DICOM configuration

How to use

Copyright file

DICOM information

CARE Analytics – Enhanced Dose Reporting

Operator Manual

Answers for life.

SIEMENS

DICOM Configuration of CARE Analytics

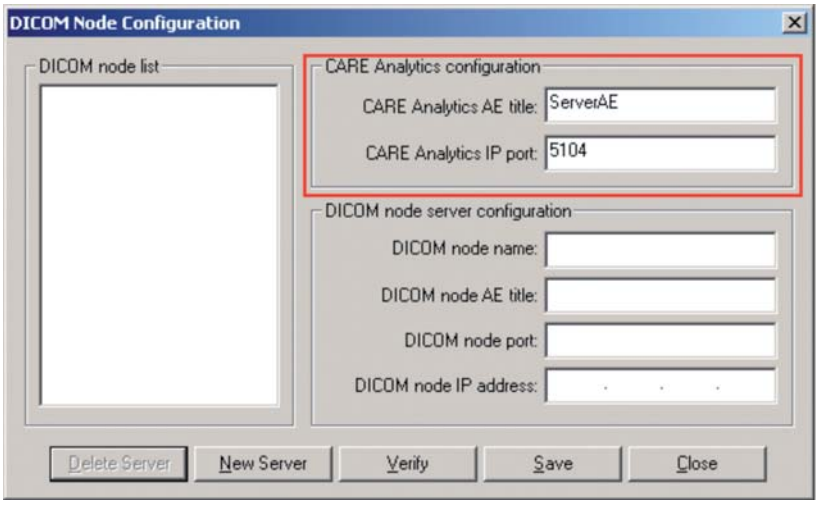
Note: CARE Analytics is freeware and will not be installed by Siemens service engineers. The selection of a PC or USB stick in the hospital network is the responsibility of the hospital IT administrator. He has to ensure that there is no risk related to the introduction of this PC or USB stick in the DICOM network (i.e. virus protection). It is prohibited to put CARE Analytics on any Siemens medical device.

Step 1

Configure CARE Analytics' AE title and IP port.

Explanation:
Worked as a DICOM SCU (Service Class User), this AE title and IP port is used to indentify CARE Analytics.

- The AE title should not exceed 16 characters.
- This configuration part should not be changed frequently because the information is used by the DICOM node server. Once these parameters are changed, all the DICOM node servers that are listed in the "DICOM node list" will also need to be changed accordingly.

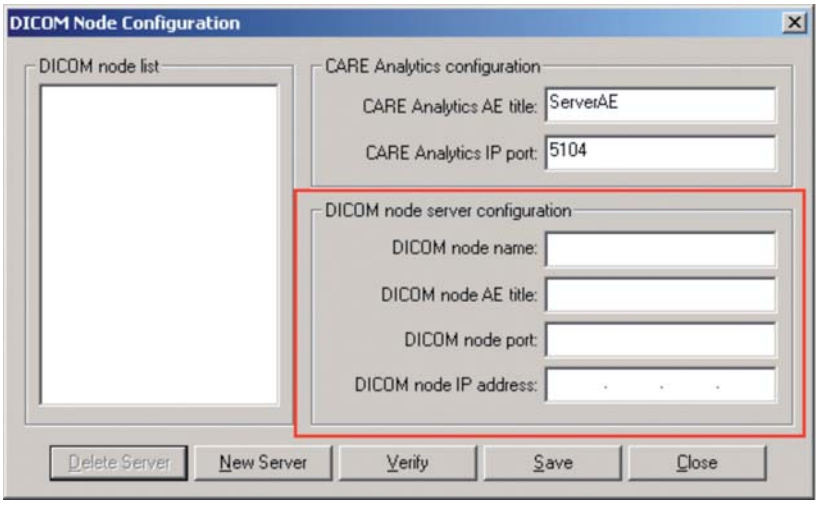


Step 2

Input DICOM node server's information (CARE Analytics' node name, AE title, node port, and IP address).

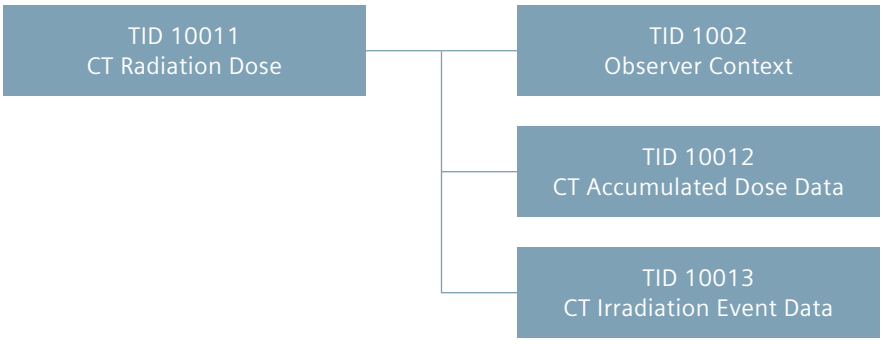
Explanation:
For detailed configuration, please refer to the DICOM node server's configuration manual.

The following example of how to configure the DICOM node is provided for demonstration purposes:
Server: Somaris/5 *syngo* CT 2009E(VX70A)
IP Address: 139.24.185.19
Client: Microsoft Windows XP
IP Address: 139.24.185.236



DICOM Configuration for CT Scanners

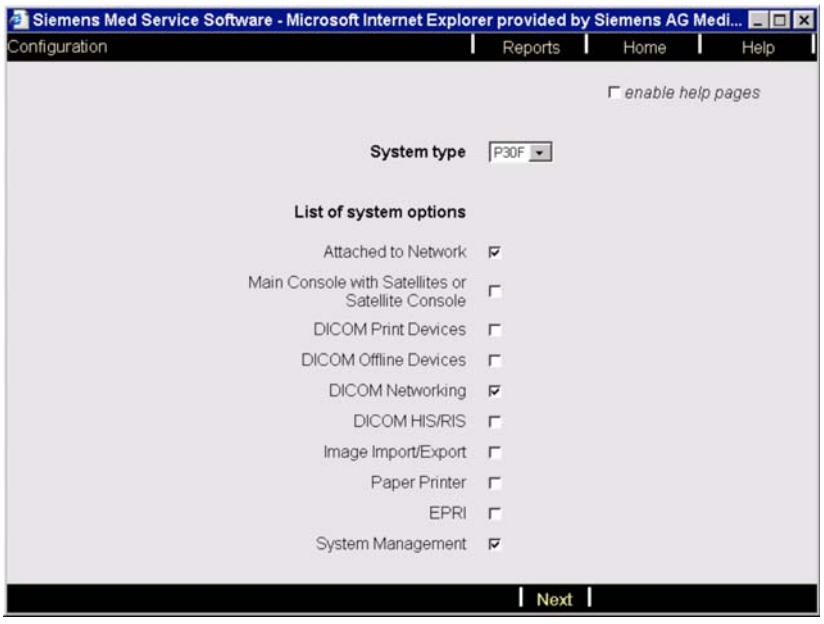
CARE Analytics is a stand-alone tool that can be used on any office computer. It can query/retrieve DICOM Structured Dose Reports from a DICOM node server. The retrieved structured reports can be exported to Microsoft® Office Excel for further analysis. This tool only supports retrieval and analysis of dose reports that conform to DICOM standard 2008 "CT RADIATION DOSE SR ID TEMPLATES". The templates that comprise the CT Radiation Dose SR are interconnected as depicted below:



Before starting a query on a new DICOM node server, both the DICOM node server and the CARE Analytics tool need to be configured.

Step 1

Open the Service UI on the *syngo* system, select "Configuration → System Options". Enable checkbox "DICOM networking".

