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Technical Publication
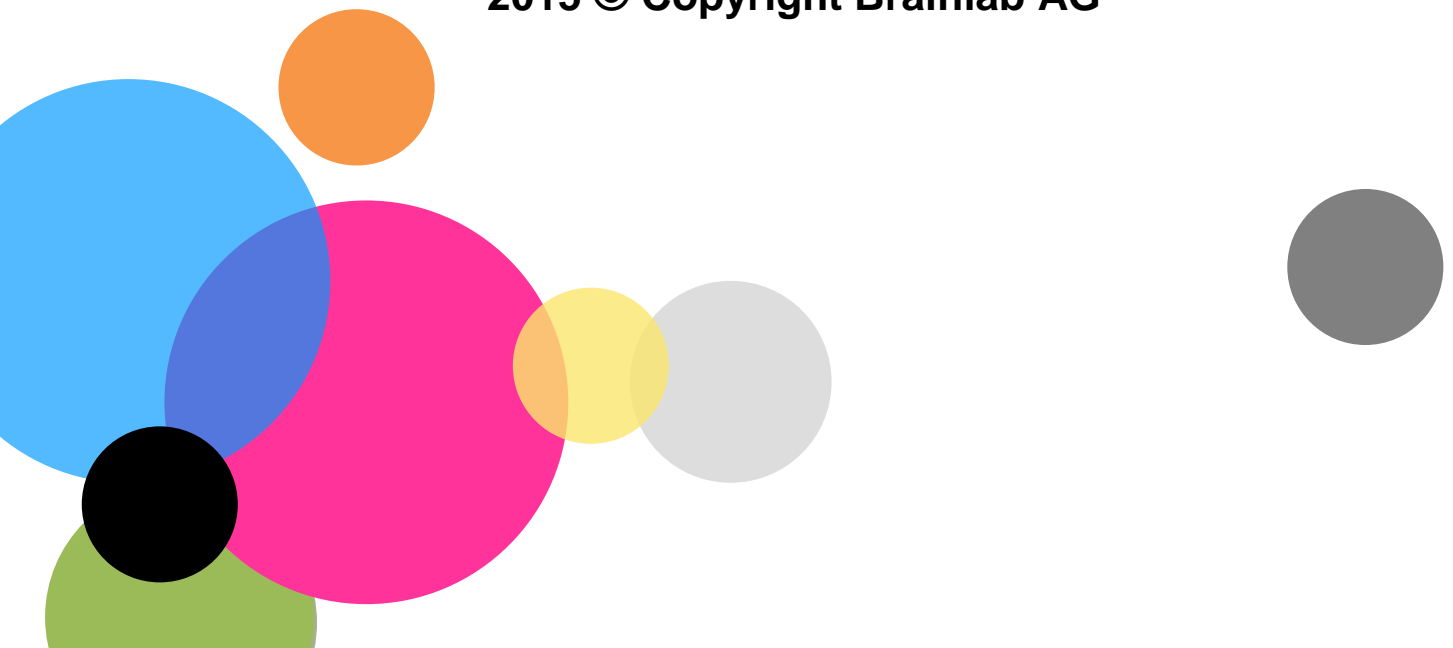
DICOM Conformance Statement

iPlan RT 4.5.4

Document Revision 3

August 17, 2015

1 Conformance Statement Overview

This is a conformance statement for the Brainlab software iPlan RT. This software can be started in different configurations with different DICOM capabilities:

Application	Description
iPlan RT Dose	Exports DICOM CT images and RT objects
iPlan RT Phantom Mapping	Exports DICOM CT images and RT objects
iPlan RT Adaptive	Provides Q/R functionality and imports DICOM CT images.
iPlan RT Review	Does not provide DICOM functionality.

The DICOM import part of the application is as follows. Please see the sections in chapter 4 for details of each single application:

- Browse and display of DICOM files (simple message files as well as standard DICOM files).
- Query remote DICOM archives.
- Retrieve DICOM data from archives.

The DICOM import part is only available in the iPlan RT Adaptive application.

The DICOM export part of the application is

- Send DICOM data to another DICOM application or archive.
- Write DICOM data to the file system (no media interchange application profile supported so far).

The DICOM export part is only available in the iPlan RT Dose and iPlan RT Phantom Mapping applications.

SOP Classes	User Of Service (SCU)	Provider Of Service (SCP)
Transfer		
CT Image Storage	Yes	Yes
RT Structure Set Storage	Yes	No
RT Plan Storage	Yes	No
RT Dose Storage	Yes	No
RT Image Storage	Yes	No
Query/Retrieve		
Patient Root Query/Retrieve Information Model - FIND	Yes	No
Patient Root Query/Retrieve Information Model - MOVE	Yes	No
Study Root Query/Retrieve Information Model - FIND	Yes	No
Study Root Query/Retrieve Information Model - MOVE	Yes	No
Patient/Study Only Query/Retrieve Information Model - FIND	Yes	No
Patient/Study Only Query/Retrieve Information Model – MOVE	Yes	No

Table 1-1: Network services supported by iPlan RT

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
Compact Disc – Recordable		
General Purpose CD–R	No	Yes

Table 1-2: Media Services supported by iPlan RT

2 Table Of Contents

3 Introduction

3.1 Revision History

Document Version	Date of Issue	Author	Description
1	March 4, 2009		Initial release for iPlan RT Dose 4.5.1
2	December 18, 2012		Update for iPlan RT 4.5.2
3	August 17, 2015		Update for iPlan RT 4.5.4

3.2 Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

3.3 Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [1]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

• The comparison of different conformance statements is the first step towards assessing interconnectivity between Brainlab and non–Brainlab equipment.

• This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended. An acceptance protocol is available to validate the desired level of connectivity.

• The DICOM standard will evolve to meet the users' future requirements. Brainlab reserves the right to make changes to its products or to discontinue its delivery.

Brainlab is involved in achieving a high level of interoperability in a heterogeneous system environment by being part of the Integrating the Healthcare Enterprise - Radiation Oncology (IHE-RO) initiative (http://www.ihe.net). As a result the iPlan RT application adheres to IHE-RO profiles that address clinical use cases. Please refer to the corresponding documentation available at http://www.brainlab.com/ihe

3.4 Abbreviations

There are a variety of terms and abbreviations used in the document that are defined in the DICOM Standard. Abbreviations and terms are as follows:

AE	DICOM Application Entity
AET	Application Entity Title
CD	Compact Disk
CD-R	Compact Disk Recordable
DVD	Digital Versatile Disc
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
HD	Hard Disk
IOD	(DICOM) Information Object Definition
ISO	International Standard Organization
MOD	Magneto Optical Disk
PDU	DICOM Protocol Data Unit
Q/R	Query and Retrieve
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM server)
SOP	DICOM Service-Object Pair
xBrain	Brainlab advanced file format

3.5 References

[1] Digital Imaging and Communications in Medicine (DICOM) 3.0, NEMA PS 3.1-3.20 – 2011
[2] DICOM Proxy Conformance Statement 3.1, Brainlab AG, August 30, 2012
[3] DICOM File Set Reader Conformance Statement (v2.3), Advanced Technology Consortium at Washington University in St. Louis,
http://itc.wustl.edu/dicom/Conf_Stmts/ATC_FSR_ConfStmt_V2.3f.pdf
[4] Varian System Server DICOM Conformance Statement, P/N VA8005D3CS, July 2007

3.6 Contact

In case of any questions or any inconsistencies concerning this Conformance Statement please contact dicomrt@brainlab.com.

4 Networking

4.1 Implementation Model

The Brainlab iPlan RT Adaptive application is an implementation of:

- A Query/Retrieve SCU to query DICOM archives and to initiate a move request for the queried archive.
- A Media File Set Reader to load DICOM data from a file system.
- An application to convert DICOM image data (CT) into the Brainlab advanced file format.

The Brainlab iPlan RT Dose/Phantom Mapping application is an implementation of:

- A Storage SCU that sends DICOM data to a DICOM archive or workstation.
- An application to convert data from the Brainlab advanced file format into DICOM data (CT, RT Structure Set, RR Plan, RT Image, RT Dose).

