

**Philips Medical Systems  
DICOM Conformance Statement**

**BV300 R 2.1.1**

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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-1999 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 3.2-1999.

### 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 3.3-1999 and PS 3.4-1999.

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 1999  
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).

## Introduction

**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 BV300 R2.1.1 system of Philips Medical Systems (further mentioned as the BV300 system) is a mobile image generating system. The BV300 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 BV300 system Export function and the RIS interaction are described in this document.

### 2.1 Application Data Flow Diagram

The BV300 system defines one DICOM Application Entities (AE) with 4 basic functions; BV300 system DICOM Print (part of BV300 export function), the BV300 system DICOM Image Storage (part of BV300 system export function), DICOM verification and BV300 system DICOM Modality Worklist Query. The related Implementation Model is shown in Figure 2-1 on page 5.

A part of the received BV300 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.

An image is grabbed and placed on the user interface called the Page Layout. This grab and formatting the page can be driven by an operator of the BV300 system via manual control.

In the case where the BV300 system DICOM Print AE is used, the film will be printed as formatted on the Page Layout.

In the case where the BV300 system DICOM Image Storage is used, the Images on the Page Layout will be transmitted as separate Secondary Capture Images (e.g. if the Page Layout consists of 6 images, 6 images transfers will occur).

BV300 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 BV300 system and reconcile every page to a worklist entry.



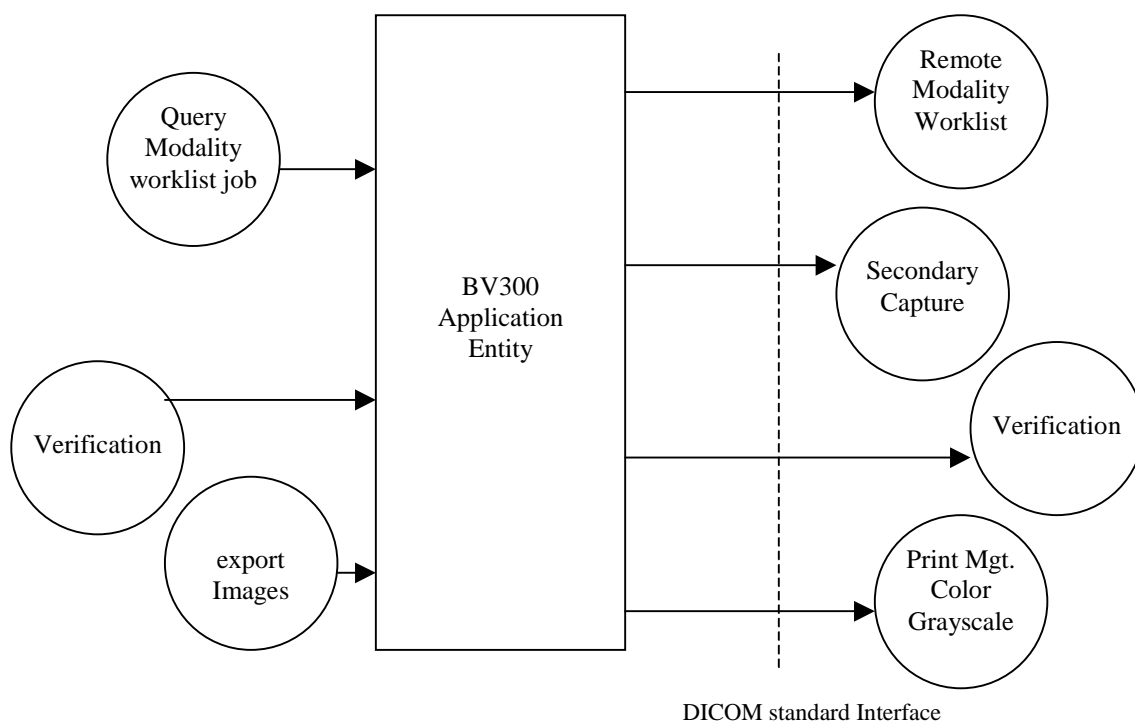


Figure 2-1: Implementation Model

## 2.2 Functional definition of application Entities

The BV300 system DICOM Image Storage function acts as a Service Class User (SCU) of the Storage Service Class