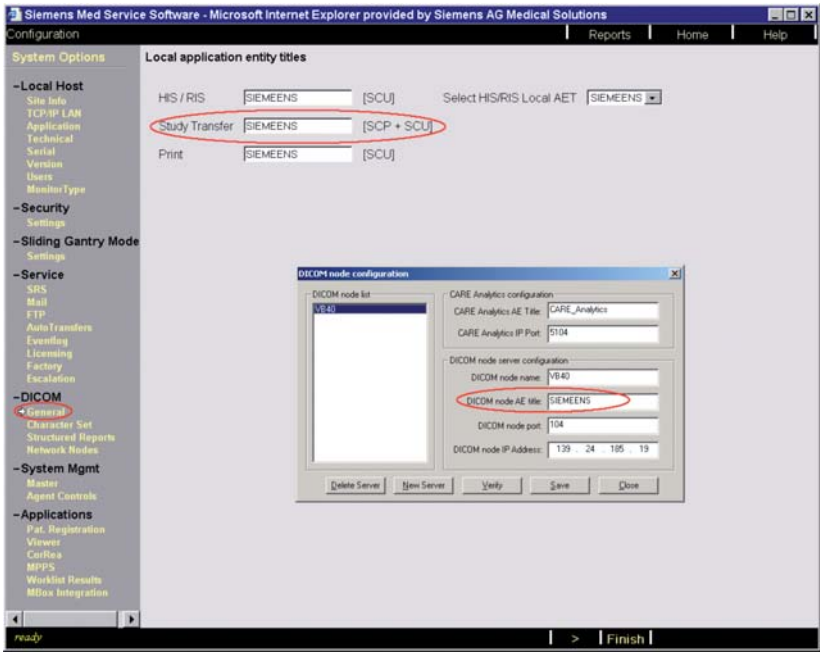


Step 2

Configure entity titles for “Study Transfer”.

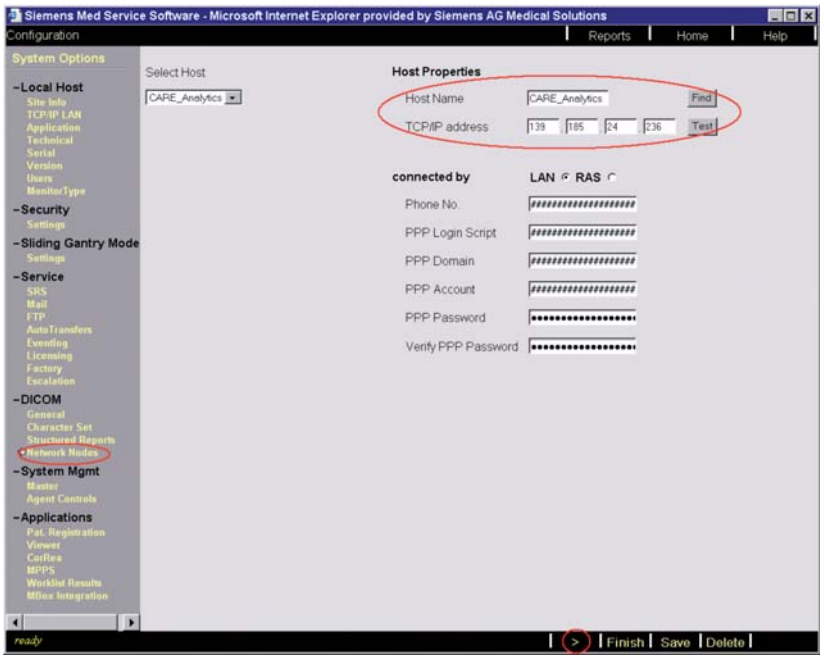
Explanation:

1. “VB40” is just used as the DICOM node’s identification. The user can define it at will.
2. *syngo’s* DICOM node port is 104 (*syngo* default value and cannot be changed).
3. Target DICOM nodes IP address is “139.24.185.19”.



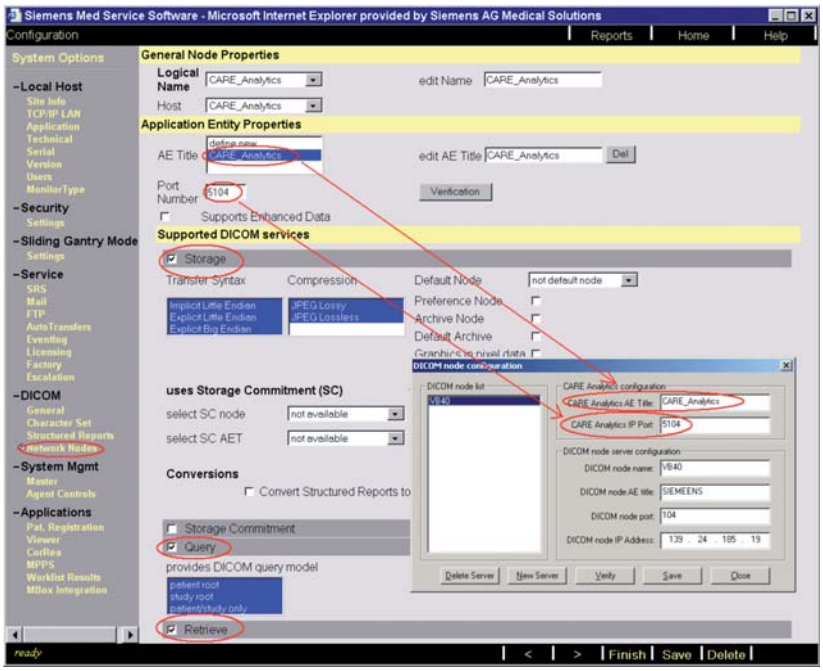
Step 3

Add client’s IP address to Host list.



Step 4

Add DICOM configuration, and then click “Save”.



Step 5

Click “Save” and “Finish”, a restart of the application SW is necessary to make changes valid!

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DICOM Configuration of Artis zee Systems

CARE Analytics is freeware, a non-medical software tool designed to query dose information from Structured Dose Report objects stored on configured DICOM nodes. The tool can be executed from any PC in the hospital network or from a USB stick approved by a hospital IT administrator. CARE Analytics was tested with Structured Dose Reports from Artis zee/zeego systems beginning with version VC14.

Preparation

Step 1

Alternative 1:
Report directly from the Artis zee system: Ask the customer for the following parameters for the PC to be connected.

Host Name	
TCP/IP Address	
Logical Name	
AE Title	

Alternative 2:
Report from PACS: Ask the customer for the following parameters.

Logical Name	

Explanation:
A distinction must be made here whether the customer would like to have the report sent directly from the Artis zee system or from PACS.

Step 2

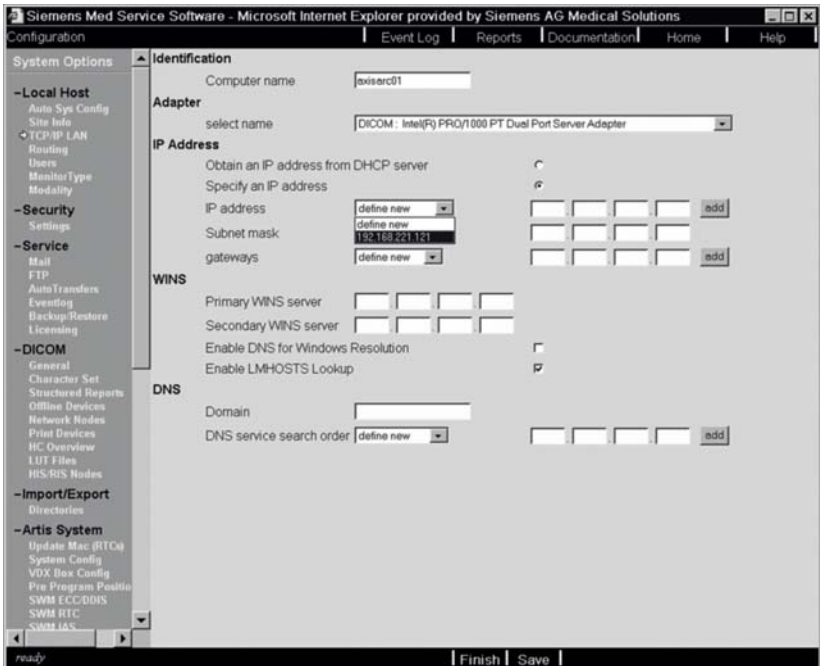
Note: This point should be worked through only if the report is to come directly from the Artis zee system.