4.1.1 Application Data Flow Diagram
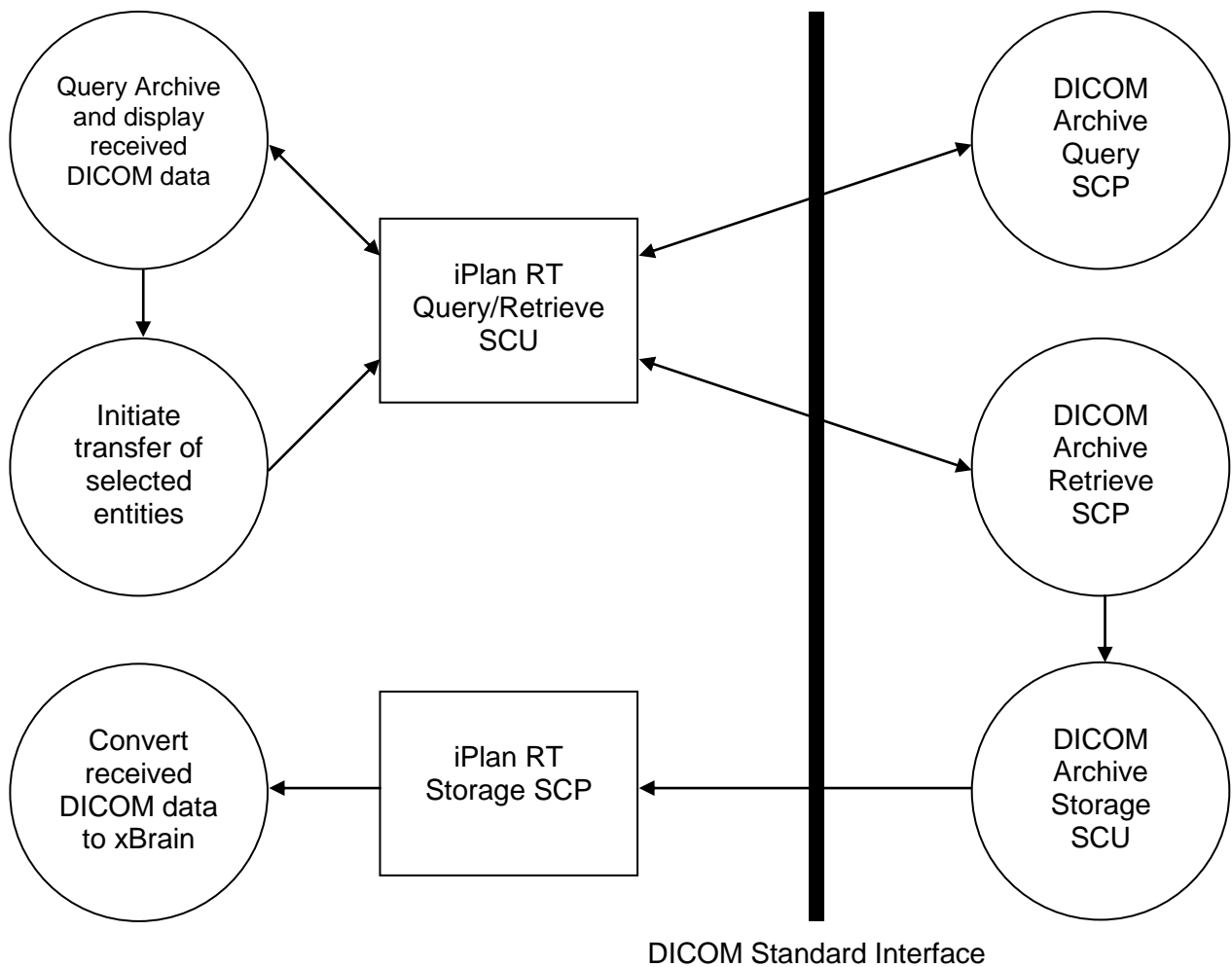
Figure 4-1: The Query/Retrieve SCU and Storage SCP application flow diagram of iPlan RT Adaptive
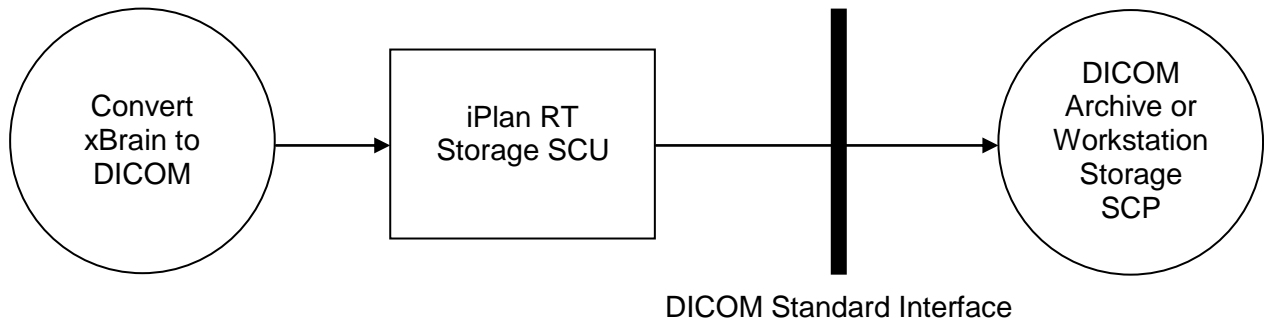
Figure 4-2: The Storage SCU application flow diagram of iPlan RT Dose/Phantom Mapping

4.1.2 Functional Definition of Application Entity (AE)

Some communications and data transfer with remote AEs are accomplished utilizing the DICOM protocol over a network using the TCP/IP protocol stack.

- iPlan RT Dose / iPlan RT Phantom Mapping
  iPlan RT Dose will export CT image data and RT objects when triggered by the user. Upon execution, the user can select a HDD location for storage of DICOM media or a network node for sending DICOM messages to. Data is loaded from the Brainlab advanced file format, converts it to DICOM – with user interaction – and initiates an association with a Storage SCP negotiating all SOPs listed in Table 4-8. The converted DICOM data is then sent to the remote DICOM Storage SCP.

- iPlan RT Adaptive
  When iPlan RT Adaptive is started the user can either select a HDD storage location or a remote Q/R archive in order to import CT image data for adaptive planning. iPlan RT Adaptive initiates an association as a Q/R SCU negotiating all models. The find request can be performed (depending on the negotiated models) on all DICOM levels (patient, study, series or instance). For a selected DICOM entity (patient, study, series or instance) a move request can be performed. The application supplies all unique keys for the requested level. During a move operation a DICOM Storage SCP is invoked. iPlan RT Adaptive accepts an association with a Storage SCU negotiating any of the SOP Classes listed in Table 4-8. The received data may be – with user interaction – converted to the Brainlab advanced file format.

4.1.3 Sequencing Of Real World Activities

iPlan RT Adaptive Query/Retrieve SCU performs a sequencing of real world activities as follows:

1. Query Archive and display received DICOM data:
   a. Send DICOM Query/Retrieve C-FIND request.
   b. Receive DICOM Query/Retrieve C-FIND responses.
2. User selects data to retrieve.
3. Initiate transfer of selected entities:
   a. Start the DICOM Storage SCP
   b. Send a DICOM Query/Retrieve C-MOVE request
   c. Receive DICOM C-STORE requests with the requested SOP instances.
   d. Receive DICOM Query/Retrieve C-MOVE responses
   e. Stop the DICOM Storage SCP
4. Convert received DICOM data to Brainlab Advanced file format.
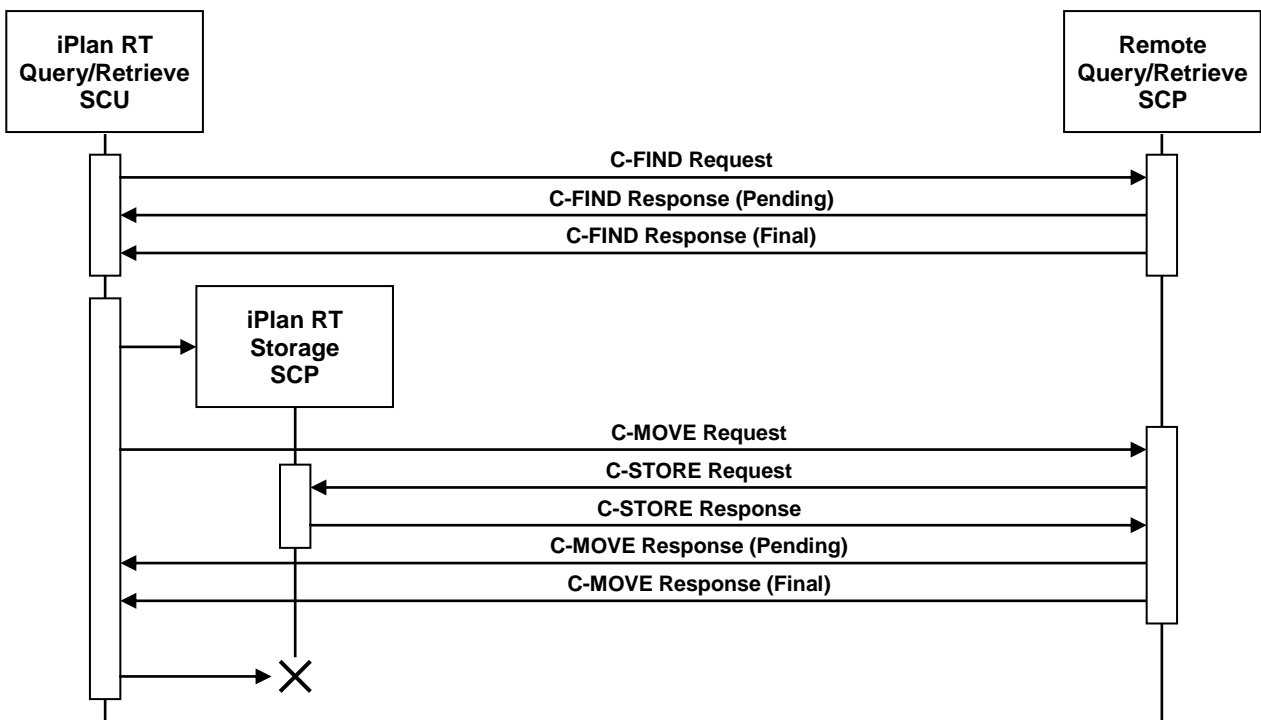
Figure 4-3: Sequencing of Query/Retrieve SCU and Storage SCP of iPlan RT Adaptive

4.2 Application Entity Specifications

4.2.1 iPlan RT Common Specification

This section describes the specifications valid for all iPlan RT applications.

4.2.1.1 SOP Classes and Transfer Syntaxes

iPlan RT sends or receives a C-ECHO request in order to test the connection to a remote AE. It provides standard conformance to the following DICOM V3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	No

Table 4-1: Supported Verification SOP Classes

iPlan RT supports the following transfer syntaxes. In an association negotiation the syntaxes are proposed in the order of appearance in the list.

Transfer Syntax Name	Transfer Syntax UID	SCU	SCP
DICOM Implicit VR Little Endian	1.2.840.10008.1.2	Yes	Yes
DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	Yes	Yes
DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	Yes	Yes
JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14)	1.2.840.10008.1.2.4.70	No	Yes

Table 4-2: Supported Transfer Syntaxes

4.2.1.2 Association Policies

4.2.1.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2 Number of Associations

For both association initiation and acceptance:

Maximum number of simultaneous Associations	1

4.2.1.2.3 Asynchronous Nature

iPlan RT does not support asynchronous communication (multiple outstanding transactions over a single association).

Maximum number of outstanding asynchronous transactions	1

4.2.1.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

Implementation Class UID	1.2.276.0.20.1.1.5.4.1.2
Implementation Version Name	IPLANRTDOSE

4.2.2 iPlan RT Adaptive Specification

This section describes the specifications in addition valid for the iPlan RT Adaptive application.

4.2.2.1 Association Policies

See section 4.2.1.2 for details.

4.2.2.2 SOP Classes and Transfer Syntaxes

iPlan RT Adaptive is able to query a remote archive. It provides Standard Conformance to the following DICOM V3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Patient/Study Only Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Yes	No
Patient/Study Only Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Yes	No

Table 4-3: Supported Query/Retrieve SOP Classes

iPlan RT Adaptive imports DICOM image data. It provides Standard Conformance to the following DICOM V3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes

Table 4-4: Supported Storage SOP Classes of iPlan RT Adaptive

4.2.2.3 Association Initiation Policy

iPlan RT initiates an association in these cases:

1. <u>Find</u>: The user tries to find a specific entity in a remote DICOM archive.

2. <u>Retrieve</u>: The user wants to retrieve a specific entity from the remote DICOM archive and wants to convert it to the Brainlab advanced file format.

3. <u>Store</u>: The user loaded a dataset in the Brainlab advanced file format and wants to convert it to the DICOM format and send it to a remote DICOM node.

4.2.2.3.1 Activity – Find

4.2.2.3.1.1 Description and Sequencing of Activities

A DICOM Query/Retrieve C-FIND request is performed when the user queries the remote DICOM archive for patients, studies, series or instances.