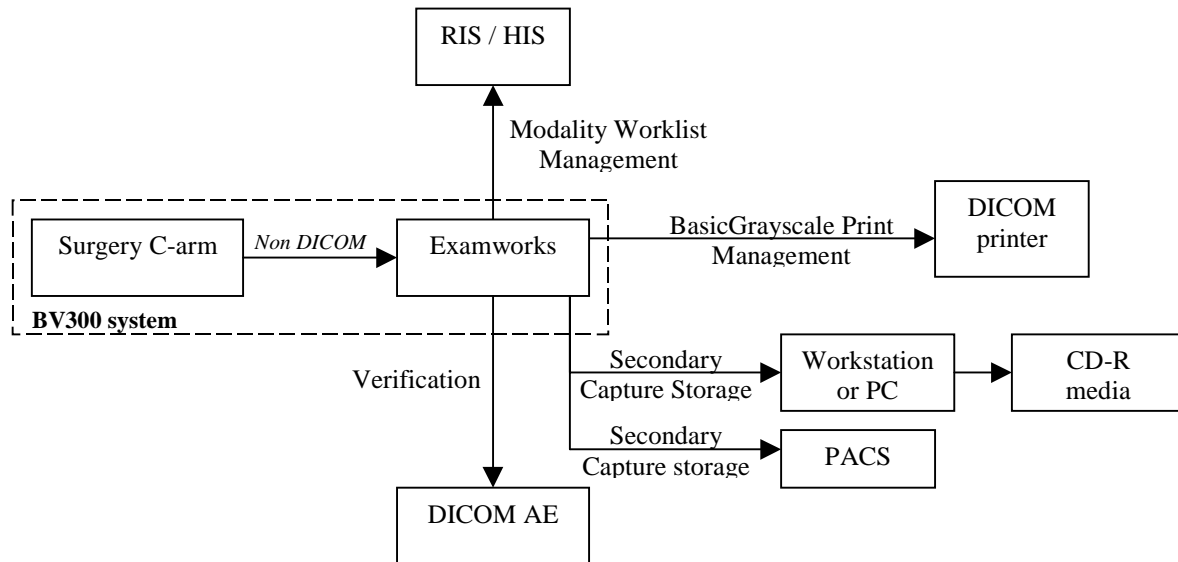
The BV300 system DICOM Print function acts as a Service Class User (SCU) of the print Service Class.

The BV300 system DICOM Worklist function acts as a Service class User (SCU) of the Basic Worklist Management Service Class. When the user uses the BV300 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 BV300 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 BV300 system (The ExamWorks Merge Box is part of the system) in a DICOM network.



**Figure 2-2: The BV300 system in a DICOM network**

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

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

The user Exports the images with BV300 system Export function.

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 BV300 system Automatically exports the selected images. The BV300 system DICOM Print Function Prints a film conform the Page Layout. A Storage of each individually picture is done with the BV300 system DICOM Image storage function.

## 3 AE Specifications

### 3.1 BV300 system DICOM AE Specification

The BV300 system provides Standard Conformance to the following DICOM 3.0 SOP class as SCU:

**Table 3-1: Supported SOP Classes as SCU**

<i>SOP Class Name</i>	<i>UID</i>
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 BV300 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 BV300 system export will attempt to establish one to ten association at a time.

##### 3.1.1.3 Asynchronous Nature

The BV300 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: "1.3.46.670589.15.1.2.0".

The implementation version name is: "BV 300 R2.1.1".

### 3.1.2 Association Initiation Policy

On boot up, BV300 system will attempt to open an Association with any of the configured DICOM export (Print and Storage) targets. When an association failed the BV300 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 BV300 system Export function is called the BV300 system will initiate a Modality Worklist Information Query via the BV300 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 BV300 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 BV300 system Verify will propose the following presentation contexts:

**Table 1: Proposed Presentation Contexts for the BV300 system Verification**

<i>Presentation Context table</i>					
<i>Abstract Syntax</i>		<i>Transfer Syntax</i>		<i>Role</i>	<i>Extended Negotiation</i>
<i>Name</i>	<i>UID</i>	<i>Name List</i>	<i>UID List</i>		
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 BV300 system provides standard conformance.