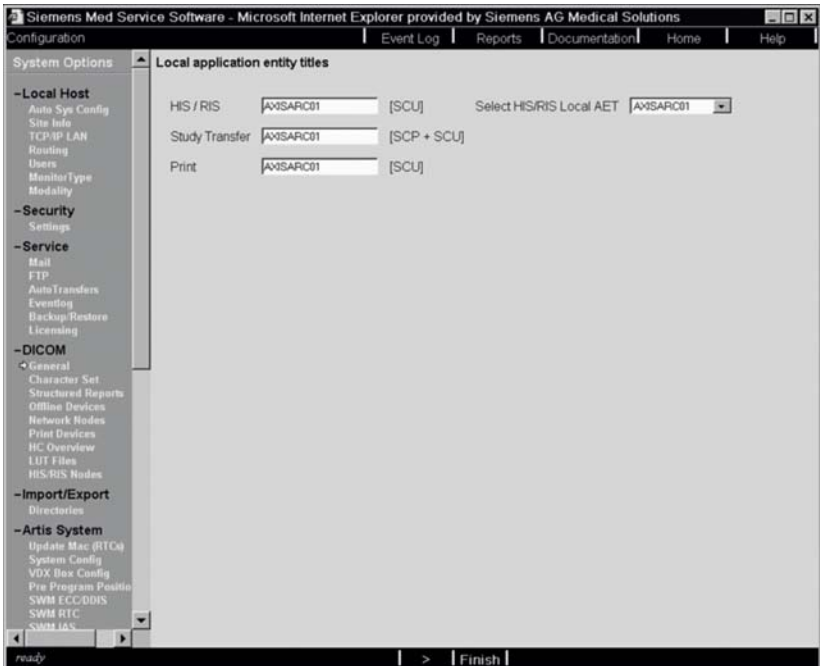
Host Name	
TCP/IP Address	
AE Title	

Provide the following information to the customer:

1. Open the service software.
2. Select “TCP/IP LAN” under “Local host”.
3. Enter the name displayed under “Computer name” into the table.
4. Page to the “IP address” and enter the IP address below.

5. Select the “General” point under “DICOM”.
6. Enter the name displayed under “Study Transfer” into the table.



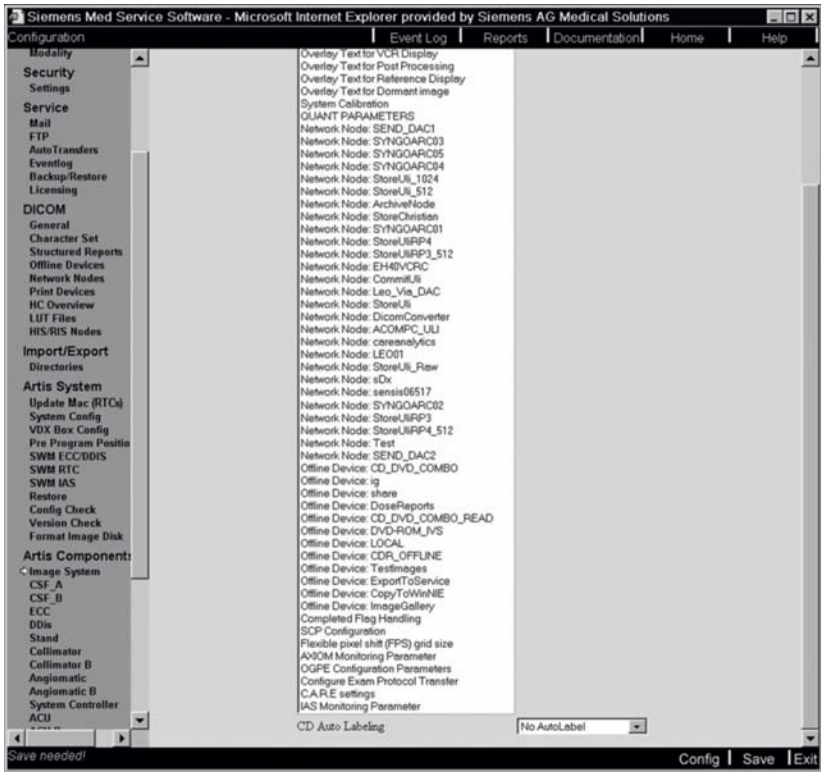


Step 3

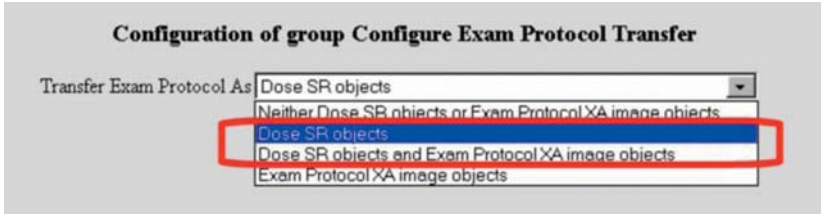
Check the configuration for Dose Structured Report at the Artis zee system.

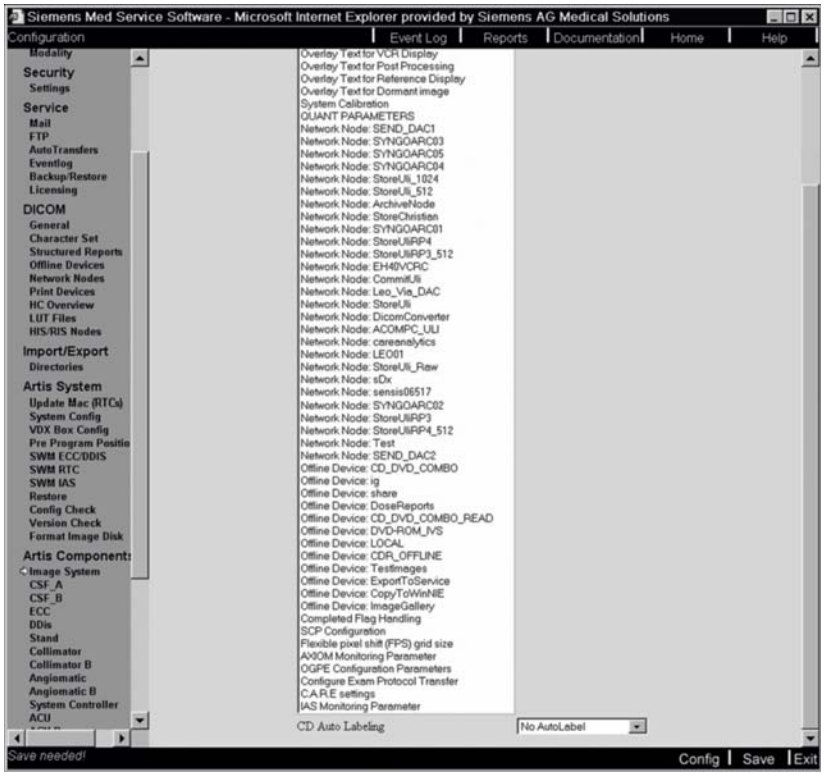
Note: This point must be checked, regardless of whether the report is to come directly from the Artis zee system or from PACS.

1. Open the service software.
2. Click on “Configuration”.
3. Select the “Image System” point under “Artis Components”.
4. Select “Configure Exam Protocol Transfer”.
5. Click on “Config”.