4.2.2.3.1.2 Proposed Presentation Contexts

Presentation Context Table			
Abstract Syntax	**Transfer Syntax**	**Role**	**Ext. Neg.**
All SCU SOP Classes listed in Table 4-1 and all FIND SCU SOP Classes as listed in Table 4-3	All SCU Transfer Syntaxes as listed in Table 4-2	SCU	None
		SCU	None
		SCU	None

Table 4-5: Proposed Presentation Contexts for Activity Find.

4.2.2.3.1.3 SOP Specific Conformance

iPlan RT Adaptive provides standard conformance to the DICOM Verification Service Class and to the DICOM Query/Retrieve FIND SOP Classes. No extended negotiation is implemented.

For the patient-root and patient/study only model, the user may restrict the patient query by the following attributes:

Attribute Name	Tag
Patient's Name	(0010,0010)
Patient ID	(0010,0020)

For the study-root model, the user may restrict the patient/study query by the following attributes:

Description	Tag
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Study Date	(0008,0020)
Accession Number	(0008,0050)

4.2.2.3.2 Activity – Retrieve

4.2.2.3.2.1 Description and Sequencing of Activities

On user selection of a specific DICOM study or series (depends on the available SOP Class for Query/Retrieve), a move request is performed. The storage target for receiving the DICOM data (the AET with which the move-request is equipped) is the iPlan RT Adaptive application itself. The Move operation only can be invoked after a Find operation. See chapter 4.1.3 for a detailed sequencing diagram.

4.2.2.3.2.2 Proposed Presentation Contexts

Presentation Context Table			
Abstract Syntax	**Transfer Syntax**	**Role**	**Ext. Neg.**
All SCU SOP Classes listed in Table 4-1 and all SCU MOVE SOP Classes as listed in Table 4-3	All SCU Transfer Syntaxes as listed in Table 4-2	SCU	None
		SCU	None
		SCU	None

Table 4-6: Proposed Presentation Contexts for Activity Move.

4.2.2.3.2.3 SOP Specific Conformance

iPlan RT provides standard conformance to the DICOM Verification Service Class and to the DICOM Query/Retrieve MOVE SOP Classes. No extended negotiation is implemented.

4.2.2.3.3 Activity – Store

4.2.2.3.3.1 Associated Real-World Activity

After successful conversion of the selected Brainlab data to DICOM a storage request is performed to send the DICOM data to a remote Storage SCP. The remote Storage SCP must be one of the AETs known by iPlan RT Dose/Phantom Mapping.

4.2.2.3.3.2 Proposed Presentation Contexts

Presentation Context Table			
Abstract Syntax	**Transfer Syntax**	**Role**	**Ext. Neg**
All SCU SOP Classes as listed in Table 4-1 and Table 4-8	All SCU Transfer Syntaxes as listed in Table 4-2	SCU	None
		SCU	None
		SCU	None

Table 4-7: Proposed Presentation Contexts for Activity Store.

4.2.2.3.3.3 SOP Specific Conformance

iPlan RT Dose/Phantom Mapping provides standard conformance to the DICOM Verification Service Class and to the DICOM Storage SOP Classes. No extended negotiation is implemented.

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4.2.3 iPlan RT Dose / iPlan RT PhantomMapping

This section describes the specifications in addition valid for the iPlan RT Dose and iPlan RT PhantomMapping applications.

4.2.3.1 SOP Classes and Transfer Syntaxes

iPlan RT Dose / iPlan RT PhantomMapping exports DICOM image data. It provides Standard Conformance to the following DICOM V3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	No
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	No
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	No
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	No
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	No

Table 4-8: Supported Storage SOP Classes of iPlan RT Dose/Phantom Mapping

4.2.3.2 Association Policies

See section 4.2.1.2 for details.

4.2.3.3 Association Initiation Policy

iPlan RT Dose / iPlan RT PhantomMapping initiates an association in the case the user loaded a dataset in the Brainlab advanced file format and wants to convert it to the DICOM format and send it to a remote DICOM node.

4.2.3.3.1 Activity – Store

4.2.3.3.1.1 Associated Real-World Activity

After successful conversion of the selected Brainlab data to DICOM a storage request is performed to send the DICOM data to a remote Storage SCP. The remote Storage SCP must be one of the AETs known by iPlan RT Dose.

4.2.3.3.1.2 Proposed Presentation Contexts

Presentation Context Table			
Abstract Syntax	**Transfer Syntax**	**Role**	**Ext. Neg**
All SCU SOP Classes as listed in Table 4-1 and Table 4-8	All SCU Transfer Syntaxes as listed in Table 4-2	SCU	None
		SCU	None
		SCU	None

Table 4-9: Proposed Presentation Contexts for Activity Store.

4.2.3.3.1.3 SOP Specific Conformance

iPlan RT Dose provides standard conformance to the DICOM Verification Service Class and to the DICOM Storage SOP Classes. No extended negotiation is implemented.

4.3 Network Interfaces

4.3.1 Physical Network Interface

iPlan RT supports the DICOM upper layer using TCP/IP. iPlan RT is indifferent to the physical medium over which TCP/IP executes. It inherits this from the operating system upon which it executes.

4.3.2 Additional Protocols

The usage of DNS and DHCP is possible and is based on the network configuration of the operating system upon which iPlan RT executes.

4.4 Configuration

4.4.1 AE Title / Presentation Address Mapping

Configuration of remote and local DICOM nodes can be performed with the graphical user interface of iPlan RT.
iPlan RT can configure several nodes representing remote Q/R Servers or Storage SCPs. On the corresponding settings page node-specific parameters can be entered.

4.4.1.1 Local AE Titles

The local AET for the Query/Retrieve SCU is an application-wide global parameter. The local AET for the Storage SCP defaults to the one of the Query/Retrieve SCU. But for each specified node you may define an own Storage SCP AET.
The listening port is an application-wide global parameter.

4.4.1.2 Remote AE Title/Presentation Address Mapping

In iPlan RT Dose you can specify several nodes for export. The IP address/hostname, AET and listening port may be configured for each DICOM network node separately within the Graphical User Interface.

4.4.2 Parameters

Additional a timeout may be specified for each DICOM network archive separately.

Parameter	Configurable	Default Value
Timeout	Yes	30
Maximum PDU Size	No	28672

5 Media Interchange

iPlan RT Adaptive supports DICOM media interchange for import and export of DICOM data:

- For import iPlan RT Adaptive supports media interchange application profiles. To reflect this the support for the Standard General Purpose CD-R Interchange is added to provide the supported SOP Classes. Nevertheless, iPlan RT Adaptive is able to import DICOM files even without the existence of any DICOMDIR by scanning a given file system located on any media (e.g. HD, MOD, CD, DVD, Tapes) for any kind of DICOM files.

- For export there is no media interchange application profile supported. The files are simply stored to the file system grouped by patient without using any DICOMDIR. For export it supports the same SOP Classes like the Storage SCU (see Table 4-8 or Table 4-7).

5.1 Implementation Model

5.1.1 Application Data Flow Diagram

With iPlan RT Adaptive the user may browse DICOM File-sets, import selected entities and convert them to the Brainlab advanced file format.
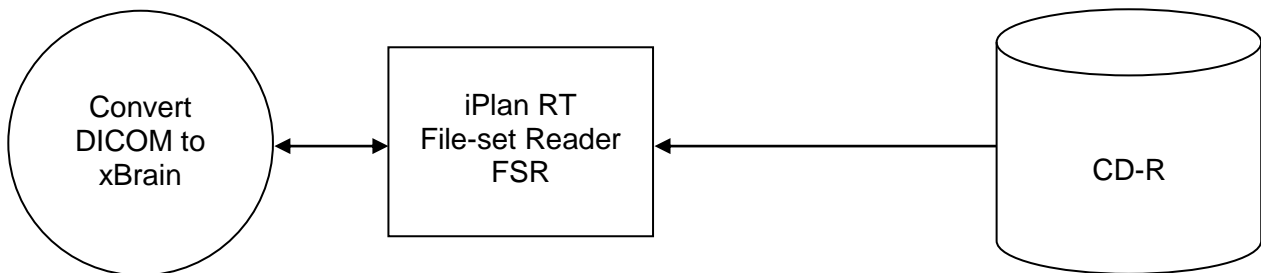
Figure 5-1: The media interchange application flow diagram of iPlan RT Adaptive

5.1.2 Functional Definition of Application Entity (AE)

Some communications and data transfer with remote AE's are accomplished utilizing the file system provided by the operating system upon which iPlan RT Adaptive executes.

- File Set Reader:
  iPlan RT Adaptive loads DICOM data from the file system and converts it to the Brainlab advanced file format – with user interaction. The reader supports the same SOP classes as the Storage SCP (see Table 4-8).

5.1.3 Sequencing Of Real World Activities

Not necessary.

5.1.4 File Meta Implementation Identifying Information

iPlan RT Adaptive provides the same information as in chapter 4.2.1.2.4.

5.2 Application Entity Specifications

5.2.1 iPlan RT Adaptive Specification

iPlan RT Adaptive supports the following Media Interchange Profiles:

AE Related Application Profiles, Real-World Activities, and Roles			
Supported APs	**Real World Activity**	**Roles**	**SC Option**
STD-GEN-CD	Convert DICOM to Brainlab data	FSR	Interchange

Table 5-1: Supported Media Interchange Profiles.

5.2.1.1 File Meta Information For The Application Entity

The Source Application Entity Title included in the File Meta Header is configurable. It is the same as the local AET of the network configuration (see chapter 4.4.1.1)

5.2.1.2 Real-World Activities

5.2.1.3 Activity – Convert DICOM to Brainlab Data

iPlan RT Adaptive acts as an FSR using the Interchange option

- When requested to provide a directory listing it will read the File-set and display the DI-COMDIR directory entries for all SOP Instances in the File-set.
- When requested to load the selected entries from directory listing to convert them to Brainlab Advanced file format, only those SOP Instances are loaded that correspond to the Application Profile STD-GEN-CD.
- For the list of Application Profiles that invoke this AE see Table 5-1. The supported SOP Classes see Table 4-8.

5.2.1.3.1 Media Storage Application Profiles

iPlan RT Adaptive supports the STD-GEN-CD Application Profile.

5.2.1.3.1.1 Options

The Offline-Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in the Table below:

SOP Classes	Transfer Syntaxes
All SCP SOP Classes listed in Table 4-8	All SCP Transfer Syntaxes listed in Table 4-2

See chapter 8.1.2 for further information on acceptance of SOP Instances, i.e. whether iPlan RT Adaptive is able to import and convert the DICOM data.