### 3.1.2.2 The BV300 system DICOM Image Storage Request

#### 3.1.2.2.1 Associated Real-World Activity

The BV300 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 BV300 system Storage will propose the following presentation contexts:

**Table 3-2: Proposed Presentation Contexts for the BV300 system Storage**

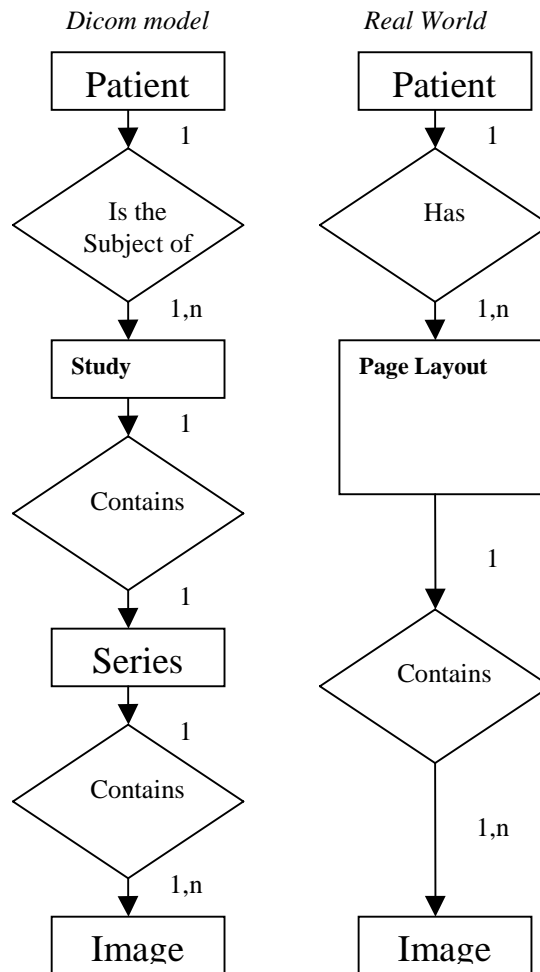
<i>Presentation Context table</i>					
<i>Abstract Syntax</i>		<i>Transfer Syntax</i>		<i>Role</i>	<i>Extended Negotiation</i>
<i>Name</i>	<i>UID</i>	<i>Name List</i>	<i>UID List</i>		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2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

#### 3.1.2.2.3 SOP Specific Conformance to Storage SOP Classes

The BV300 system DICOM Image Storage transmits the images from the Page Layout 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. The images transferred are managed by the BV300 system Image Storage function based on the Page Layout on the user interface (e.g. if 6 images are acquired by the operator for this film sheet, 6 images will be transferred). 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. Here a series of images is placed on the Page Layout, this Images contains information for only one patient. When this Page Layout is exported with the Export function information such as Patient name, study ID, series ID series UID are the same for each individual image.

The BV300 system can not handle different patients (Patient ID, Patient Name) on one page.



**Figure 3-1: DICOM data model and real world data model**

Upon receiving a C-STORE response containing an Error or a Refused status the implementation will release the association. All of the images generated placed on the Page Layout will be considered by the BV300 system to have failed to transfer. The BV300 system Image Storage AE has the ability to automatically recover from this situation and will attempt to send all the images on the Page Layout 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**

<i>IE</i>	<i>Module</i>	<i>Used Optional Attributes</i>	<i>Used Conditional Attributes</i>
Patient	Patient	-	-
Study	General Study	-	-
Series	General Series	Laterality	-
Equipment	General Equipment	-	Institution Name, Station Name, Institutional Department Name, Manufacturer's Model Name, Software Version(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:**

<b>Service Status</b>	<b>Codes</b>	<b>Further Meaning Status</b>
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 through user interface.

### 3.1.2.3 The BV300 system DICOM Print Request

#### 3.1.2.3.1 Associated Real-World Activity

The BV300 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 12, to all of the selected Print target device(s).

The BV300 system DICOM Print function will create a Film Session (based on the Page 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.

BV300 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 BV300 system Print function will propose the following presentation contexts:

**Table 3-4: Proposed Presentation Contexts for the BV300 system print**

<i>Presentation Context table</i>					
<i>Abstract Syntax</i>		<i>Transfer Syntax</i>		<i>Role</i>	<i>Extended Negotiation</i>
<i>Name</i>	<i>UID</i>	<i>Name List</i>	<i>UID List</i>		
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 3-5: Supported DIMSE Service Elements**

<i>SOP Class</i>	<i>Supported DIMSE Service Element</i>
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 BV300 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 BV300 system will release the association. The printing of the current Page Layout will be considered failed. The BV300 system Basic Print AE has the ability to automatically recover from this situation and will attempt to print the Page Layout 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 through the user interface.

