Presentation Contexts defined in the Table shown in 3.1.2.3.2 on page 17, to all of the selected Print target device(s).

The BV Family system DICOM Print function will create a Film Session (based on the selected Layout) containing a single Film Box. The Basic Print AE will subsequently fill in the content of the image box and request the print at the Film Box level. The Film Session is deleted once the Print has completed. A new Film Session is created for each successive film.

BV Family system is configured to acquire grayscale images, and to negotiate for Basic Grayscale DICOM print on each output.

3.1.2.3.2   Proposed Presentation Contexts

The BV Family system Print function will propose the following presentation contexts:

Table 3-16: Proposed Presentation Contexts for the BV Family system print

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta SOP	1.2.840.10008.5.1.1.9	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

The following DIMSE Services are supported:

Table 3-17: Supported DIMSE Service Elements

SOP Class	Supported DIMSE Service Element
Printer SOP Class	N-GET, N-EVENT-REPORT
Basic Film Session SOP Class	N-CREATE
Basic Film Box SOP Class	N- CREATE
Basic Grayscale Image Box SOP Class	N-SET

3.1.2.3.3   SOP Specific Conformance to Print SOP Classes

The BV Family system DICOM Print function supports the Basic Grayscale Print Management SOP Classes. Films are printed according to the real world activity described earlier.

Upon receiving a normalized service response (N-CREATE, N-SET) containing a Failure Status, the BV Family system will release the association. The printing of the current Page will be considered failed. The BV Family system Basic Print AE has the ability to automatically recover from this situation and will attempt to print the Page again. This retry mechanism will continue until the transfer of all images is successful.

Upon receiving a normalized service response (N-GET, N-EVENT-REPORT) containing a Failure Status, this status is ignored.

Errors that occur are logged in a system file, no information is given trough the user interface.

The modules selected from the several print IOD module table of DICOM 3.0 are given in the table below. The list of possible attribute values are given. The situation that an attribute is present conditionally/optionally is indicated too

Note:
* can be set in User Interface.

Table 3-18: Printer SOP Class - N-GET

Attribute Name	Tag	Note
Manufacturer	0008,0070	Accepted but not used.
Manufacturer's Model Name	0008,1090	Accepted but not used.
Device Serial Number	0018,1000	Accepted but not used.
Date of Last Calibration	0018,1200	Accepted but not used.
Time of Last Calibration	0018,1201	Accepted but not used.
Printer Status	2110,0010	Applied value(s): FAILURE, NORMAL, WARNING. Displayed in User Interface.
Printer Status Info	2110,0020	
Printer Name	2110,0030	Accepted but not used.

Table 3-19: Printer SOP Class - N-EVENT-REPORT

Attribute Name	Tag	Note
Printer Status Info	2110,0020	
Printer Name	2110,0030	Accepted but not used.

Table 3-20: Basic Film Box SOP Class - N-CREATE

Attribute Name	Tag	Note
Image Display Format *	2010,0010	Applied value(s): STANDARD\1,1, STANDARD\1,2, STANDARD\2,2, STANDARD\2,3,
Film Orientation	2010,0040	Applied value(s): LANDSCAPE, PORTRAIT
Film Size ID	2010,0050	Applied value(s): 10INX12IN, 10INX14IN, 11INX14IN, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM, 8INX10IN
Magnification Type	2010,0060	Applied value(s): BILINEAR, CUBIC, NONE, REPLICATE
Smoothing Type	2010,0080	Can be configured per printer.
Border Density	2010,0100	Applied value(s): BLACK,WHITE
Empty Image Density	2010,0110	
Min Density	2010,0120	Applied value(s): 0.. 300
Max Density	2010,0130	Applied value(s): 0.. 300
Trim	2010,0140	Applied value(s): NO, YES
Configuration Information	2010,0150	Can be configured per printer.
Referenced Film Session Sequence	2010,0500	
> Referenced SOP Class UID	0008,1150	
> Referenced SOP Instance UID	0008,1155	
Empty Image Density	2010,0110	Applied value(s): BLACK, WHITE

Table 3-21: Basic Film Session SOP Class - N-CREATE

Attribute Name	Tag	Note
Number of Copies *	2000,0010	Applied value(s):1 to 9
Print Priority	2000,0020	Applied value(s): HIGH, LOW
Medium Type	2000,0030	Applied value(s): BLUE FILM, CLEAR FILM, PAPER, TRANSPARENCY, NONE
Film Destination	2000,0040	Applied value(s): PROCESSOR, MAGAZINE, CURRENT, BIN_1
Film Session Label	2000,0050	Equal to Study ID.