5.3 Augmented And Private Application Profiles

iPlan RT Adaptive does not support any augmented or private application profiles.

5.4 Media Configuration

iPlan RT Adaptive uses the local AET configured for the network services as source AET for the DICOM files.

6 Support Of Extended Character Sets

iPlan RT supports the

- ISO_IR 100 (ISO 8859-1:1987 Latin Alphabet No. 1 supplementary set)

7 Security Profiles

No security profiles are supported.

8 Annexes

8.1 IOD Contents

8.1.1 Created SOP Instances

The following tables use a number of abbreviations. The abbreviations used in the "Presence of Module" column are:

MNAP   Module not always present
ALWAYS   Module always present

8.1.1.1 Created IODs

8.1.1.1.1 Computed Tomography Image Storage

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8-6	ALWAYS
	Clinical Trial Subject	Table 8-7	MNAP
Study	General Study	Table 8-8	ALWAYS
	Patient Study	Table 8-9	ALWAYS
	Clinical Trial Study	Table 8-10	MNAP
Series	General Series	Table 8-11	ALWAYS
	Clinical Trial Series	Table 8-13	MNAP
Frame of Reference	Frame of Reference	Table 8-14	ALWAYS
Equipment	General Equipment	Table 8-15	ALWAYS
Image	General Image	Table 8-16	ALWAYS
	Image Plane	Table 8-17	ALWAYS
	Image Pixel	Table 8-18	ALWAYS
	Device	Table 8-19	MNAP
	CT Image	Table 8-20	ALWAYS
	VOI LUT	Table 8-22	MNAP
	SOP Common	Table 8-23	ALWAYS

Table 8-1: CT Image Storage IOD

8.1.1.1.2 RT Structure Set Storage

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8-6	ALWAYS
	Clinical Trial Subject	Table 8-7	MNAP
Study	General Study	Table 8-8	ALWAYS
	Patient Study	Table 8-9	ALWAYS
	Clinical Trial Study	Table 8-10	MNAP
Series	RT Series	Table 8-12	ALWAYS
	Clinical Trial Series	Table 8-13	MNAP
Equipment	General Equipment	Table 8-15	ALWAYS
Structure Set	Structure Set	Table 8-24	ALWAYS
	ROI Contour	Table 8-25	ALWAYS
	RT ROI Observations	Table 8-26	ALWAYS
	Approval	Table 8-27	ALWAYS
	SOP Common	Table 8-23	ALWAYS

Table 8-2: RT Structure Set Storage IOD

8.1.1.1.3 RT Plan Storage

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8-6	ALWAYS
	Clinical Trial Subject	Table 8-7	MNAP
Study	General Study	Table 8-8	ALWAYS
	Patient Study	Table 8-9	ALWAYS
	Clinical Trial Study	Table 8-10	MNAP
Series	RT Series	Table 8-12	ALWAYS
	Clinical Trial Series	Table 8-13	MNAP
Frame of Reference	Frame of Reference	Table 8-14	MNAP
Equipment	General Equipment	Table 8-15	ALWAYS
Plan	RT General Plan Module	Table 8-28	ALWAYS
	RT Prescription Module	Table 8-29	MNAP
	RT Tolerance Tables	Table 8-30	MNAP
	RT Patient Setup	Table 8-31	ALWAYS
	RT Fraction Scheme	Table 8-32	ALWAYS
	RT Beams Module	Table 8-33	ALWAYS
	Approval	Table 8-27	ALWAYS
	SOP Common	Table 8-23	ALWAYS
Extended Interface	Extended Interface	Table 8-43	MNAP

Table 8-3: RT Plan Storage IOD

Note: For details on the Extended Interface module, please refer to [4].

8.1.1.1.4 RT Dose Storage

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8-6	ALWAYS
	Clinical Trial Subject	Table 8-7	MNAP
Study	General Study	Table 8-8	ALWAYS
	Patient Study	Table 8-9	ALWAYS
	Clinical Trial Study	Table 8-10	MNAP
Series	RT Series	Table 8-12	ALWAYS
	Clinical Trial Series	Table 8-13	MNAP
Frame of Reference	Frame of Reference	Table 8-14	ALWAYS
Equipment	General Equipment	Table 8-15	ALWAYS
Image	General Image	Table 8-16	MNAP
	Image Plane	Table 8-17	MNAP
	Image Pixel	Table 8-18	MNAP
	Multi-Frame	Table 8-21	MNAP
	RT Dose	Table 8-34	ALWAYS
	RT DVH	Table 8-35	MNAP
	SOP Common	Table 8-23	ALWAYS

Table 8-4: RT Dose Storage IOD

Note: The RT Dose IOD exported by iPlan RT Dose contains either a dose volume and thus the Image Plane, Image Pixel and Multi-Frame modules or a DVH thus an RT DVH module, never both. Whereas the dose volume can be separated per fractionation or per beam, the DVH always comprises the entire treatment plan.

8.1.1.1.5 RT Image Storage

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8-6	ALWAYS
	Clinical Trial Subject	Table 8-7	MNAP
Study	General Study	Table 8-8	ALWAYS
	Patient Study	Table 8-9	ALWAYS
	Clinical Trial Study	Table 8-10	MNAP
Series	RT Series	Table 8-12	ALWAYS
	Clinical Trial Series	Table 8-13	MNAP
Frame of Reference	Frame of Reference	Table 8-14	ALWAYS
Equipment	General Equipment	Table 8-15	ALWAYS
Image	General Image	Table 8-16	ALWAYS
	Image Pixel	Table 8-18	ALWAYS
	RT Image	Table 8-36	ALWAYS
	VOI LUT	Table 8-22	ALWAYS
	SOP Common	Table 8-23	ALWAYS

Table 8-5: RT Image Storage IOD

8.1.1.2 Created Modules

The following tables use a number of abbreviations. The abbreviations used in the "Presence" column are:

VNAP	Value not always present (attribute set to zero length if no value is present)
ANAP	Attribute not always present
ALWAYS	Attribute is always present
EMPTY	Attribute is set to zero length

The abbreviations used in the "Source" column:

USER	The attribute value source is from user input
AUTO	The attribute value is generated automatically
CONFIG	The attribute value source is a configurable parameter

8.1.1.2.1 Patient

Attribute Name	Tag	VR	Value	Presence	Source
Patient's Name	(0010,0010)	PN	From loaded data or user input (see also Note 8-1)	VNAP	AUTO/USER
Patient ID	(0010,0020)	LO	From loaded data or user input (see also Note 8-1)	VNAP	AUTO/USER
Patient's Birth Date	(0010,0030)	DA	From loaded data	VNAP	AUTO
Patient's Sex	(0010,0040)	CS	From loaded data	VNAP	AUTO

Table 8-6: Patient Module

8.1.1.2.2 Clinical Trial Subject

Attribute Name	Tag	VR	Value	Presence	Source
Clinical Trial Sponsor Name	(0012,0010)	LO	From user input	ANAP	USER
Clinical Trial Protocol ID	(0012,0020)	LO	From user input	ANAP	USER
Clinical Trial Protocol Name	(0012,0021)	LO	From user input	ANAP	USER
Clinical Trial Site ID	(0012,0030)	LO	From user input	ANAP	USER
Clinical Trial Site Name	(0012,0031)	LO	From user input	ANAP	USER
Clinical Trial Subject ID	(0012,0042)	LO	From user input	ANAP	USER

Table 8-7: Clinical Trial Subject Module

Note 8-1: Data for Clinical Trial modules is entered by user and is mandatory for clinical trial export. A patient de-identification of the exported data (including all UIDs) is automatically performed according to the ATC Conformance Statement [3].

8.1.1.2.3 General Study

Attribute Name	Tag	VR	Value	Presence	Source
Study Instance UID	(0020,000D)	UI	From imported data or generated	ALWAYS	AUTO
Study Date	(0008,0020)	DA	From loaded data	ANAP	AUTO
Referring Physician's Name	(0008,0090)	PN		EMPTY	AUTO
Study ID	(0020,0010)	SH	From loaded data	VNAP	AUTO
Accession Number	(0008,0050)	SH		EMPTY	AUTO
Study Description	(0008,1030)	LO	From loaded data	ANAP	AUTO

Table 8-8: General Study Module

8.1.1.2.4 Patient Study

Attribute Name	Tag	VR	Value	Presence	Source
Patient's Height	(0010,1020)	DS	From loaded data	ANAP	AUTO
Patient's Weight	(0010,1030)	DS	From loaded data	ANAP	AUTO

Table 8-9: Patient Study Module

8.1.1.2.5 Clinical Trial Study

Attribute Name	Tag	VR	Value	Presence	Source
Clinical Trial Time Point ID	(0012,0050)	LO	From user input	ANAP	USER
Clinical Trial Time Point Description	(0012,0051)	ST	From user input	ANAP	USER

Table 8-10: Clinical Trial Study Module

8.1.1.2.6 General Series

Attribute Name	Tag	VR	Value	Presence	Source
Modality	(0008,0060)	CS	From loaded data	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated	ALWAYS	AUTO
Series Number	(0020,0011)	IS	From loaded data	ALWAYS	AUTO
Series Date	(0008,0021)	DA	From loaded data	ANAP	AUTO
Series Time	(0008,0031)	TM	From loaded data	ANAP	AUTO
Series Description	(0008,103E)	LO	From loaded data	ANAP	AUTO
Patient Position	(0018,5100)	DA	If applicable: From loaded data or user	ANAP	AUTO/ USER

Table 8-11: General Series Module

8.1.1.2.7 RT Series Module

Attribute Name	Tag	VR	Value	Presence	Source
Modality	(0008,0060)	CS		ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Series Number	(0020,0011)	IS		ALWAYS	AUTO

Table 8-12: RT Series Module

8.1.1.2.8 Clinical Trial Series

Attribute Name	Tag	VR	Value	Presence	Source
Clinical Trial Coordinating Center Name	(0012,0060)	LO	From user input	ANAP	USER

Table 8-13: Clinical Trial Series Module

8.1.1.2.9 Frame Of Reference

Attribute Name	Tag	VR	Value	Presence	Source
Frame of Reference UID	(0020,0052)	UI	Generated	ALWAYS	AUTO
Position Reference Indicator	(0020,1040)	LO		EMPTY	AUTO

Table 8-14: Frame of Reference Module

8.1.1.2.10 General Equipment

Attribute Name	Tag	VR	Value	Presence	Source
Manufacturer	(0008,0070)	LO	"Brainlab"	ALWAYS	AUTO
Station Name	(0008,1010)	SH	<Host Name>	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	"iPlan RT Dose"	ALWAYS	AUTO
Software Version(s)	(0018,1020)	LO	4.5.0	ALWAYS	AUTO
Private Creator Code	(0009,00xx)	LO	"Brainlab_Conversion"	ALWAYS	AUTO
Export Platform Name	(0009,xx01)	LO	Configured Platform Name	ALWAYS	CONFIG