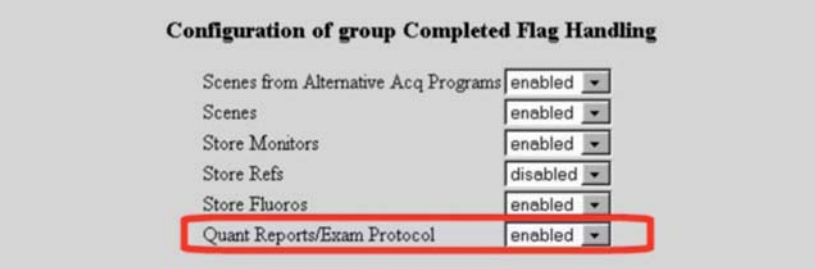


6. Check whether “Neither Dose SR objects or Exam Protocol XA image objects” or “Exam Protocol XA image objects” is selected.
   - If “Neither Dose SR objects or Exam Protocol XA image objects” is selected, select “Dose SR objects”.
   - If “Exam Protocol XA image objects” is selected, select the “Dose SR objects and Exam Protocol XA image objects” point.
7. Click on “OK”.
8. Click on “Save”.





9. Select “Completed Flag Handling”.
10. Click on “Config”.
11. Check to ensure the point “Quant Reports / Example Protocol” is set to “enabled”. If not, select “enabled”.
12. Click on “OK”.
13. Click on “Save”.
14. Click on “Exit”.
15. Click on “Finish”.



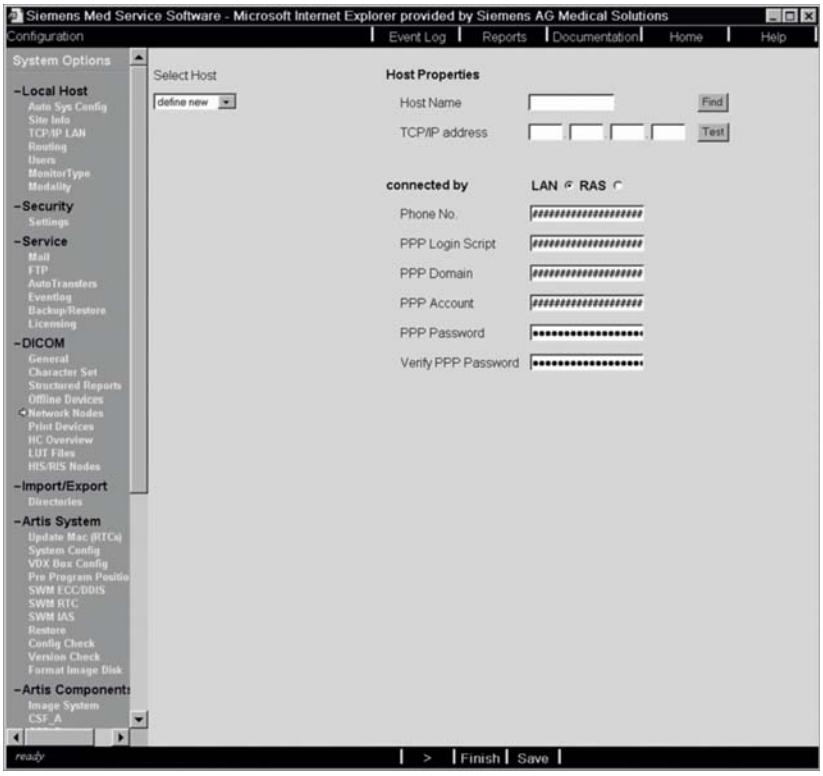
Configuration when the report is to come directly from the Artis zee system

Note: This point should be worked through only if the report is sent from the Artis zee system. This configuration is necessary to send the “Dose SR” to an extra DICOM node.

Step 1

Set the DICOM configuration of the Artis zee system.

1. Open the service software.
2. Click on “Configuration”.
3. Under “DICOM”, select the ”Network Nodes point.



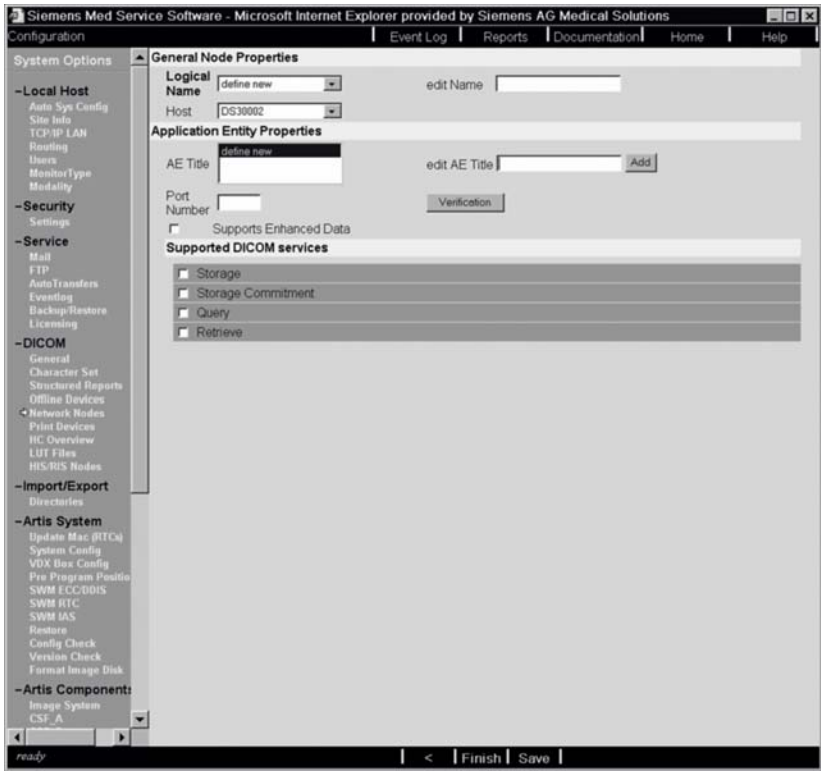
4. “Host Name” and enter the IP address under “TCP/IP Address”. This information comes from the customer.
5. Click on “>”.

6. Enter the AE Title under “edit Name”. This information comes from the customer.
7. Select the “Host Name” entered under “Host” on the previous page.
8. Enter the same name under “Edit AE Title” as was entered under “Edit Name”.
9. Enter the value “5104” under “Post Number”.
10. Select “Storage”.
11. Click on “Add”.
12. Click on “Save”.
13. Click on “OK”.

14. Click on “Next”.
    → A configuration check is performed automatically.
    → “Auto config needed” is displayed in the list.

15. Click on “Auto Conf”.
    → When this is done, “Auto config” is started automatically.
    → “Auto Conf finished” appears in the status line.

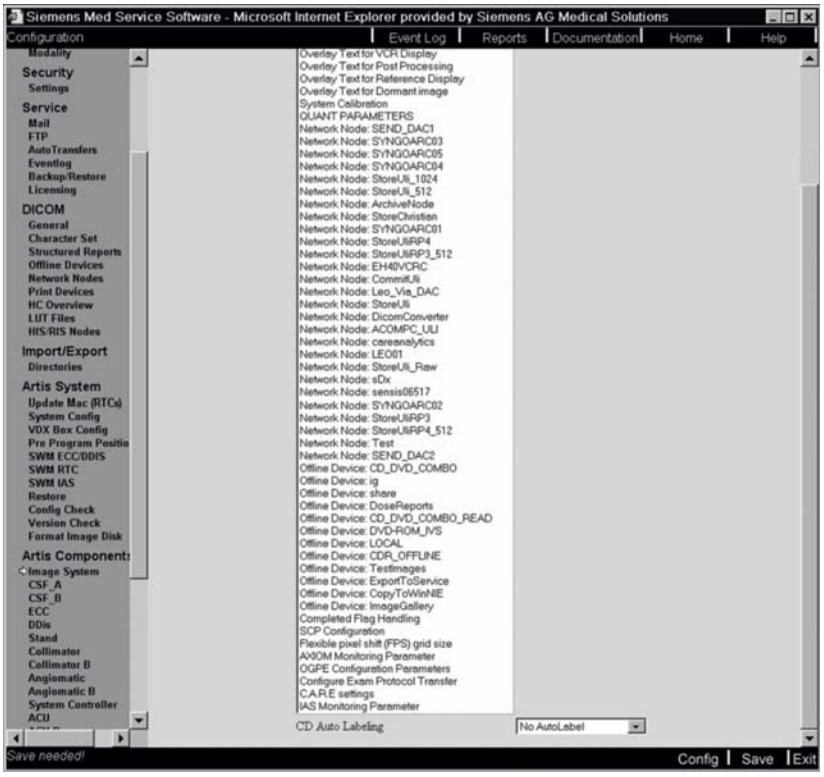
16. Click on “Exit”.