A detailed overview of the applied Print IOD is given in section 9.

### 3.1.2.4 The BV300 system DICOM Worklist Management

#### 3.1.2.4.1 Associated Real-World Activity

The BV300 system Modality Worklist Query AE initiates an association to query a remote Information System. Upon completion of the C-FIND, the association is released.

When an Export request is done the BV300 system will Automatically generate a BV300 system Modality Worklist Query based on data from the ATR function.

Upon receiving a C-FIND response containing a Failure Status, the BV300 system aborts the association.

#### 3.1.2.4.2 Proposed Presentation Contexts

The BV300 system Worklist Management will propose the following presentation contexts:

**Table 3-6: Proposed Presentation Contexts for the BV300 system Worklist**

<i>Presentation Context table</i>					
<i>Abstract Syntax</i>		<i>Transfer Syntax</i>		<i>Role</i>	<i>Extended Negotiation</i>
<i>Name</i>	<i>UID</i>	<i>Name List</i>	<i>UID List</i>		
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 BV300 system Modality Worklist Query function provides Standard conformance to the Modality Worklist SOP Class. The attributes supported are documented in section 10 on page 28 of this document.

Following are the status codes that are processed by the BV300 system Modality Worklist Query AE when received from a remote Modality Worklist SCP system:

**Table 3-7: WLM STATUS**

**Table 2:**

<i>Service Status</i>	<i>Status Codes</i>	<i>Further Meaning</i>	<i>Behaviour upon receiving Status Codes</i>
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.

A detailed overview of the applied Modality Worklist IOD is given in section 10.

### 3.1.3 Association Acceptance Policy

The BV300 system does not accept associations.

## **4 Communication Profiles**

### **4.1 TCP/IP Stack**

The BV300 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 BV300 system supports Ethernet v2.0 and IEEE 802.3, 10/100 BASE-T.

## **5 Extensions/Specializations/Privatizations**

BV300 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 BV300 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 BV300 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 BV300 system supports Extended Character Set “ISO\_IR 100” which is the Latin alphabet NO1, supplementary set.

## Overview of the applied Secondary Capture IOD

## 8 Overview of the applied Secondary Capture IOD

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

**Table 8-1: Applied Modules in the Extended SC IOD**

<i>IE</i>	<i>Module</i>	<i>Reference</i>
Patient	Patient	Table 8-2
Study	General Study	Table 8-3
	Patient Study **	Table 8-4
Series	General Series	Table 8-5
Equipment	General Equipment	Table 8-6
	SC General Equipment	Table 8-7
Image	General Image	Table 8-8
	Image Pixel	Table 8-9
	SC Image	Empty
	VOI LUT	Table 8-11
	SOP Common	Table 8-12

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 8-2: Secondary Capture Image Storage SOP Class - Patient Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Patient's Name *	0010,0010	Can not handle “\”
Patient ID *	0010,0020	
Patient's Birth Date *	0010,0030	
Patient's Sex *	0010,0040	
Patient's Birth Time **	0010,0032	
Other Patient IDs **	0010,1000	



**Table 8-2: Secondary Capture Image Storage SOP Class - Patient Module (Continued)**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Other Patient Names **	0010,1001	Can not handle “\”
Ethnic Group **	0010,2160	
Patient Comments **	0010,4000	

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

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
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 8-4: Secondary Capture Image Storage SOP Class - Patient Study Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Admitting Diagnoses Description **	0008,1080	
Patient's Age **	0010,1010	
Patient's Size **	0010,1020	
Patient's Weight **	0010,1030	
Occupation **	0010,2180	
Additional Patient History **	0010,21B0	

## Overview of the applied Secondary Capture IOD

**Table 8-5: Secondary Capture Image Storage SOP Class - General Series Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
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 8-6: Secondary Capture Image Storage SOP Class - General Equipment Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Manufacturer	0008,0070	Applied Value(s): Philips Medical Systems
Institution Name *	0008,0080	
Manufacturer's Model Name	0008,1090	Applied Value(s): BV300 R2.1.1