Table 8-15: General Equipment Module

8.1.1.2.11 General Image

Attribute Name	Tag	VR	Value	Presence	Source
Instance Number	(0020,0013)	IS	From loaded data	ALWAYS	AUTO
Content Date	(0008,0023)	DA	<Current Date>	ALWAYS	AUTO
Content Time	(0008,0033)	TM	<Current Time>	ALWAYS	AUTO
Derivation Description	(0008,2111)	ST		ANAP	AUTO
>Derivation Code	(0008,9215)	SQ		ANAP	AUTO

Table 8-16: General Image Module

8.1.1.2.12 Image Plane

Attribute Name	Tag	VR	Value	Presence	Source
Pixel Spacing	(0028,0030)	DS	From loaded data	ALWAYS	AUTO
Image Orientation (Patient)	(0020,0037)	DS	From loaded data (see Note 8-2)	ALWAYS	AUTO
Image Position (Patient)	(0020,0032)	DS	From loaded data (see Note 8-2)	ALWAYS	AUTO
Slice Thickness	(0018,0050)	DS	From loaded data	ALWAYS	AUTO

Table 8-17: Image Plane Module

Note 8-2: As a default, the pixel data will be re-sampled during export in order to re-align the slices to create an orthogonal alignment ("Image Orientation (Patient)": 1/0/0,0/1/0) for localized or tilted image data sets. This will result in a different "Image Position (Patient)" and different image pixel data. This behavior can be changed and the original, non-orthogonal images will be exported then. In case of an image fusion

the image pixel data will be re-based in the coordinate system of the alignment set. In case a reference point is used, the pixel data will be re-based to the new origin in order to represent the reference point.

8.1.1.2.13 Image Pixel

Attribute Name	Tag	VR	Value	Presence	Source
Rows	(0028,0010)	IS	From loaded data	ALWAYS	AUTO
Columns	(0028,0011)	DA	From loaded data	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OB OW	From loaded data (see Note 8-2)	ALWAYS	AUTO

Table 8-18: Image Pixel Module

8.1.1.2.14 Device

Attribute Name	Tag	VR	Value	Presence	Source
Device Sequence	(0050,0010)	SQ		ALWAYS	AUTO
>Include 'Code Sequence Macro'			Baseline CID 4051 (see chapter 8.3 Coded Terminology And Templates for details)	ALWAYS	AUTO
>Device ID	(0018,1003)	LO		ALWAYS	AUTO
>Device Description	(0050,0020)	LO		ANAP	AUTO

Table 8-19: Device Module

8.1.1.2.15 CT Image

Attribute Name	Tag	VR	Value	Presence	Source
Image Type	(0008,0008)	CS	(see Note 8-3:)	ALWAYS	AUTO
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	"MONOCHROME2"	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	16	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	16	ALWAYS	AUTO
High Bit	(0028,0102)	US	15	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0000H *(unsigned integer)*	ALWAYS	AUTO
Rescale Intercept	(0028,1052)	DS	-1024	ALWAYS	AUTO
Rescale Slope	(0028,1053)	DS	1	ALWAYS	AUTO
KVP	(0018,0060)	DS		EMPTY	AUTO
Acquisition Number	(0020,0012)	IS		EMPTY	AUTO

Table 8-20: CT Image Module

Note 8-3: The default Image Type parameters are "DERIVED\SECONDARY\AXIAL". Depending on the image export two additional values will be added:

- 4th parameter: RESAMPLED or REBASED
  depending on whether the images are or orthogonalized and therefore resampled or spatially relocated.
- 5th parameter: LOCALIZED, REGISTERED, REFERENCE_POINT or FORCED
  detailing the reason for the action described with the 4th parameter.

8.1.1.2.16 Multi-frame

Attribute Name	Tag	VR	Value	Presence	Source
Number Of Frames	(0028,0008)	IS	From loaded data	ALWAYS	AUTO
Frame Increment Pointer	(0028,0009)	AT	"(3004,0002)" Grid Frame Off-set Vector	ALWAYS	AUTO

Table 8-21: Multi-frame Module

8.1.1.2.17 VOI LUT

Attribute Name	Tag	VR	Value	Presence	Source
Window Center	(0028,1050)	DS	From loaded data	ANAP	AUTO
Window Width	(0028,1051)	DS	From loaded data	ANAP	AUTO

Table 8-22: VOI LUT Module

8.1.1.2.18 SOP Common

Attribute Name	Tag	VR	Value	Presence	Source
SOP Class UID	(0008,0016)	DS	IOD specific	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	DS	Generated	ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	"ISO_IR 100"	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	<Current Date>	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	TM	<Current Time>	ALWAYS	AUTO
Private Creator Code	(0009,00XX)	LO	"Brainlab_Conversion"	ANAP	AUTO
Export Platform Name	(0009,XX01)	LO		ANAP	CONFIG

Table 8-23: SOP Common Module

8.1.1.2.19 Structure Set Module

Attribute Name	Tag	VR	Value	Presence	Source
Structure Set Label	(3006,0002)	SH		ALWAYS	CONFIG
Structure Set Name	(3006,0004)	LO		ALWAYS	CONFIG
Structure Set Description	(3006,0006)	ST		ALWAYS	CONFIG
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Structure Set Date	(3006,0008)	DA		ALWAYS	AUTO
Structure Set Time	(3006,0009)	TM		ALWAYS	AUTO
Referenced Frame of Reference Sequence	(3006,0010)	SQ		ALWAYS	AUTO
>Frame of Reference UID	(0020,0052)	UI		ALWAYS	AUTO
>RT Referenced Study Sequence	(3006,0012)	SQ		ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO
>>RT Referenced Series Sequence	(3006,0014)	SQ		ALWAYS	AUTO
>>Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
>>>Contour Image Sequence	(3006,0016)	SQ		ALWAYS	AUTO

>>>>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>>>>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO
Structure Set ROI Sequence	(3006,0020)	SQ		ALWAYS	AUTO
>ROI Number	(3006,0022)	IS		ALWAYS	AUTO
>Referenced Frame of Reference UID	(3006,0024)	UI		ALWAYS	AUTO
>ROI Name	(3006,0026)	LO		ALWAYS	AUTO
>ROI Volume	(3006,002C)	DS		ALWAYS	AUTO
>ROI Generation Algorithm	(3006,0038)	CS		ALWAYS	AUTO

Table 8-24: Structure Set Module

8.1.1.2.20 ROI Contour Module

Attribute Name	Tag	VR	Value	Presence	Source
ROI Contour Sequence	(3006,0039)	SQ		ALWAYS	AUTO
>Referenced ROI Number	(3006,0084)	IS		ALWAYS	AUTO
>ROI Display Color	(3006,002A)	IS		ALWAYS	AUTO
>Contour Sequence	(3006,0040)	SQ		ALWAYS	AUTO
>>Contour Number	(3006,0048)	IS		ALWAYS	AUTO
>>Contour Image Sequence	(3006,0016)	SQ		ALWAYS	AUTO
>>>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>>>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO
>>Contour Geometric Type	(3006,0042)	CS	"CLOSED_PLANAR"	ALWAYS	AUTO
>>Contour Offset Vector	(3006,0045)	DS		ALWAYS	AUTO
>>Number of Contour Points	(3006,0046)	IS		ALWAYS	AUTO
>>Contour Data	(3006,0050)	DS	Note 8-4	ALWAYS	AUTO

Table 8-25: ROI Contour Module

Note 8-4: According to the definition of the transfer syntax or the capabilities of third-party systems there is a maximum number of contour points. As iPlan RT Dose stores the contours with a very high resolution it might be possible that this maximum number of contour points may be reached and a reduction of contour points will take place. In this case, the software indicates this during export and the user has to verify the reduced versus the original contour.

8.1.1.2.21 ROI Observations Module

Attribute Name	Tag	VR	Value	Presence	Source
RT ROI Observations Sequence	(3006,0080)	SQ		ALWAYS	AUTO
>Observation Number	(3006,0082)	IS		ALWAYS	AUTO
>Referenced ROI Number	(3006,0084)	IS		ALWAYS	AUTO
>RT ROI Interpreted Type	(3006,00A4)	CS	"EXTERNAL", "PTV", "AVOIDANCE", "ORGAN", "BOLUS", "SUPPORT"	ALWAYS	AUTO
>ROI Interpreter	(3006,00A6)	PN		ALWAYS	AUTO

Table 8-26: RT ROI Observations Module

8.1.1.2.22 Approval Module

Attribute Name	Tag	VR	Value	Presence	Source
Approval Status	(300E,0002)	CS	"UNAPPROVED" or "APPROVED"	ALWAYS	AUTO
Review Date	(300E,0004)	DA		ANAP	AUTO
Review Time	(300E,0005)	TM		ANAP	AUTO
Reviewer Name	(300R,0008)	PN		ANAP	AUTO

Table 8-27: Approval Module

8.1.1.2.23 RT General Plan Module

Attribute Name	Tag	VR	Value	Presence	Source
RT Plan Label	(300A,0002)	LO	(see Note 8-5)	ALWAYS	AUTO/ USER
RT Plan Name	(300A,0003)	SH	(see Note 8-5)	ANAP	AUTO/ USER
RT Plan Description	(300A,0004)	ST	(see Note 8-5)	ANAP	AUTO/ USER
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Operators' Name	(0008,1070)	PN		VNAP	AUTO
RT Plan Date	(300A,0006)	DA		ALWAYS	AUTO
RT Plan Time	(300A,0007)	TM		ALWAYS	AUTO
Plan Intent	(300A,000A)	CS	(only written if defined)	ANAP	AUTO
RT Plan Geometry	(300A,000C)	CS	"TREATMENT_DEVICE" or "PATIENT"	ALWAYS	AUTO
Referenced Structure Set Sequence	(300C,0060)	SQ		ANAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO
Referenced RT Plan Sequence	(300C,0002)	SQ	(see Note 8-6)	ANAP	CONFIG/ AUTO
>Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO
>RT Plan Relationship	(300A,0055)	CS	"CONCURRENT" or "EQUIVA-LENT" (see Note 8-6)	ANAP	AUTO
>Private Creator Code	(320B,10xx)	LO	Brainlab - ONC - Beam Parameters	ANAP	AUTO
>Referenced Beam List	(300B,xx10)	IS		ANAP	AUTO

Table 8-28: RT General Plan Module

Note 8-5: iPlan RT Dose offers the possibility to configure which string element will be assigned to which DICOM attribute for RT Plan Label (300A,0002), RT Plan Name (300A,0003) and RT Plan Description (300A,0004) in order to guarantee the correct assignment in different target systems.