Step 2

Check the Name under “Network Nodes”.

1. Select the ”Image System” point under “Artis Components”.

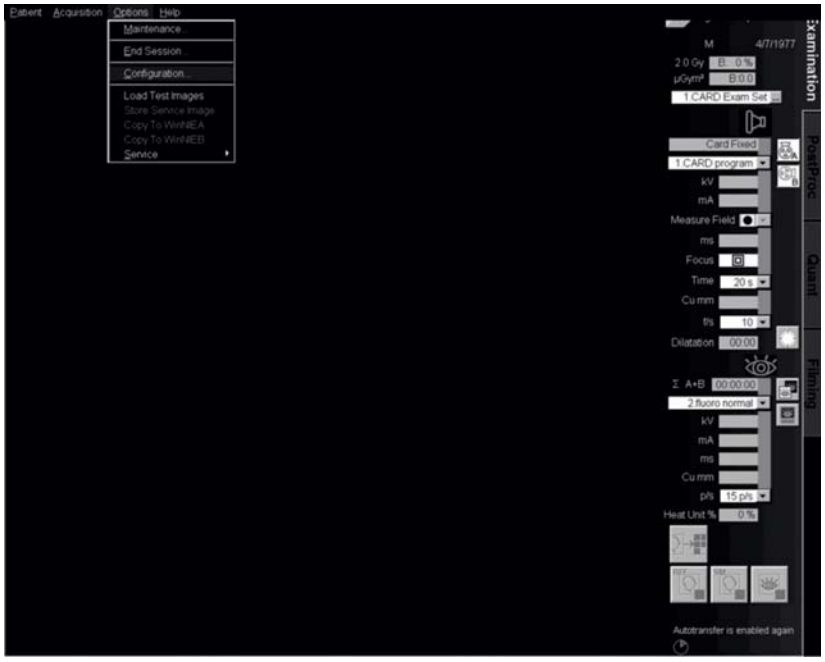


Configuration when the report is to come from PACS

Note: The definition for the Auto Report is checked here.

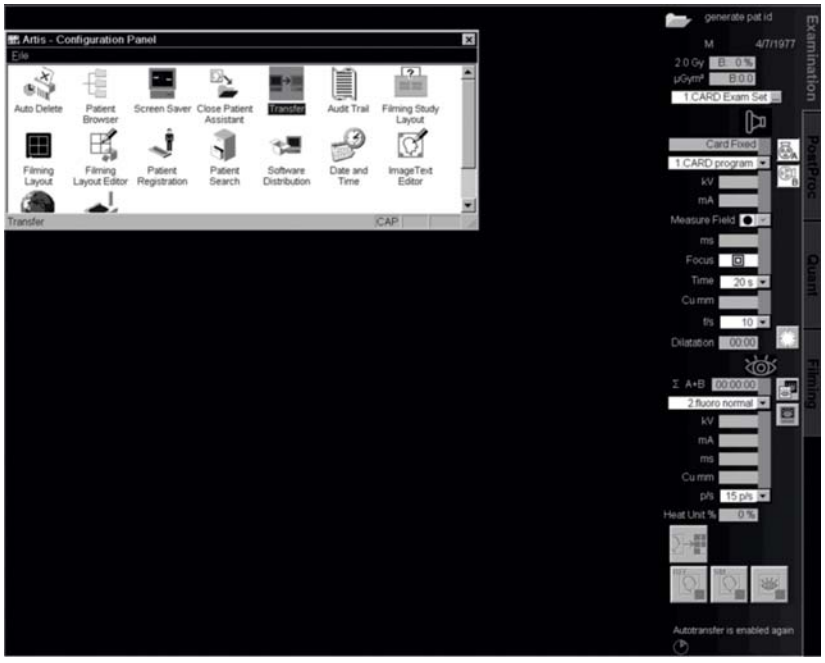
Step 1

Select “Options”. Select “Configuration” → The Artis zee Configuration Panel is opened.



Step 2

Double-click on “Transfer”.



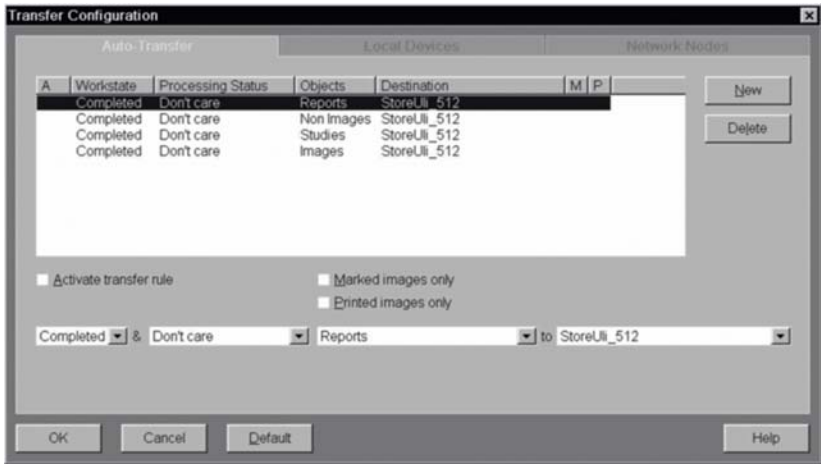
Step 3

Check whether the PACS name is already present under “Destination”.

If yes,
- Do not make any changes.
- Close the windows.

If no, make the following settings.
- Click on “New”.
- Select “Completed”.
- Select “Don’t care”.
- Select “Reports”.
- Enter the AE title from PACS obtained from the customer under “to”.
- Click on “OK”.
- Close the windows.

Note: The required configuration for when the report is to come from PACS is now complete.



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DICOM Configuration of FLUOROSPOT Compact based systems (Luminos dRF, Luminos Agile, Ysio, UROSKOP Omnia)

CARE Analytics is freeware, a non-medical software tool designed to query dose information from Structured Dose Report objects stored on configured DICOM nodes. The tool can be executed from any PC in the hospital network or from a USB stick approved by a hospital IT administrator. CARE Analytics was tested with Structured Dose Reports from Luminos dRF, Luminos Agile, Ysio and UROSKOP Omnia VC10.

Strutured Dose Reports from FLUOROSPOT Compact based systems have to be send to a PACS system. CARE Analytics needs to be configured to retrieve the Structured Dose Reports from the PACS.

Configuration of FLUOROSPOT Compact

Step 1

Ask the customer for the following parameters.