Table 3-22: Basic Grayscale Image Box SOP Class - N-SET

Attribute Name	Tag	Note
Image Position	2020,0010	Generated
Polarity	2020,0020	Applied value(s): NORMAL, REVERSE
Preformatted Grayscale Image Sequence	2020,0110	
> Samples per Pixel	0028,0002	Applied value(s): 1
> Photometric Interpretation	0028,0004	Applied value(s):MONOCHROME2
> Rows	0028,0010	Value from install script. this install script is run when machine is installed.
> Columns	0028,0011	Value from install script. this install script is run when machine is installed.
> Pixel Aspect Ratio	0028,0034	Value from install script. this install script is run when machine is installed.
> Bits Allocated	0028,0100	Applied value(s): 8
> Bits Stored	0028,0101	Applied value(s): 8
> High Bit	0028,0102	Applied value(s): 7
> Pixel Representation	0028,0103	Applied value(s): 0
> Pixel Data	7FE0,0010	

3.1.2.4 The BV Family system DICOM Worklist Management

3.1.2.4.1   Associated Real-World Activity

Before the acquisition the operator can request a DICOM worklist form e.g. a RIS.

The BV Family system Modality Worklist Query AE initiates an association to query a remote Information System. Upon completion of the C-FIND, the association is released.

Upon receiving a C-FIND response containing a Failure Status, the BV Family system aborts the association.

3.1.2.4.2   Proposed Presentation Contexts

The BV Family system Worklist Management will propose the following presentation contexts:

Table 3-23: Proposed Presentation Contexts for the BV Family system Worklist

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

3.1.2.4.3   SOP Specific Conformance to WLM SOP Classes

Modality Worklist is accomplished according to the real world activity described earlier. The BV Family system Modality Worklist Query function provides Standard conformance to the Modality Worklist SOP Class. The attributes supported are documented in section on page 20 of this document.

Following are the status codes that are processed by the BV Family system Modality Worklist Query AE when received from a remote Modality Worklist SCP system:

Table 3-24: WLM STATUS

Table 2:

Service Status	Status Codes	Further Meaning	Behaviour upon receiving Status Codes
Refused	A700	Out of resources	Processing of the matches and the association is terminated. A message appears on the User Interface.
Failed	A900	Identifier does not match SOP Class	The association is terminated and the status is logged into the system error log. A message appears on the User Interface.
	Cxxx	Unable to process	Processing of the matches and the association is terminated. A message appears on the User Interface.
Cancel	FE00	Matching terminated due to cancel	Processing of the matches and the association is terminated.
Success	0000	Matching is complete - No final identifier is supplied	The association is released and the matches received are stored.
Pending	FF00	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys.	Processing of the matches continues.
	FF01	Matches are continuing - Warning that one or more Option Keys were not supported for existence of this identifier.	Processing of the matches continues without any warnings or errors.

The modules selected from the modality Worklist Information Model IOD module table of DICOM 3.0 are given in the table below. The list of possible attribute values are given.

Note:
* Attribute can be used as match criterion.

Table 3-25: Modality Worklist Information Model - FIND SOP Class - SOP Common

Attribute Name	Tag	Note
Specific Character Set	0008,0005	Applied value(s): ISO_IR 100 Not used in standard query, only present when configured.

.