Note 8-6: Due to some limitations of third-party systems, iPlan RT Dose offers the export of a DICOM RT Plan per fractionation. Thus, the Referenced RT Plan Sequence (300C,0002) is only present in cases where several plans are exported with the Defined Term "CONCURRENT". In case, a plan is exported more than once and is also split up into more than one instance, the list of Defined Terms "PRIOR", "AL-TERNATIVE", "PREDECESSOR" and "VERIFIED_PLAN" is extended by the term "EQUIVALENT" in order to describe that several instances in combination define another single conceptual treatment plan.

8.1.1.2.24 RT Prescription Module

Attribute Name	Tag	VR	Value	Presence	Source
Dose Reference Sequence	(300A,0010)	SQ		ALWAYS	AUTO
>Dose Reference Number	(300A,0022)	IS		ALWAYS	AUTO
>Dose Reference UID	(300A,0013)	UI		ALWAYS	AUTO
>Dose Reference Structure Type	(300A,0014)	CS	"COORDINATES" or "VOL-UME" if RT Plan Geometry (300A,000C) is "PATIENT", otherwise "SITE".	ALWAYS	AUTO
>Constraint Weight	(300A,0021)	DS	If configured (see Note 8-9).	ANAP	AUTO
>Dose Reference Description	(300A,0016)	ST	(see Note 8-7)	ALWAYS	CONFIG
>Referenced ROI Number	(3006,0084)	IS		ANAP	AUTO
>Dose Reference Point Coordinates	(300A,0018)	DS		ANAP	AUTO
>Dose Reference Type	(300A,0020)	CS	"TARGET"	ALWAYS	AUTO
>Target Prescription Dose	(300A,0026)	DS		ALWAYS	AUTO
>Target Underdose Volume Fraction	(300A,0028)	DS	If configured (see Note 8-9).	ANAP	AUTO
>Organ at Risk Maximum Dose	(300A,002C)	DS	If configured (see Note 8-9).	ANAP	AUTO
>Organ at Risk Overdose Volume Fraction	(300A,002D)	DS	If configured (see Note 8-9).	ANAP	AUTO

Table 8-29: RT Prescription Module

Note 8-7: iPlan RT Dose offers the possibility to configure the Dose Reference Description (300A,0016). The Description can either be the PTV Name, Isocenter Name and/or a Course ID.

Note 8-8: As one or more DICOM RT Plans can be created out of one treatment plan (see Note 8-6 and Note 8-10) and it is configurable how the treatment plan is separated, there will be no RT Prescription Module in case plan separation is performed for each Treatment Group. If plan separation is performed for each prescription, the RT Prescription Module is included.

Note 8-9: It is possible to configure the export that prescription constraints are added to the Dose Reference Sequence (300A,0010). Then the sequence of items will be extended by items representing corresponding Target Prescription Dose (300A,0026)/Target Underdose Volume Fraction (300A,0028) (along with a Constraint Weight (300A,0021)) or Organ at Risk Maximum Dose (300A,002C)/Organ at Risk Overdose (300A,002D) value pairs.

8.1.1.2.25 RT Tolerance Tables Module

Attribute Name	Tag	VR	Value	Presence	Source
Tolerance Table Sequence	(300A,0040)	SQ		ALWAYS	AUTO
>Tolerance Table Number	(300A,0042)	IS		ALWAYS	AUTO
>Tolerance Table Label	(300A,0043)	SH	From Machine Profile	ALWAYS	CONFIG

Table 8-30: RT Tolerance Tables Module

8.1.1.2.26 RT Patient Setup Module

Attribute Name	Tag	VR	Value	Presence	Source
Patient Setup Sequence	(300A,0180)	SQ		ALWAYS	AUTO
>Patient Setup Number	(300A,0182)	IS		ALWAYS	AUTO
>Patient Setup Label	(300A,0183)	LO	Names of Treatment Group and Isocenter Coordinate.	ALWAYS	AUTO

>Patient Position	(0018,5100)	CS		ALWAYS	AUTO
>Referenced Setup Image Sequence	(300A,0401)	SQ	If configured.	ANAP	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI	"1.2.840.10008.5.1.4.1.1.481.1"	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0005,1155)	UI		ALWAYS	AUTO

Table 8-31: RT Patient Setup Module

8.1.1.2.27 RT Fraction Scheme Module

Attribute Name	Tag	VR	Value	Presence	Source
Fraction Group Sequence	(300A,0070)	SQ		ALWAYS	AUTO
>Fraction Group Number	(300A,0071)	IS		ALWAYS	AUTO
>Referenced Dose Reference Sequence	(300C,0050)	SQ		ALWAYS	AUTO
>>Referenced Dose Reference Number	(300C,0051)	IS		ALWAYS	AUTO
>Number of Fractions Planned	(300A,0078)	IS		ALWAYS	AUTO
>Number of Beams	(300A,0080)	IS		ALWAYS	AUTO
>Referenced Beam Sequence	(300C,0004)	SQ		ALWAYS	AUTO
>>Beam Dose Specification Point	(300A,0082)	DS	Only if RT Plan Geometry (300A,000C) is "PATIENT"	ANAP	AUTO
>>Beam Dose	(300A,0084)	DS		ALWAYS	AUTO
>>Private Creator Code	(3249,00xx)	LO		ANAP	CONFIG
>>Maximum Treatment Time	(3249,xx00)	DS		ANAP	CONFIG
>>Beam Delivery Duration Limit	(300A,00C5)	FD		ANAP	CONFIG
>>Beam Dose Point Depth	(300A,0088)	DS	Only if RT Plan Geometry (300A,000C) is "PATIENT" (See Note 8-11)	ANAP	AUTO
>>Beam Dose Equivalent Depth	(300A,0089)	DS	Only if RT Plan Geometry (300A,000C) is "PATIENT" (See Note 8-11)	ANAP	AUTO
>>Beam Dose SSD	(300A,008A)	DS	Only if RT Plan Geometry (300A,000C) is "PATIENT" (See Note 8-11)	ANAP	AUTO
>>Beam Dose Verification Control Point Sequence	(300A,008C)	SQ	(See Note 8-11)	ANAP	AUTO
>>>Cumulative Meterset Weight	(300A,0134)	DS		ALWAYS	AUTO
>>>Referenced Control Point Index	(300C,00F0)	IS		ANAP	AUTO
>>>Average Beam Dose Point Depth	(300A,008D)	FL		ALWAYS	AUTO
>>>Average Beam Dose Point Equivalent Depth	(300A,008E)	FL		ALWAYS	AUTO
>>>Average Beam Dose Point SSD	(300A,008F)	FL		ALWAYS	AUTO
>>Beam Meterset	(300A,0086)	DS		ALWAYS	AUTO
>>Referenced Beam Number	(300C,0006)	IS		ALWAYS	AUTO

>Number of Brachy Application Setups	(300A,00A0)	IS	"0"	ALWAYS	AUTO

Table 8-32: RT Fraction Scheme Module

Note 8-10: It is configurable how many items are within a Fraction Group Sequence. This can either be one fractionation item or all. If only one item is included, the application will create as many RT Plans as there are fractionations. See also Note 8-6.

Note 8-11: It is configurable whether the deprecated attributes Beam Dose Point Depth (300A,0088), Beam Dose Equivalent Depth (300A,0089) and Beam Dose SSD (300A,008A) are used or the corresponding values in the Beam Dose Verification Control Point Sequence (300A,008C).

