



dcm4chee Reference Documentation

Version: 2.9.1

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Preface

We need a better introduction than the following.

dcm4chee is an implementation of an IHE (Integrating the Healthcare Enterprise) compliant Image Archive and Report Repository. This includes the capabilities

- to store and retrieve various kinds of DICOM Objects such as:
 1. Images from multiple modalities,
 2. Grayscale Presentation States [GSPS], which specifies the presentations of images as grayscaling, zoom, text and graphical annotations,
 3. Key Objects [KO], which specifies a particular selection of images for a specified reason and with an attached note,
 4. Structured Reports [SR].
- to process HL7 notification messages from the Order Filler, about Procedure Scheduling, Procedure Updates and Patient Information Updates,
- to process DICOM Modality Performed Procedure Step [MPPS] messages from modalities and forward them to the Order Filler.

dcm4chee is a server application. Its Web-based User Interface is intended for system configuration and monitoring by system administrators.

Chapter 1. Installation Instructions

1.1. Minimum System Requirements and Supporting Software

dcm4chee is a Java-based application for the management of digital clinical objects. As such, it should be run under the best hardware available for production systems. The minimal system configuration is as follows:

- 512 MB RAM
- 100 MB hard disk space (in addition to archive disk space for object storage and caching)
- 400 MHz CPU or better

dcm4chee requires a database to store transient and permanent information from the clinical workflow and objects. The authors of dcm4chee realize that database expertise varies from site to site, and has included support for several different databases for deployment with the archive. The list of supported databases is:

- PostgreSQL 8.1.x
- MySQL 4.1+
- Oracle 9i/10g
- SQL Server
- DB2 8.1+

Additional Software Notes

dcm4chee is a Java-based application. It requires the installation of the JDK version 1.4.2 or higher. JDK version 5 is recommended for the best performance and stability.

For image compression/decompression, dcm4chee 2.8.x utilizes Sun's Java Advanced Imaging (JAI) Image I/O Tools 1.0_01. The binary distribution packages of dcm4chee 2.8.x already includes the necessary JARs and native libraries for Windows and Linux i586. For Solaris support, you need to download the software package from Sun at http://java.sun.com/products/java-media/jai/downloads/download-iio-1_0_01.html and replace the Linux version of `libclib_jiio.so` in `DCM4CHEE_DIST/bin/` with the file of the same name from the Solaris JAI Image IO distribution.

dcm4chee depends heavily on the JBoss (<http://www.jboss.org>) application server for its infrastructure. It is not necessary to download JBoss (as dcm4chee is pre-packaged within JBoss), but viewing the online (or downloaded) JBoss documentation will assist a great deal in learning the dcm4chee directory structure, and how the product operates under the covers. JBoss services such as XMBeans, JBossMQ (JMS), and EJB (Session and Entity beans) are utilized by dcm4chee.

1.2. Installation Steps

Installing dcm4chee is fairly easy:

1. Download the binary distribution of dcm4chee for the database of your choice from the Files page of the

dcm4che project page on SourceForge (<http://sourceforge.net/projects/dcm4che/>). If you do not see a distribution for your database, you will have to build dcm4chee from the source code. See Appendix A, *Building from Source Code* for instructions on doing so.

2. Once downloaded, extract the distribution package into your desired destination directory. Avoid using a directory path that contains spaces though, as that may cause problems when running the application from the command line.
3. Install the database software of your choice (keeping in mind the supported database systems) if you have not already done so. Keep in mind that the database software that you install (or have installed) must match the version of dcm4chee that you downloaded. For example, if you want to use PostgreSQL with dcm4chee then you should download the dcm4chee-standalone-psql-2.8.2.zip file from SourceForge.
4. If using a database other than MySQL or PostgreSQL you will need to copy an appropriate JDBC Driver for the database to `DCM4CHEE_DIST/server/default/lib/`. This is not necessary for MySQL or PostgreSQL because the binary distribution of dcm4chee already contains the correct JDBC drivers for these database systems.
5. Verify that your database installation has TCP/IP socket access available.

For example, with PostgreSQL you can check the `pg_hba.conf` file for your database:

```
$PGDATA/pg_hba.conf:
# IPv4 local connections:
host      all             all             127.0.0.1/32          trust
```

With Oracle, you can verify that the TNS Listener is enabled:

```
C:\>netstat -b -p TCP
Active Connections
  TCP    localhost:1284          host.domain.com:1521    ESTABLISHED    1788
  [ORACLE.EXE]
  TCP    localhost:1521          host.domain.com:1284    ESTABLISHED    1816
  [TNSLSNR.exe]
```

6. Initiate the archive database instance (named pacsdb) using the create DDL script located in `DCM4CHEE_DIST/sql/create.xxx`.