Alias of DICOM store Node (PACS node)	

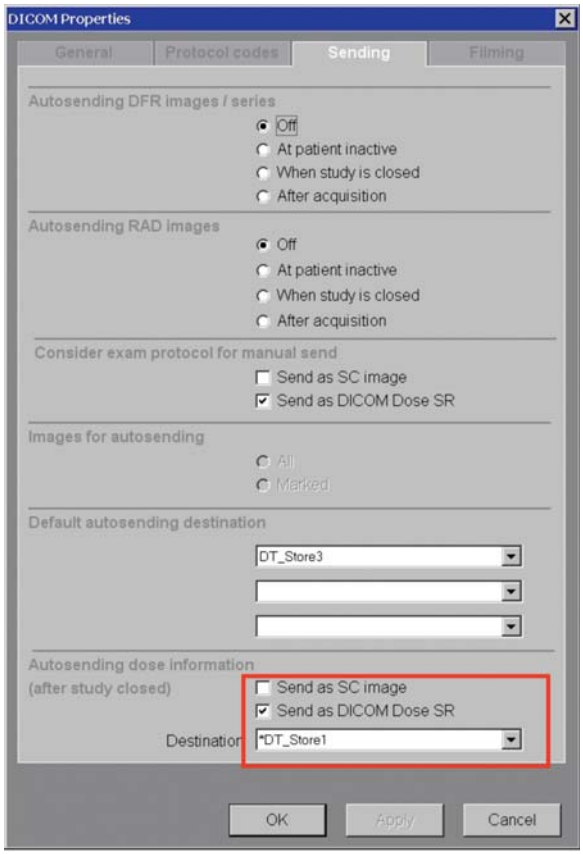
Step 2

Configure the transfer of Structured Dose Reports to PACS node.

Structured Dose Reports can be sent automatically to a PACS node, if a patient studie is finished, or sent manually when the images are sent. It is recommanded to use either automatic or manual transfer.

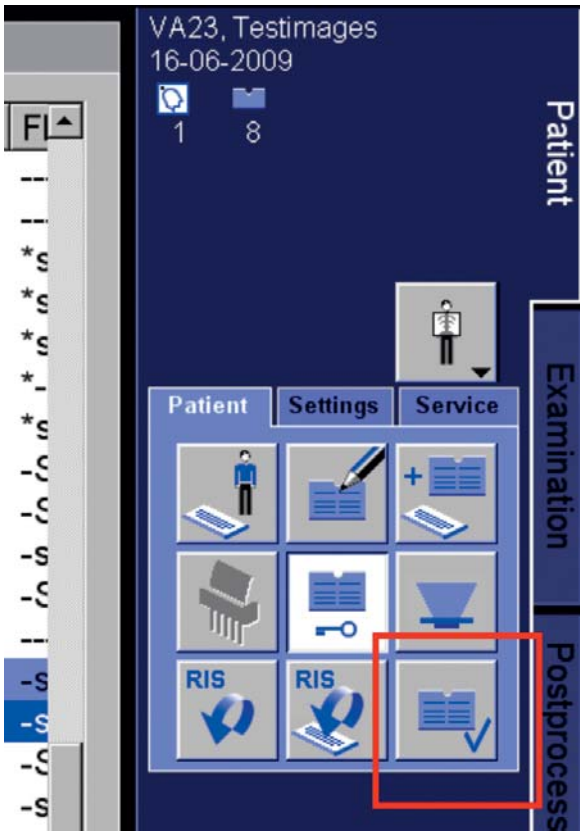
In case of autotransfer of DICOM Dose SRs (shall be used, if patient studies are closed after examination):

- Select “User Settings”
- Select “DICOM Properties”
- Select “Sending”.



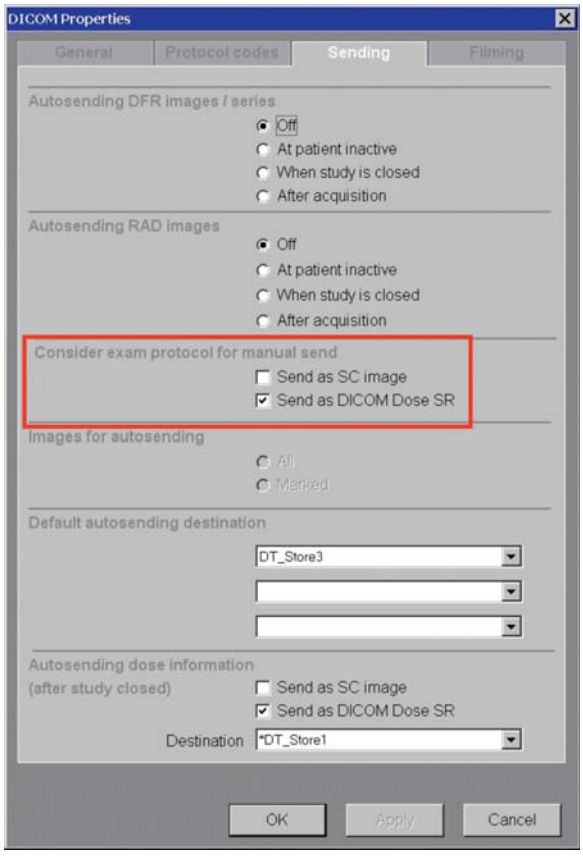
- Enable “Send as DICOM Dose SR” in section “Autosending dose information” and select a destination (Alias from step 1)
- Click OK.

Explanation:
Now the reports are sent automatically, when the study is closed.



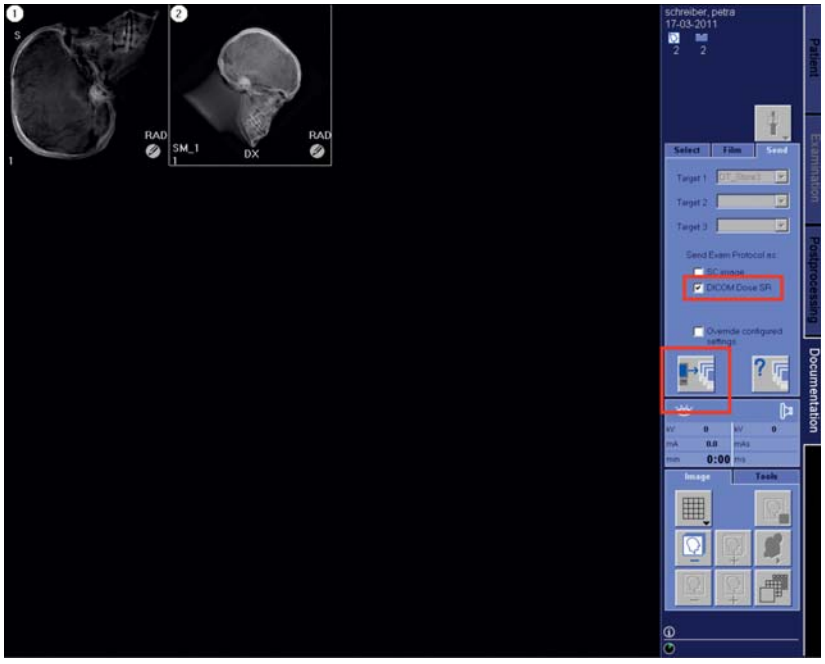
In case of manual transfer of DICOM Dose SRs (shall be used, if patient studies are not closed after examination)

- Select “User Settings”
- Select “DICOM Properties”
- Select “Sending”.



- Enable “Send as DICOM Dose SR” in section “Consider exam protocol for manual send”.
- Click Ok.

Explanation:
Now the reports could be send manually to the PACS together with the images. The checkbox DICOM Dose SR is enabled automatically.



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About CARE Analytics:

CARE Analytics is a freeware, non-medical software tool designed to extract dose information from Structured Dose Report objects stored on configured DICOM nodes or local media. The tool can be executed from any PC. The Structured Dose Report can be queried from any DICOM node within the hospital network or an USB stick approved by a hospital IT administrator. The Structured Dose Report objects are not made available on the PC, only distinct information from these objects is presented to the user or transformed into other formats. The information can be exported in xml-format to other programs like Microsoft ® Office Excel for further analysis, e.g. statistical reports of dose data and related parameters.