**Table 8-7: Secondary Capture Image Storage SOP Class - SC Equipment Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
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 1.1 IB 38

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

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Image Type	0008,0008	Applied value(s): DERIVED \ SECONDARY
Instance Number	0020,0013	Image Number reflects the Image Position on the Page Layout.
Patient Orientation	0020,0020	Always Empty

**Table 8-9: Secondary Capture Image Storage SOP Class - Image Pixel Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
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 8-10
Columns	0028,0011	Applied value(s): See Table 8-10
Pixel Aspect Ratio	0028,0034	Applied value(s): See Table 8-10
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 8-10 gives an overview of the applied value(s) for Rows, Columns and Pixel Aspect Ratio.

**Table 8-10: Overview applied value(s) for Rows, Columns and Pixel Aspect Ratio**

<i>Monitor type</i>	<i>Rows</i>	<i>Columns</i>	<i>Pixel Aspect Ratio horizontal</i>	<i>Pixel Aspect Ratio Vertical</i>
60 Hz, Square	560	480	1	1
60 Hz, Non-square	1012	480	463	761
50 Hz, Square	740	576	1	1
50 Hz, Non-square	1012	576	549	753

**Table 8-11: Secondary Capture Image Storage SOP Class - VOI LUT Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Window Center	0028,1050	Applied value(s):256
Window Width	0028,1051	Applied value(s):128

## Overview of the applied Secondary Capture IOD

**Table 8-12: Secondary Capture Image Storage SOP Class - SOP Common Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
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	

## 9 Overview of the applied Print IOD

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 9-1: Printer SOP Class - N-GET**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
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 9-2: Printer SOP Class - N-EVENT-REPORT**

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

**Table 9-3: Basic Film Box SOP Class - N-CREATE**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
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

**Table 9-3: Basic Film Box SOP Class - N-CREATE (Continued)**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
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 9-4: Basic Film Session SOP Class - N-CREATE**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
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 9-5: Basic Grayscale Image Box SOP Class - N-SET**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Image Position	2020,0010	Generated
Polarity	2020,0020	Applied value(s): NORMAL, REVERSE
Preformatted Grayscale Image Sequence	2020,0110	

**Table 9-5: Basic Grayscale Image Box SOP Class - N-SET (Continued)**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
> 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	

## Overview of the Modality Worklist Information Model IOD

## 10 Overview of the Modality Worklist Information Model IOD

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 10-1: Modality Worklist Information Model - FIND SOP Class - SOP Common**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Specific Character Set	0008,0005	Applied value(s): ISO_IR 100

**Table 10-2: Modality Worklist Information Model - FIND SOP Class - Patient Identification Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Patient's Name *	0010,0010	Can not handle “\”
Patient ID *	0010,0020	
Other Patient IDs	0010,1000	
Other Patient Names	0010,1001	

**Table 10-3: Modality Worklist Information Model - FIND SOP Class - Patient Demographic Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Patient's Birth Date *	0010,0030	
Patient's Sex *	0010,0040	
Patient's Weight	0010,1030	
Patient's Birth Time	0010,0032	
Patient's Age	0010,1010	
Patient's Size	0010,1020	
Ethnic Group	0010,2160	
Occupation	0010,2180	
Patient Comments	0010,4000	



## Overview of the Modality Worklist Information Model IOD

**Table 10-4: Modality Worklist Information Model - FIND SOP Class - Scheduled Procedure Step Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Scheduled Procedure Step Sequence	0040,0100	
> Scheduled Station AE Title *	0040,0001	
> Scheduled Procedure Step Start Date *	0040,0002	
> Scheduled Procedure Step Start Time	0040,0003	
> Scheduled Procedure Step Description	0040,0007	
> Scheduled Action Item Code Sequence	0040,0008	
> Scheduled Performing Physican Name	0040,0060	
> Scheduled Procedure Step ID	0040,0004	

**Table 10-5: Modality Worklist Information Model - FIND SOP Class - Requested Procedure Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Study Instance UID	0020,000D	

**Table 10-6: Modality Worklist Information Model - FIND SOP Class - Patient Medical Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Additional Patient History	0010,21B0	

**Table 10-7: Modality Worklist Information Model - FIND SOP Class - Imaging Service Request Module**

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Accession Number	0008,0050	
Referring Physician's Name	0008,0090	