8.1.1.2.28 RT Beams Module

Attribute Name	Tag	VR	Value	Presence	Source
Beam Sequence	(300A,00B0)	SQ		ALWAYS	AUTO
>Beam Number	(300A,00C0)	IS	(see Note 8-12)	ALWAYS	AUTO
>Beam Name	(300A,00C2)	LO	(see Note 8-12)	ALWAYS	AUTO
>Beam Description	(300A,00C3)	LO	(see Note 8-12)	ALWAYS	AUTO
>Beam Type	(300A,00C4)	CS	"STATIC" or "DYNAMIC"	ALWAYS	AUTO
>Radiation Type	(300A,00C6)	CS	"PHOTON"	ALWAYS	AUTO
>Primary Fluence Mode Sequence	(3002,0050)	SQ	(see Note 8-13)	ANAP	CONFIG
>>Fluence Mode	(3002,0051)	CS		ALWAYS	AUTO
>>Fluence Mode ID	(3002,0052)	SH	"SRS" or "FFF"	ANAP	CONFIG
>High Dose Technique Type	(300A,00C7)	CS	if applicable "SRS"	ANAP	AUTO
>Treatment Machine Name	(300A,00B2)	SH		ALWAYS	AUTO
>Manufacturer	(0008,0070)	LO	(see Note 8-14)	ALWAYS	AUTO
>Institution Name	(0008,0080)	LO		ALWAYS	CONFIG
>Institutional Department Name	(0008,1040)	LO		ALWAYS	CONFIG
>Manufacturer's Model Name	(0008,1090)	LO		ALWAYS	AUTO
>Primary Dosimeter Unit	(300A,00B3)	CS	"MU"	ALWAYS	AUTO
>Source-Axis Distance	(300A,00B4)	DS		ALWAYS	AUTO
>Beam Limiting Device Sequence	(300A,00B6)	SQ		ANAP	AUTO
>>RT Beam Limiting Device Type	(300A,00B8)	CS		ALWAYS	AUTO
>>Number of Leaf/Jaw Pairs	(300A,00BC)	IS		ALWAYS	AUTO
>>Leaf Position Boundaries	(300A,00BE)	DS		ANAP	AUTO
>Referenced Patient Setup Number	(300C,006A)	IS		ALWAYS	AUTO
>Referenced Reference Image Sequence	(300C,0042)	SQ	If configured.	ANAP	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI	"1.2.840.10008.5.1.4.1.1.481.1"	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0005,1155)	UI		ALWAYS	AUTO
>>Reference Image Number	(300A,00C8)	IS		ALWAYS	AUTO
>Planned Verification Image Sequence	(300A,00CA)	SQ	Only if Treatment Delivery Type is "SETUP"	ANAP	AUTO
>>Imaging Device-Specific Acquisition Parameters	(300A,00CC)	LO	"KV\Image"	ANAP	AUTO
>Treatment Delivery Type	(300A,00CE)	CS	"TREATMENT" or "SETUP"	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence	Source
>Number of Wedges	(300A,00D0)	IS	"0" or "1"	ALWAYS	AUTO
>Wedge Sequence	(300A,00D1)	SQ	Only for Cones	ANAP	AUTO
>>Wedge Number	(300A,00D2)	IS		ANAP	AUTO
>> Wedge Type	(300A,00D3)	CS	"STANDARD"	ANAP	AUTO
>>Wedge ID	(300A,00D4)	SH	(see Note 8-16)	ANAP	CONFIG
>>Accessory Code	(300A,00F9)	LO		ANAP	CONFIG
>>Wedge Angle	(300A,00D5)	IS		EMPTY	AUTO
>>Wedge Factor	(300A,00D6)	DS		EMPTY	AUTO
>>Wedge Orientation	(300A,00D8)	DS		EMPTY	AUTO
>Number of Blocks	(300A,00F0)	IS	"0" or "1"	ALWAYS	AUTO
>Block Sequence	(300A ,00F4)	SQ	Only for m3 MLC Full Integration or Cones	ANAP	AUTO
>>Block Tray ID	(300A ,00F5)	SH	(see Note 8-16)	ANAP	CONFIG
>>Accessory Code	(300A,00F9)	LO		ANAP	CONFIG
>> Source to Block Tray Distance	(300A, 00F6)	DS		EMPTY	AUTO
>>Block Type	(300A,00F8)	CS	"APERTURE"	ANAP	AUTO
>>Block Divergence	(300A ,00FA)	CS		EMPTY	AUTO
>>Block Number	(300A,00FC)	IS		ANAP	AUTO
>>Material ID	(300A,00E1)	SH		EMPTY	AUTO
>>Block Thickness	(300A,0100)	DS		EMPTY	AUTO
>>Block Transmission	(300A,0102)	DS		EMPTY	AUTO
>>Block Number of Points	(300A,0104)	IS		EMPTY	AUTO
>>Block Data	(300A,0106)	DS		EMPTY	AUTO
>Applicator Sequence	(300A,0107)	SQ		ANAP	AUTO
>>Applicator ID	(300A,0108)	SH	(see Note 8-16)	ANAP	CONFIG
>>Accessory Code	(300A,00F9)	LO		ANAP	CONFIG
>>Applicator Type	(300A,0109)	CS	"STEREOTACTIC" or "PHOTON_CIRC"	ANAP	AUTO
>>Applicator Geometry Sequence	(300A,0431)	SQ	(see Note 8-17)	ANAP	CONFIG
>>>Applicator Aperture Shape	(300A,0432)	CS	"SYM_CIRCULAR"	ALWAYS	AUTO
>>>Applicator Opening	(300A,0433)	FL		ALWAYS	AUTO
>Number of Compensators	(300A,00E0)	IS	"0"	ALWAYS	AUTO
>Number of Boli	(300A,00ED)	IS	"0"	ALWAYS	AUTO
>Final Cumulative Meterset Weight	(300A,010E)	DS	"1.0"	ALWAYS	AUTO
>Number of Control Points	(300A,0110)	IS		ALWAYS	AUTO
>Control Point Sequence	(300A,0111)	SQ		ALWAYS	AUTO
>>Control Point Index	(300A,0112)	IS		ALWAYS	AUTO
>>Cumulative Meterset Weight	(300A,0134)	DS		ALWAYS	AUTO
>>Referenced Dose Reference Sequence	(300C,0050)	SQ	Not present if Treatment Delivery Type (300A,00CE) is "SETUP"	ANAP	AUTO
>>>Referenced Dose Reference Number	(300C,0051)	IS		ANAP	AUTO
>>>Cumulative Dose Reference Coefficient	(300A,010C)	DS		ANAP	AUTO
>>Beam Dose Point Depth	(300A,0088)	DS	Only if RT Plan Geometry	ANAP	AUTO

Attribute Name	Tag	VR	Value	Presence	Source
			(300A,000C) is "PATIENT" (See Note 8-11)		
>>Beam Dose Equivalent Depth	(300A,0089)	DS	Only if RT Plan Geometry (300A,000C) is "PATIENT" (See Note 8-11)	ANAP	AUTO
>>Beam Dose SSD	(300A,008A)	DS	Only if RT Plan Geometry (300A,000C) is "PATIENT" (See Note 8-11)	ANAP	AUTO
>>Nominal Beam Energy	(300A,0114)	DS		ALWAYS	AUTO
>>Dose Rate Set	(300A,0115)	DS	(see Note 8-15)	ANAP	CONFIG
>>Beam Limiting Device Position Sequence	(300A,011A)	SQ		ANAP	AUTO
>>>RT Beam Limiting Device Type	(300A,00B8)	CS		ANAP	AUTO
>>>Leaf/Jaw Positions	(300A,011C)	DS		ANAP	AUTO
>>Gantry Angle	(300A,011E)	DS		ANAP	AUTO
>>Gantry Rotation Direction	(300A,011F)	CS		ANAP	AUTO
>>Beam Limiting Device Angle	(300A,0120)	DS		ANAP	AUTO
>>Beam Limiting Device Rotation Direction	(300A,0121)	CS		ANAP	AUTO
>>Patient Support Angle	(300A,0122)	DS		ANAP	AUTO
>>Patient Support Rotation Direction	(300A,0123)	CS		ANAP	AUTO
>>Table Top Eccentric Angle	(300A,0125)	DS		ANAP	AUTO
>>Table Top Eccentric Rotation Direction	(300A,0126)	CS		ANAP	AUTO
>>Table Top Pitch Angle	(300A,0140)	DS		ANAP	AUTO
>>Table Top Pitch Rotation Direction	(300A,0142)	CS		ANAP	AUTO
>>Table Top Roll Angle	(300A,0144)	DS		ANAP	AUTO
>>Table Top Roll Rotation Direction	(300A,0146)	CS		ANAP	AUTO
>>Table Top Vertical Position	(300A,0128)	DS		VNAP	CONFIG
>>Table Top Longitudinal Position	(300A,0129)	DS		VNAP	CONFIG
>>Table Top Lateral Position	(300A,012A)	DS		VNAP	CONFIG
>>Isocenter Position	(300A,012C)	DS	Only if RT Plan Geometry (300A,000C) is "PATIENT"	VNAP	AUTO
>>Source to Surface Distance	(300A,0130)	DS	Only if RT Plan Geometry (300A,000C) is "PATIENT"	ANAP	CONFIG
>Private Creator Code	(320B,10xx)	LO	Brainlab Multi-axial treatment machine Group	ANAP	AUTO
>Dynamic Tracking	(320B,xx01)	CS		ANAP	AUTO

Table 8-33: RT Beams Module

Note 8-12: iPlan RT Dose offers the possibility to configure which string element will be assigned to which DICOM attribute for Beam Number (300A,00C0), Beam Name (300A,00C2) and Beam Description (300A,00C3) in order to guarantee the correct assignment in different record-and-verify systems.

Note 8-13: As a default the Primary Fluence Mode Sequence (3002,0050) is written with the Primary Fluence Mode (3002,0051) set to "STANDARD". For cases where this causes an issue, this behavior can be

changed in the iPlan RT Dose settings. For a Primary Fluence Mode "NON_STANDARD" this sequence will always be written.

Note 8-14: Some target systems do not interpret this value as the manufacturer of the treatment delivery device, but as the manufacturer of the beam-limiting device. Therefore, the value of this attribute can be configured accordingly.

Note 8-15: iPlan RT Dose offers the possibility to configure how the Dose Rate Set (300A,0115) is written. There are four possibilities: None: No Dose Rate at all is written (Attribute not present); Null: 0 is written as Dose Rate; Defined: Dose Rate from Machine Profile is written; Actual: the actual Dose Rate is written.

Note 8-16: For the export of an identifier of a conical collimator iPlan RT Dose offers the possibility to configure the usage of either the Wedge ID (300A,00D4), the Block Tray ID (300A,00F5) or the Applicator ID (300A,0108). Also for specific MLCs that require identification as an applicator, the Applicator Sequence can be configured accordingly.

Note 8-17: For conical collimators it is possible to configure that the Applicator Geometry Sequence (300A,0431) is exported.

8.1.1.2.29 RT Dose Module

Attribute Name	Tag	VR	Value	Presence	Source
Samples per Pixel	(0028,0002)	US		ANAP	AUTO
Photometric Interpretation	(0028,0004)	CS		ANAP	AUTO
Bits Allocated	(0028,0100)	US		ANAP	AUTO
Bits Stored	(0028,0101)	US		ANAP	AUTO
High Bit	(0028,0102)	US		ANAP	AUTO
Pixel Representation	(0028,0103)	US		ANAP	AUTO
Dose Units	(3004,0002)	CS	"GY"	ALWAYS	AUTO
Dose Type	(3004,0004)	CS	"PHYSICAL" (see Note 8-18)	ALWAYS	AUTO
Dose Comment	(3004,0006)	LO		ANAP	AUTO
Dose Summation Type	(3004,000A)	CS	(see Note 8-19)	ALWAYS	AUTO
Referenced RT Plan Sequence	(300C,0002)	SQ	(see Note 8-20)	ANAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO
>Referenced Fraction Group Sequence	(300C,0020)	SQ		ANAP	AUTO
>>Referenced Fraction Group Number	(300C,0022)	IS		ANAP	AUTO
>>Referenced Beam Sequence	(300C,0004)	SQ	(see Note 8-21)	ANAP	AUTO
>>>Referenced Beam Number	(300C,0006)	IS		ANAP	AUTO
Grid Frame Offset Vector	(3004,000C)	DS		ANAP	AUTO
Dose Grid Scaling	(3004,000E)	DS		ALWAYS	AUTO

Table 8-34: RT Dose Module

Note 8-18: The default value is "PHYSICAL". For ATC compliant exports, this value may also be "PHYSICAL_HOMO" or "PHYSICAL_HETERO". See the ATC Conformance Statement for details [3].

Note 8-19: Out of the list of Defined Terms only "PLAN", "FRACTION" and "BEAM" are supported. The list has been extended with the term "COMPOSITE" if more than one plan is created out of the treatment plan. Additionally, the ATC terms "TOTAL_HOMO" and "TOTAL_HETERO" are supported. See the ATC Conformance Statement for details [3]. For "COMPOSITE", "TOTAL_HOMO" and "TOTAL_HETERO" no Referenced RT Plan Sequence (300C,0002) is created. In case the usage of term "MULTI_PLAN" is enabled, this term will be used in case a dose references more than one RT Plan (see Note 8-20).

Note 8-20: Not present, if more than one RT Plan is exported for one conceptual treatment plan and Dose Summation Type is configured not to be set to "MULTI_PLAN". Otherwise, Referenced RT Plan Sequence (300C,0002) will be created and includes more than one referenced RT Plan.