CARE Analytics supports DICOM Structured Dose Reports from modality types:
- Computed Tomography
- Projection X-Ray
- Mammography

General Layout

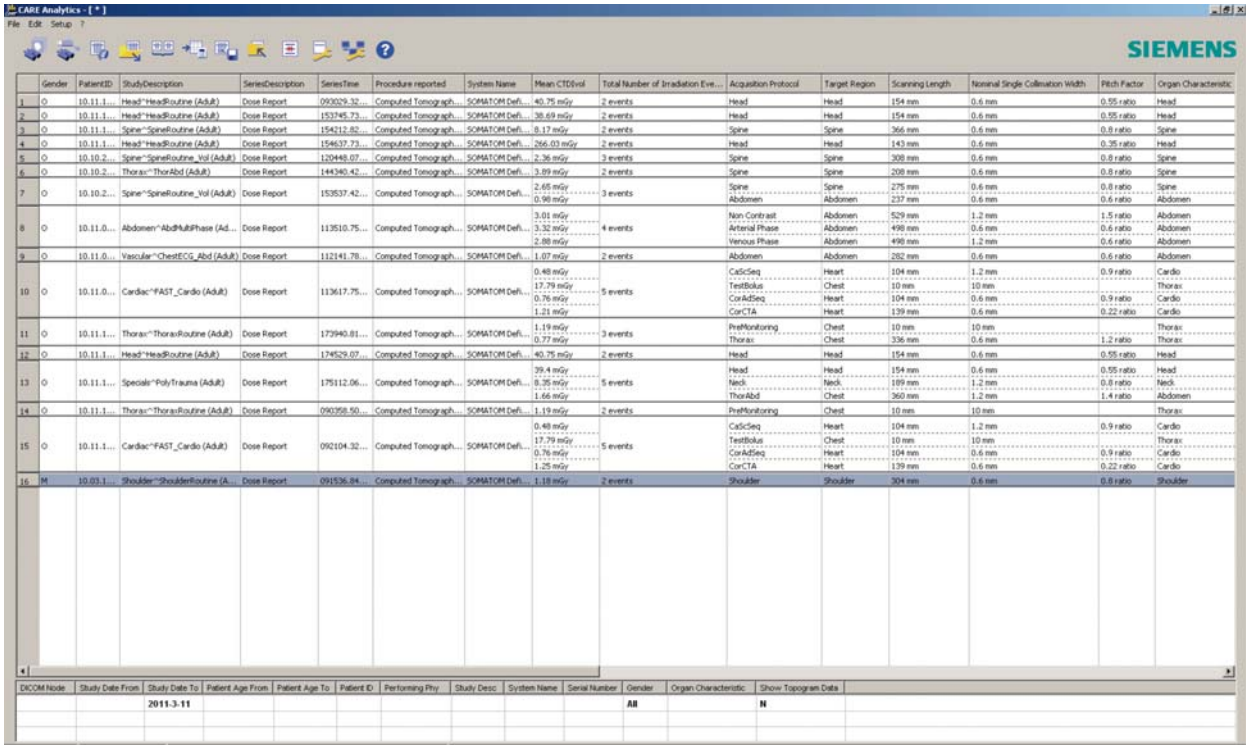

Figure 1: Main Screen of CARE Analytics (Computer Tomography)

Workflow

- Configure a DICOM node in the <DICOM node configuration> dialog to query the Structured Dose Reports or import data directly from local media.
- Define Query Criteria and start the search or open an already saved file.
- Transfer the saved xml file to Microsoft® Office Excel for further evaluations.

Toolbar

1. Query dose reports from a network node

Opens a window, where the user can define a query.
a. Select the type of Structured Dose Report
b. Enter the query criteria
c. Select a preconfigured DICOM node
d. Select "Search" Button to start the query from the defined DICOM node

a. Dose SR type
Opens a drop down box, which allows the selection of SR types. It can be selected whether the query shall contain "Computed Tomography X-Ray", "Projection X-Ray", or "Mammography" dose reports.

b. Query criteria
- Time Range <From> or <To> in YYYY-MM-DD
- Patient Birth Date <From> or <To> in years
- Patient ID (use wildcard character "*" for broad search)
- Performing Physician
- Study Description
- System Name
- Serial Number of System
- Gender
- Organ Characteristic (only available for "Computed Tomography X-Ray" report)

Note: Characters compatible to ISO Latin-1 character sets can be used for query.

c. Select a preconfigured DICOM node
Unless one or more DICOM nodes have been defined in the <DICOM node configuration> dialog, the drop-down box allows the selection of one predefined DICOM node for the query.

d. Select "Search" Button to start the query from the defined DICOM node
The status bar will inform about the found reports and reports that were not considered for display due to the entered search criteria ("filtered out").


Query dose reports


Query dose reports from local media


Update report


Merge results


Export file to Excel


Save file as XML


Close current dose report


Delete entry from list


Column configuration


DICOM parameter configuration


Help

Figure 2: Toolbar

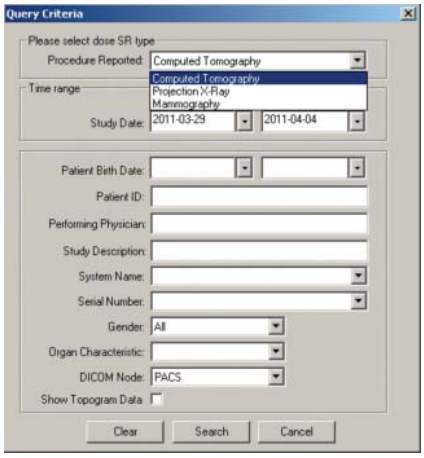

Figure 3: Query Criteria Dialog

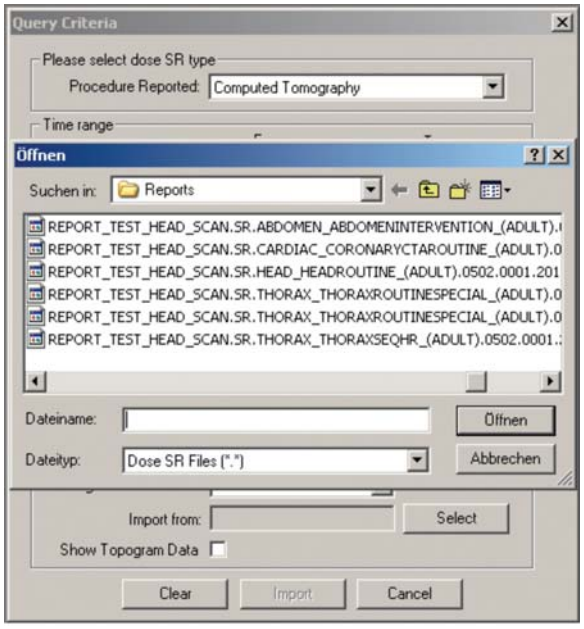

Figure 4: Query Dose Reports from Local Media Dialog

2. Query dose reports from local media

Opens the <Query Criteria> dialog (as described above) containing an additional field "Import From..." to indicate the location of Structured Dose Report objects. The "Select" button brings up an "Open" dialog, which allows browsing through directories from local file systems.

The "Search" Button starts the import of the Structured Dose Report information into CARE Analytics according to the selected objects and entered criteria.

3. "Save file as xml"

A "Save as" dialog pops up where the filename and location can be entered. This file can be reopened for further evaluations.

4. Update dose reports

Starts a new query with the same query criteria.
The new dose reports are added to the list.

5. Open file

Opens an already saved xml file. If the selected file is invalid, a message window pops up: "Invalid xml file".
The status bar shows: "Unable to load report"

6. Merge files

Multiple existing XML files can be merged for further evaluations, e.g. in Microsoft ® Office Excel

7. Export to Excel

In case Microsoft® Office Excel is installed on the same system as CARE Analytics, the displayed results can be exported to Microsoft® Office Excel for further analysis. Microsoft® Office Excel will open automatically when this function is selected.