Table 3-26: Modality Worklist Information Model - FIND SOP Class - Patient Identification Module

Attribute Name	Tag	Note
Patient's Name *	0010,0010	Can not handle "\"
Patient ID *	0010,0020	

Table 3-27: Modality Worklist Information Model - FIND SOP Class - Patient Demographic Module

Attribute Name	Tag	Note
Patient's Birth Date *	0010,0030	
Patient's Sex *	0010,0040	Applied Value(s): F, M, O
Patient's Weight	0010,1030	

Table 3-28: Modality Worklist Information Model - FIND SOP Class - Scheduled Procedure Step Module

Attribute Name	Tag	Note
Scheduled Procedure Step Sequence	0040,0100	
>Modality	0008,0060	
>Requested Contrast Agent	0032,1070	Not used in standard query, only present when configured.
>Scheduled Station AE Title *	0040,0001	
>Scheduled Procedure Step Start Date *	0040,0002	
>Scheduled Procedure Step Start Time	0040,0003	
>Scheduled Performing Physician's Name	0040,0006	
>Scheduled Procedure Step Description	0040,0007	
>Scheduled Procedure Step ID	0040,0009	Not used in standard query, only present when configured.
>Scheduled Station Name	0040,0010	Not used in standard query, only present when configured.
>Scheduled Procedure Step Location	0040,0011	Not used in standard query, only present when configured.

Table 3-28: Modality Worklist Information Model - FIND SOP Class - Scheduled Procedure Step Module

Attribute Name	Tag	Note
>Pre-Medication	0040,0012	Not used in standard query, only present when configured.

Table 3-29: Modality Worklist Information Model - FIND SOP Class - Requested Procedure Module

Attribute Name	Tag	Note
Study Instance UID	0020,000D	Not used in standard query, only present when configured.
Requested Procedure Description	0032,1060	Not used in standard query, only present when configured.
Requested Procedure ID	0040,1001	Not used in standard query, only present when configured.
Requested Procedure Priority	0040,1003	Applied Value(s): HIGH, LOW, MEDIUM, ROUTINE, STAT Not used in standard query, only present when configured.
Patient Transport Arrangements	0040,1004	Not used in standard query, only present when configured.

Table 3-30: Modality Worklist Information Model - FIND SOP Class - Patient Medical Module

Attribute Name	Tag	Note
Additional Patient History	0010,21B0	Not used in standard query, only present when configured.

Table 3-31: Modality Worklist Information Model - FIND SOP Class - Visit Identification Module

Attribute Name	Tag	Note
Admission ID	0038,0010	Not used in standard query, only present when configured.

Table 3-32: Modality Worklist Information Model - FIND SOP Class - Visit Status Module

Attribute Name	Tag	Note
Current Patient Location	0038,0300	Not used in standard query, only present when configured.

Table 3-33: Modality Worklist Information Model - FIND SOP Class - Imaging Service Request Module

Attribute Name	Tag	Note
Accession Number	0008,0050	
Referring Physician's Name	0008,0090	
Requesting Physician	0032,1032	

3.1.3 Association Acceptance Policy

The BV Family system does not accept associations.

4 Communication Profiles

4.1 TCP/IP Stack

The BV Family system provides DICOM 3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM 3.0 Standard. The TCP/IP stack is inherited from the BSD/OS 4.0.1 UNIX operation system.

4.1.1 Physical Media Support

The BV Family system supports Ethernet v2.0 and IEEE 802.3, 10/100 BASE-T.

5 Extensions/Specializations/Privatizations

BV Family system conforms to the Verify, Basic Print, Secondary Image Storage, and Modality Worklist SOP Classes as Standard SOP Classes (i.e. no private attributes are defined).

6 Configuration

The configuration of a BV Family system is done by means of updating configuration files. This should be done by Philips service engineers only.

6.1 AE Title/Presentation Address Mapping

The following fields are configurable for the BV Family system AEs (local):
- Local AE Title
- Local IP Address

The following fields are configurable for every remote DICOM AE:
- Remote AE Titles
- Listening TCP/IP Port
- Remote IP Address
- Print, Storage and WLM service

7 Support of Extended Character Sets.

The BV Family system supports Extended Character Set "ISO_IR 100"