For example, with PostgreSQL on a Unix-based system:

```
> export PGUSER=postgres
> createdb pacsdb
> psql pacsdb -f DCM4CHEE_DIST/sql/create.psql
```

To initialize a MySQL database on a Unix-based system:

```
> mysql -uroot
mysql> create database pacsdb;
mysql> grant all on pacsdb.* to 'pacs'@'localhost' identified by 'pacs';
mysql> \q
> mysql -upacs -ppacs < DCM4CHEE_DIST/sql/create.mysql
```

Note: If you wish to take advantage of specific features of your RDBMS such as tablespaces, partitioning, etc. you will need to implement them on your own. This can sometimes be done with the tools that come with the database, or by modifying the DDL script before running it. If you make changes to the DDL script that you think might be useful to the wider audience, please submit them to the dcm4che-users list-serv.

7. Adjust the dcm4chee database connection pool settings in DCM4CHEE_DIST/server/default/deploy/xxxx-ds.xml to suit your environment. This includes the user name and password that the application should use when obtaining connections. In addition, JBoss allows for the configuration of other aspects of the connection pool. Although the default settings are fine for basic deployment scenarios, the following may be added to the XML file in order to tune the connection pool:

```
<!--example of how to specify class that determines if exception means connection should be destroyed-->
<!--exception-sorter-class-name>org.jboss.resource.adapter.jdbc.vendor.DummyExceptionSorter</exception-sorter-class-name>

<!-- this will be run before a managed connection is removed from the pool for use by a client-->
<!--<check-valid-connection-sql>select * from something</check-valid-connection-sql> -->

<!-- The minimum connections in a pool/sub-pool. Pools are lazily constructed on first use -->
<min-pool-size>5</min-pool-size>

<!-- The maximum connections in a pool/sub-pool -->
<max-pool-size>20</max-pool-size>

<!-- The time before an unused connection is destroyed -->
<!-- NOTE: This is the check period. It will be destroyed somewhere between 1x and 2x this timeout after -->
<idle-timeout-minutes>0</idle-timeout-minutes>

<!-- sql to call when connection is created
<new-connection-sql>some arbitrary sql</new-connection-sql>
-->

<!-- sql to call on an existing pooled connection when it is obtained from pool
<check-valid-connection-sql>some arbitrary sql</check-valid-connection-sql>
-->

<!-- example of how to specify a class that determines a connection is valid before it is handed out
<valid-connection-checker-class-name>fully qualified name of class to use</valid-connection-checker-class-name>
-->

<!-- Whether to check all statements are closed when the connection is returned to the pool,
this is a debugging feature that should be turned off in production
<track-statements/>
-->
```

8. Set the JAVA_HOME environment variable to your JDK installation directory.
9. Adjust the Java heap settings for the application

[Windows]: DCM4CHEE_DIST/bin/run.bat:

```
rem Sun JVM memory allocation pool parameters. Modify as appropriate.
set JAVA_OPTS=%JAVA_OPTS% -Xms128m -Xmx512m
```

[Linux/Unix]: DCM4CHEE_DIST/bin/run.conf

```
# Specify options to pass to the Java VM.
JAVA_OPTS="-server -Xms64m -Xmx200m -Djava.awt.headless=true ..
```

Keep in mind the available RAM and memory requirements of other processes running on the hardware. For example, if only 512 MB RAM is available on the machine, you should decrease the default value from `-Xmx512m` (on Windows to) `-Xmx300`.

10. *Optional:* Upon installation, all DICOM services are pre-configured with DCM4CHEE as the Application Entity Title (AE Title, or AET). Although it is possible to modify this default configuration at a later date through the Web-based administrative console, it is more efficient to replace DCM4CHEE with YOUR_AET in `DCM4CHEE_DIST/server/default/conf/xmdesc/*.xml` using utilities provided by your platform.

For example, on GNU Linux:

```
> find DCM4CHEE_DIST/server/default/conf/xmdesc -exec \ sed -i s/DCM4CHEE_DIST/YOUR_AET/g
'{' ' ' ;'
```

11. You're all done and ready to verify the installation.

After verifying that the application is installed and running correctly, you may want to install it as a Windows service or Unix daemon.