The Microsoft® Office Excel output file includes different worksheets depending on the chosen report type "Computed Tomography" or "Projection X-Ray" or "Mammography":

Computed Tomography
Select the desired template to be used for displaying the information in Microsoft® Office Excel.

Select the desired template to be used for displaying the information in Microsoft ® Office Excel.

- Details
  The results are presented within Microsoft® Office Excel structured in two sheets, see also *Projection X-Ray / Mammography*
- Summary

Uses a template which includes 4 sheets:

a. Selection Criteria
The query criteria are shown and the calculated max value for CTDI and DLP corresponding to every <Organ Characteristic>.

b. CARE Analytics Data List
The Excel file contains the parameters listed in the CARE Analytics tool

c. Ready-made Results
The Excel file contains dose related parameters for each Scan range:
- CTDIvol: {Min, Average, Max values}
- DLP: {Min, Average, Max values}
- mAs: {Min, Average, Max values}
- kV: {Min, Average, Max values}

d. DLP Monitoring
The Excel file shows the DLP and CTDIvol distribution split per month for each organ characteristic

Command Line Support

CARE Analytics comes with a command line version named “CATool.exe”. The “CATool.exe” needs to be copied to the same folder as the files “CareAnalytics.exe” and “care_conf.xml”.

The command line support ensures CARE Analytics retrieves the required dose information automatically. Using the command line tool the user can easily define own queries without executing the interactive CARE Analytics tool. It enables e.g. to write scripts for regular, automatic queries. The command line options are listed in figure 7 and can be printed on the screen using the “CATool.exe /h” command.

Example: “CATool.exe /sr ct /node NodeName” will retrieve CT dose report information from a preconfigured DICOM node called “NodeName”.

```
D:\Programme\CareAnalytics\CARE_Analytics_V2_beta>catool.exe /?
Care Analytics Version V2
Copyright(C) Siemens AG 2011

Catool: query dose SR from DICOM node
usage: Catool.exe [options]


general options:
  /out   File                  File path of output xml result.
  /verbose                     Print debug information.
  /h                           Print this help text and exit

query options:
  /sr    SRType                query dose SR type.
                               Possible type: CT, XRay, Mammo
  /node  NodeName              Dicom node name which is configured in the GUI tool CareAnalytics.exe
  /sfrom YYYY-MM-DD            Lower bound of the range of study date.
  /sto   YYYY-MM-DD            Upper bound of the range of study date.
  /bfrom YYYY-MM-DD            Lower bound of the range of patient's date of birth.
  /bto   YYYY-MM-DD            Upper bound of the range of patient's date of birth.
  /pid   PID                   Patient ID.
  /pp    PerformingPhysician   Performing physician's name.
  /sd    StudyDescriptio       Description of the study.
  /sname SystemName            System Name. Only valid when SR type is CT.
  /sno   SerialNumber          Serial Number.
  /g     Gender                Possible value: M, F, O, A, MF
  /organ Organ                 Organ characteristic. Only valid if the SR type is CT.
                               Possible value: Head, Neck, Shoulder, Thorax, Abdomen, Pelvis, Spine, Osteo, Extremitie
                                               AngioHead, AngioBody, Runoff, PerfBody, Cardio, Respiratory
  /topo                        Show tomogram info. Only valid if the SR type is CT.
  /y     YYYY                  Fetch all SR in the year YYYY. Only valid if either /sfrom or /sto is not used.
  /m     MM                    Fetch all SR from last MM months. Only valid if /sfrom, /sto or /y is not used.
  /w     WW                    Fetch all SR from last WW weeks. Only valid if /sfrom, /sto, /y or /m is not used.
```

Figure 8: Command Line Options

Please mind

CARE Analytics is freeware. It might not be trained by Siemens application specialist and will not be installed by Siemens service engineers. The selection of a PC or local media within the hospital network is under the responsibility of the hospital IT administrator. The local policies have to be observed to guarantee that there is no risk related to the attaching of this PC or USB stick to the DICOM network (i.e. virus protection). It is prohibited to copy CARE Analytics on any Siemens medical device.

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Computed Tomography Details / Projection X-Ray / Mammography
Using Projection X-Ray or Mammography Structured Dose Reports the results are presented within Microsoft® Office Excel structured in two sheets:

a. Patients
This sheet contains all parameters selected in the CARE Analytics column configuration, which are either patient or cumulated dose information.

b. Dose Events
This sheet contains the information parameters selected in the CARE Analytics column configuration for each irradiation event.

8. Close current dose report

Closes the current file. The user is asked whether he wants to save the file or not

9. Delete entry from the list

Single or multiple entries (e.g. Phantom scans) can be deleted from the List

10. Column configuration

The parameters which should be displayed into CARE Analytics and – in case of Computed Tomography Details view and "Projection X-Ray" reports – also transferred to Microsoft® Office Excel can be configured.

11. DICOM node configuration

Multiple DICOM nodes can be configured. The default CARE Analytics configuration can be used for a single user.

12. Help

Access to the "Help" file and "About CARE Analytics".

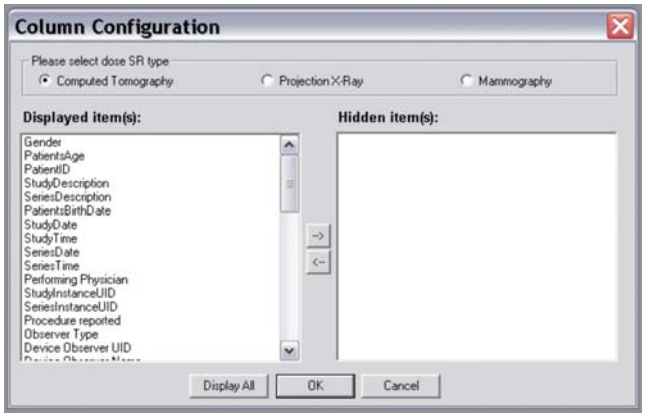

Figure 5: Column Configuration Dialog (Computed Tomography)

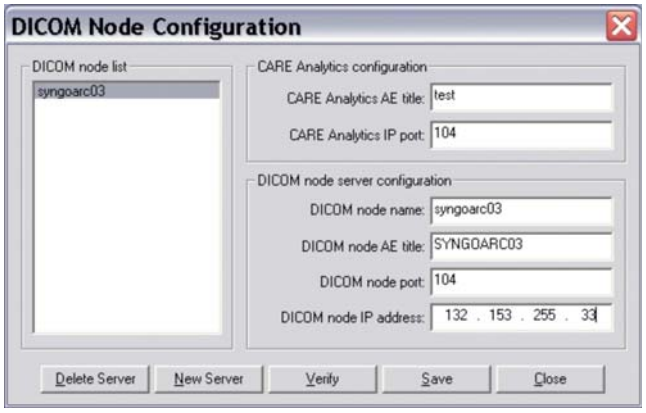

Figure 6: DICOM Node Configuration

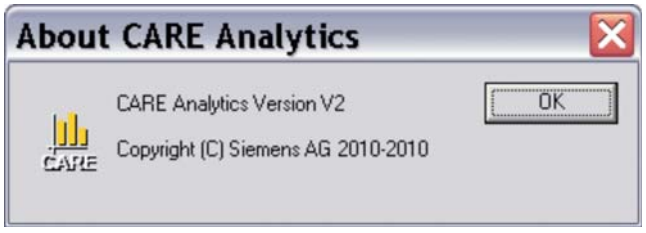

Figure 7: About Care Analytics Dialog

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Study Root Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2

The transfer syntax is DICOM Implicit VR Little Endian (1.2.840.10008.1.2)

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Verification SOP Class	1.2.840.10008.1.1
X-Ray Radiation Dose Structured Reports Storage	1.2.840.10008.5.1.4.1.1.88.67

The transfer syntax is DICOM Implicit VR Little Endian (1.2.840.10008.1.2)

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