Note 8-21: If beam is split during export due to field size or beam meterset and Dose Summation Type is set to "BEAM" then Referenced Beam Sequence will contain more than one item in order to represent dose volume of one conceptual treatment beam in iPlan RT Dose.

8.1.1.2.30 RT DVH Module

Attribute Name	Tag	VR	Value	Presence	Source
Referenced Structure Set Sequence	(300C,0060)	SQ		ALWAYS	AUTO
>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO
DVH Sequence	(3004,0050)	SQ		ALWAYS	AUTO
>DVH Referenced ROI Sequence	(3004,0060)	SQ		ALWAYS	AUTO
>>Referenced ROI Number	(3006,0084)	IS		ALWAYS	AUTO
>>DVH ROI Contribution Type	(3004,0062)	CS	"INCLUDED"	ALWAYS	AUTO
>DVH Type	(3004,0001)	CS	"DIFFERENTIAL"	ALWAYS	AUTO
>Dose Units	(3004,0002)	CS	"GY"	ALWAYS	AUTO
>Dose Type	(3004,0004)	CS	"PHYSICAL" (see Note 8-18)	ALWAYS	AUTO
>DVH Dose Scaling	(3004,0052)	DS		ALWAYS	AUTO
>DVH Volume Units	(3004,0054)	CS	"CM3"	ALWAYS	AUTO
>DVH Number of Bins	(3004,0056)	IS		ALWAYS	AUTO
>DVH Data	(3004,0058)	DS		ALWAYS	AUTO
>DVH Minimum Dose	(3004,0070)	DS		ALWAYS	AUTO
>DVH Maximum Dose	(3004,0072)	DS		ALWAYS	AUTO
>DVH Mean Dose	(3004,0074)	DS		ALWAYS	AUTO

Table 8-35: RT DVH Module

8.1.1.2.31 RT Image Module

Attribute Name	Tag	VR	Value	Presence	Source
Samples per Pixel	(0028,0002)	US	"1"	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	"MONOCHROME2"	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	"16"	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	"16"	ALWAYS	AUTO
High Bit	(0028,0102)	US	"15"	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	"0"	ALWAYS	AUTO
Pixel Intensity Relationship	(0028,1040)	CS	The presence of this attribute can be configured.	ANAP	AUTO
Pixel Intensity Relationship Sign	(0028,1041)	SS	The presence of this attribute can be configured.	ANAP	AUTO
RT Image Label	(3002,0002)	SH	Reference to beam or isocenter (see Note 8-12)	ALWAYS	CONFIG
RT Image Name	(3002,0003)	LO	Reference to beam or isocenter (see Note 8-12)	ALWAYS	CONFIG
RT Image Description	(3002,0004)	ST	Reference to beam or isocenter (see Note 8-12)	ALWAYS	CONFIG
Operators' Name	(0008,1070)	PN		ALWAYS	AUTO
Image Type	(0008,0008)	CS	(see Note 8-22)	ALWAYS	AUTO
Conversion Type	(0008,0064)	CS	"WSD"	ALWAYS	AUTO
RT Image Plane	(3002,000C)	CS	"NORMAL"	ALWAYS	AUTO
X-Ray Image Receptor Translation	(3002,000D)	DS		ALWAYS	CONFIG
X-Ray Image Receptor Angle	(3002,000E)	DS	"0"	ALWAYS	AUTO
RT Image Orientation	(3002,0010)	DS		ANAP	AUTO
Image Plane Pixel Spacing	(3002,0011)	DS		ALWAYS	CONFIG
RT Image Position	(3002,0012)	DS		ALWAYS	AUTO
Radiation Machine Name	(3002,0020)	SH		ALWAYS	CONFIG/USER
Exposure Sequence	(3002,0030)	SQ		ANAP	CONFIG
> Beam Limiting Device Sequence	(300A,00B6)	SQ		ANAP	AUTO
>> RT Beam Limiting Device Type	(300A, 00B8)	CS		ANAP	AUTO
>> Number of Leaf/Jaw Pairs	(300A,00BC)	IS		ANAP	AUTO
>> Leaf Position Boundaries	(300A,00BE)	DS		ANAP	AUTO
>> Leaf/Jaw Position	(300A,011C)	DS		ANAP	AUTO
Primary Dosimeter Unit	(300A,00B3)	CS	"MU"	ALWAYS	AUTO
Radiation Machine SAD	(3002,0022)	DS		ALWAYS	CONFIG
Radiation Machine SSD	(3002,0024)	DS		ALWAYS	AUTO
RT Image SID	(3002,0026)	DS		ALWAYS	CONFIG
Referenced RT Plan Sequence	(300C,0002)	SQ		ALWAYS	AUTO
>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>Referenced SOP In-	(0008,1155)	UI		ALWAYS	AUTO

stance UID					
Referenced Beam Number	(300C,0006)	IS		ANAP	AUTO
Referenced Fraction Group Number	(300C,0022)	IS		ALWAYS	AUTO
Gantry Angle	(300A,011E)	DS		ALWAYS	USER/CONFIG
Beam Limiting Device Angle	(300A,0120)	DS		ALWAYS	AUTO
Patient Support Angle	(300A,0122)	DS		ALWAYS	AUTO
Table Top Vertical Position	(300A,0128)	DS		ANAP	CONFIG
Table Top Longitudinal Position	(300A,0129)	DS		ANAP	CONFIG
Table Top Lateral Position	(300A,012A)	DS		ANAP	CONFIG
Private Creator Code	(3273,00xx)	LO		ANAP	USER/CONFIG
Isocenter Position	(3273,xx00)	DS		ANAP	USER/CONFIG
Patient Position	(3273,xx01)	CS		ANAP	USER/CONFIG
Isocenter Position	(300A,012C)	DS		ALWAYS	AUTO
Patient Position	(0018,5100)	CS		ALWAYS	AUTO

Table 8-36: RT Image Module

Note 8-22: The Image Type always consists out of the three standard parameters DERIVED \ SECONDARY \ DRR. A fourth parameter TBV or SETUP is appended depending on whether the image is a Treatment Beam View image or a Setup image.

Note 8-23: If Image Type (0008,0008) parameter 4 is SETUP, then Referenced Beam Number (300C,0006) is only written, if a corresponding beam with Treatment Delivery Type (300A,00CE) "SETUP" is part of the Beam Sequence in the referenced RT Plan.

8.1.2 Usage Of Attributes From Received IODs

This section describes the requirements on the DICOM data, which shall be converted into BrainLAB data. Conversion can be performed on the DICOM Images of type CT, MR, PET, NM, CR, XA, RF, and secondary captures.

8.1.2.1 Images

iPlan RT Adaptive accepts all images of the SOP Classes in Table 4-8. Though, there are some restrictions and special conversions:

- Images with an attribute (0028,0030) Pixel Spacing containing different values for x and y distance[1] will be ignored.

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[1] To be more precise: If the difference between both values is greater than 0.001 mm!

8.2 Data Dictionary Of Private Attributes

The Private Attributes added to created SOP Instances are listed in the table below. Further details on usage of these private attributes are contained in Section 8.1.

8.2.1 Group 0009

Tag	Attribute Name	VR	VM
(0009,00xx)	Private Creator Code 'BrainLAB_Conversion'	LO	1
(0009,xx01)	Export Platform Name	LO	1

Table 8-37: Export Platform Parameter

8.2.2 Group 300B

Tag	Attribute Name	VR	VM
(300B,00xx)	Private Creator Code 'Brainlab - ONC - Beam Parameters'	LO	1
(300B,xx10)	Referenced Beam List	IS	1

Table 8-38: Beam Parameters

8.2.3 Group 310B

Tag	Attribute Name	VR	VM
(310B,00xx)	Private Creator Code 'Brainlab – ONC – Meta Beam Parameters'	LO	1
(310B,xx01)	Meta Beam Sequence	SQ	1
(310B,xx10)	Meta Beam Name	LO	1
(310B,xx11)	Meta Beam Number	IS	1

Table 8-39: Meta Beam Parameters

8.2.4 Group 320B

Tag	Attribute Name	VR	VM
(320B,00xx)	Private Creator Code 'Brainlab – ONC – Multi-axial treatment machine	LO	1
(320B,xx01)	Dynamic Tracking	CS	1

Table 8-40: Multi-axial treatment machine

8.2.5 Group 330B

Tag	Attribute Name	VR	VM
(330B,00xx)	Private Creator Code 'Brainlab – ONC – Hybrid Arc Parameters'	LO	1
(330B,xx01)	Hybrid Arc Parameter Sequence	SQ	1
(330B,xx10)	Arc-Beam Relation	DS	1
(330B,xx11)	Desired Dose Weighting	DS	1
(330B,xx12)	PTV Margin	DS	1
(330B,xx13)	OAR Margin	DS	1
(330B,xx14)	Beam Limiting Device Angle IMRT	DS	1
(330B,xx15)	Beam Limiting Device Angle Arc	DS	1

Table 8-41: Hybrid Arc Parameters

8.2.6 Group 3249

Tag	Attribute Name	VR	VM
(3249,00xx)	Private Creator Code	LO	1
(3249,xx00)	Maximum Treatment Time	DS	1

Table 8-42: Data Dictionary of Private Attributes for Group 3249, see [4]

8.2.7 Group 3253

Tag	Attribute Name	VR	VM
(3253,00xx)	Private Creator Code	LO	1
(3253,xx00)	Extended Interface Data	OB	1
(3253,xx01)	Extended Interface Length	IS	1
(3253,xx02)	Extended Interface Format	LO	1

Table 8-43: Data Dictionary of Private Attributes for Group 3253, see [4]

8.2.8 Group 3273

Tag	Attribute Name	VR	VM
(3273,00xx)	Private Creator Code	LO	1
(3273,xx00)	Isocenter Position	DS	3
(3273,xx01)	Patient Position	CS	1

Table 8-44: Data Dictionary of Private Attributes for Group 3273, see [4]

8.3 Coded Terminology And Templates

CID 4051   General Devices

Context ID 4051
General Devices
Type: Extensible   **Version:** 20061023

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
INCLUDE CID BL-GEN-00001		

CID BL-GEN-00001   Brainlab Device Definitions

Context ID BL-GEN-00001

Localizer Definitions

Type: Extensible **Version:** 20100812

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
BL-GEN-LOC	LOC-HEADRING	Headring
BL-GEN-LOC	LOC-LOCALIZER	Localizer

8.4 Grayscale Image Consistency

Not supported.

8.5 Standard Extended/Specialized/Private Sop Classes

None supported.

8.6 Private Transfer Syntaxes

None supported.

9 Indexes

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