- a. Stop the application (type `ctrl-c` in the console window).
- b. Windows: install `dcm4chee` as a Windows service executing `DCM4CHEE_DIST/bin/install_service.bat`.
- c. Redhat Linux: copy the init script `DCM4CHEE_DIST/bin/dcm4chee_init_redhat.sh` to `/etc/init.d/` and adjust it according to the `dcm4chee` installation location, the JDK installation location, and which user the `dcm4chee` should run under.

1.3. Verify the Installation

Navigate to the `DCM4CHEE_DIST/bin` directory, and execute the `run.bat` or `run.sh` script, as appropriate for your operating system. Your output should look like the following and contain no error or exception messages:

```
=====
.
JBoss Bootstrap Environment
.
JBOSS_HOME: C:\apps\dcm4chee-standalone-psql-2.8.2\bin\..
.
JAVA: C:\jdk1.5.0_06\bin\java
.
JAVA_OPTS: -Dprogram.name=run.bat -Xms128m -Xmx512m
.
CLASSPATH: C:\jdk1.5.0_06\lib\tools.jar;
           C:\apps\dcm4chee-standalone-psql-2.8.2\bin\run.jar
.
=====
.
14:46:16,046 INFO [Server] Starting JBoss (MX MicroKernel)...
14:46:16,046 INFO [Server] Release ID: JBoss [Zion] 4.0.3SP1 (build:
           CVSTag=JBoss_4_0_3_SP1 date=200510231054)
...
...
...
14:46:50,626 INFO -> [JkMain] Jk running ID=0 time=0/60 config=null
14:46:50,636 INFO -> [Server] JBoss (MX MicroKernel) [4.0.3SP1 (build:
           CVSTag=JBoss_4_0_3_SP1 date=200510231054)] Started in 34s:580ms
```


1. Connect to the Web-based User Interface (default URL is `http://localhost:8080/dcm4chee-web/`) of the archive using any Web Browser (most tested are Mozilla Firefox and Microsoft Internet Explorer v6.x). You should get the User Login Screen. Login in using the default Administrator account `admin`, with password `admin`.
2. Connect to the JBoss JMX Console (default URL is `http://localhost:8080/jmx-console/`) and login in using the default Administrator account `admin`, with password `admin`.

Follow the link `service=FileSystemMgt` to the File System Management service configuration page under the `dcm4chee.archive` heading.

Invoke the operation `addOnlineFileSystem()`, with a directory path argument specifying where the archive shall store received objects/images.

Note: If no Storage File System is configured, the archive will auto-configure `DCM4CHEE_DIST/server/default/archive` as the Storage File System when the the first object/image is received.

3. *Optional:* In the default configuration, received images are stored 'as is' - meaning that no compression is performed. Lossless (or other types of) compression of received uncompressed images can be activated by the `CompressionRules` attribute in the Storage SCP Service (`service=StoreScp`) configuration page. For example, set it to `JLSL`, to compress all types of images received from any Storage SCU with JPEG-LS Lossless codec.
4. *Optional:* The directory used for caching generated JPEG representations of archived images requested by Web Access to DICOM Persistent Objects (WADO) can be specified by the `CacheRoot` attribute in the the WADO Service (`service=WADOService`) configuration page. Default: `DCM4CHEE_DIST/server/default/wadocache`.

The directory used for caching generated PDF representations of archived Structured Report Documents requested by IHE Retrieve Information for Display (RID) Services can be specified with the `CacheRoot` attribute in the RID Service (`service=RIDService`) configuration page. Default: `DCM4CHEE_DIST/server/default/ihe_rid_cache`.

5. Send some objects/images to the archive's Storage SCP, using the `send` utility of the `dcm4che14` package, the `dcm4che2` package, or another Storage SCU of your choice.

Refresh the Web Interface (`http://localhost:8080/dcm4chee-web/`), which should now show the the list of received studies.

Expand a study row to show contained series. Expand one of these series to show contained instances. In the case of images, you can follow the image icon on the right to invoke an HTTP WADO request for a JPEG presentation of this image which will be displayed in a separate browser window.

6. To test object retrieval, you will need an external Storage SCP acting as the Destination using the DICOM Receiver utility of the `dcm4che14` package, the `dcm4che2` package, or another Storage SCP of your choice.

Before initiating the retrieve, you will need to configure an additional Application Entity (AE) Title identifying your Move Destination using the "AE Management" function of the Web User Interface. For example:

```
AE Title: DCMRCV
Hostname: localhost
Port:    11112
```

7. Switch back to the Study List (the Folder view) and mark studies to retrieve using the check box on the right. Select "DCMRCV" as the send destination in the combo box above and click on the send button left from it.

Alternatively, you could initiate a C-MOVE with the utility of your choice with DCMRCV as the destination AE Title.

If everything worked, you are ready to start using dcm4chee. If not, post your questions to the dcm4che-users listserv.

Chapter 2. dcm4chee Services

2.1. Overview

dcm4chee contains a number of services... XMBEAN and EJB infrastructure... diagram...

2.2. Service Reference

2.2.1. Core Archive Services

The core archive services are implemented as EJBs and JBoss XMBEANS. They provide services to the user interface, DICOM server, HL7 server, etc. They are implemented within the `dcm4chee-sar` and `dcm4chee-ejb` code modules, and are configured by manipulating their XML descriptor files.

AE Title Configuration Service

Used to list/add/remove AE configuration entities - alternatively to more convenient AE Management Page of the Administration Web Application [<http://localhost:8080/dcm4chee-web/>]. Used/Required by various DICOM services (Query/Retrieve SCP, Storage Commitment SCU/SCP, DICOM Hanging Protocol SCP) to 'guess' the port number of DICOM peer Application Entities, if no AE configuration entry for a given AE Title matches.

Audit Logger

Compression Service

Consistency Check Service

Sets up a schedule to automatically check the consistency of compressed images. You can set image compression rules in the Compression Service. You can also use it directly via JMX to manually check the consistency of images.

Content Edit service

Identifies where patient information and study information updates are sent and received.

Use the values in `ReceivingApplication` and `ReceivingFacility` attributes or the `SendingApplication` or `SendingFacility` attributes to configure specific forwarding rules in the `HL7SendService` for patient information updates received from this Content Edit Service.

Use the values in the `CalledAETitle` and the `CallingAETitle` attributes to configure specific forwarding rules in the `StudyMgtScu` Service for study information updates received from this Content Edit Service.

The Content Edit Service sends also `PatientUpdated` and `SeriesUpdated` JMX Notifications. This allows to forward instances to systems not supporting either `StudyMgtScu` or HL7 ADT patient updates.

In this case the receiver must use the received instances for updating! Use the `ForwardService` to configure this

forward option.

DICOM Server

Sends incoming service request to registered DICOM services. When configuring, select the TCP port listening port, the security protocol for communication, timeouts, and the maximum number of connected DICOM clients.

Device Service

Use the commands in this service to import device mapping files, delete device mappings, delete a specific device, get a list of all devices for a specific protocol, and add the scheduled station name AE title, the name, and the modality to the given SPS items.

Echo Service

Use this service to test the AE configurations (host and port and protocol) you defined with the AE Configuration Service. First, you must set the CallingAETitle used in echo associations used to test those AE configurations.

Teaching File and Clinical Trial Export Manager

File Copy Service

FixPatientAttributes Service

DICOM Forward Service

File System Management Service

Specifies the location of file systems in which DICOM objects received from the Store SCP Server are stored. You can also set up rules to delete the most infrequently accessed studies.

DICOM GPWL Feed Service

Used to add entries to the General Purpose Worklist, triggered by received MPPS N-Set messages.

DICOM GPWL Service Class Providers

DICOM GPWL SCU Service

DICOM Hanging Protocol SCP

DICOM IAN/SCN SCU Service

Used to notify DICOM peers about available instances via Instance Available Notifications and Study Content

Notifications.

DICOM Key Object Generation Service

DICOM Media Creation Management SCU

MD5 Check Service

Used to check if the MD5 sum of the new object differs from the MD5 sum of the existing file. If the MD5 sum does not match, the files may be corrupted.

Move SCU Service

Process move orders. Invokes DICOM Retrieve requests, typically from the archive's own DICOM Query/Retrieve Service (SCP).

MPPS Emulator

DICOM Modality Performed Procedure Step (MPPS) SCP

Used to define the calling and called AE titles for receiving MPPS messages.

DICOM Modality Performed Procedure Step (MPPS) SCU

Used to forward MPPS messages received by the MPPS SCP Service.

DICOM Modality Worklist SCP

Modality Worklist SCU

Performed Procedure Step (PPS) Exception Management

PPS SCU Service

Forwards GP-PPS messages received by the PPS SCP Service.

DICOM Query/Retrieve SCP

Simple SMTP Mail Sender

Used to send email messages through SMTP.

DICOM Storage Commitment SCU/SCP

Provides a DICOM Storage Commitment Service in the Service Class Provider (SCP) and the Service Class

User (SCU) Role. When acting as the SCP, the service handles storage commitment requests that it receives from modalities or evidence creators (workstations). When acting as the SCU, it may request storage commitment for objects for itself that were retrieved from the archive to a remote application. Typically this application is a further archive instance acting as a long-term or central archive.

DICOM Storage SCP

Study Information Service

Used to retrieve information about a study, or about a series of image in a study.

Study Reconciliation Service

Study Status Service

used to update Study Status triggered by receive of General Purpose Performed Procedure Step N-CREATE-RQ with particular Performed Work Item Code by General Purpose Performed Procedure Step SCP.

Private Study Management Service SCP

DICOM Modality Worklist SCU

used to forward messages received by private Study Management Service SCP Service. You must use the Content edit service to identify where study information updates are sent and received. Use the values in the CalledAETitle and the CallingAETitle attributes to configure specific forwarding rules in this StudyMgtScu Service for study information updates received from the Content Edit Service

Check File Status Service

TLS Configuration

XDS-I Service

Cross-enterprise Document Sharing for Imaging. (Imaging Document Source actor)

Chapter 3. User Interface Guide

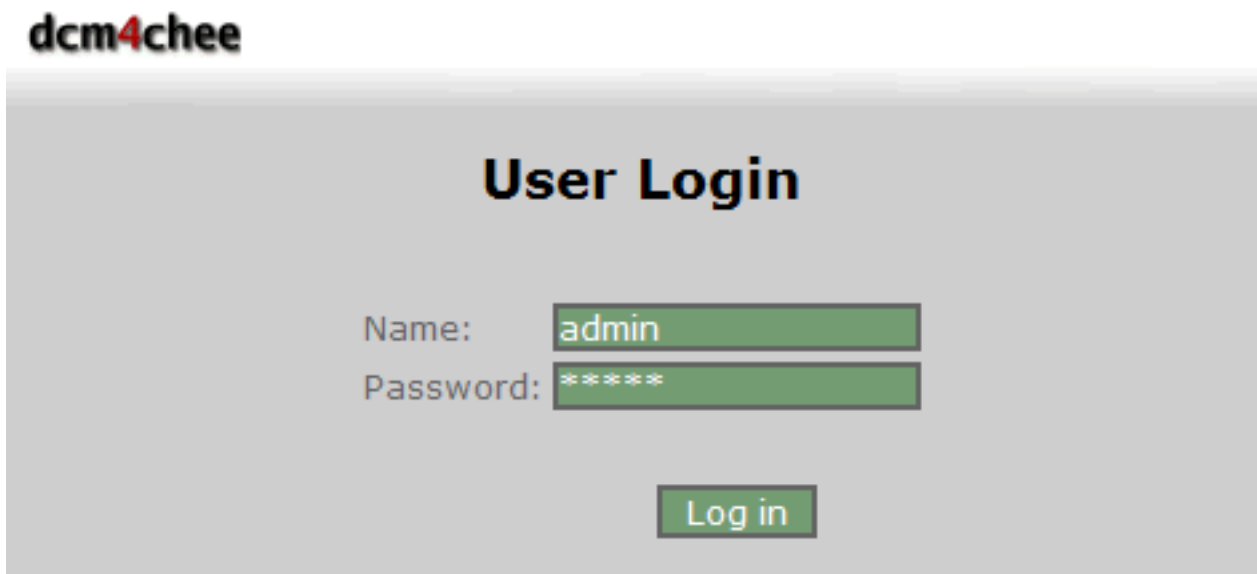
3.1. Introduction

The dcm4chee User Interface Guide was written for system administrators responsible for the administration of dcm4chee archive application. The user interface consists of several dynamic web pages, and is named dcm4chee-web. dcm4chee-web contains the following functionality: in:

- Archive Content Administration
- AE Management
- Offline Storage
- Worklist Console
- MPPS Console
- User admin
- Audit Repository

3.2. User Login

The default login page for dcm4chee-web is <http://hostname:8080/dcm4chee-web/>. Upon browsing to this location, you will be presented with a login screen. If this is your first time logging into the application, you may use the username/password combination `admin/admin`.



The screenshot shows the dcm4chee User Login interface. At the top left is the 'dcm4chee' logo. The main heading is 'User Login'. Below this, there are two input fields: 'Name:' with the value 'admin' and 'Password:' with the value '*****'. Below these fields is a 'Log in' button.

After logging in, the user will remain logged in until the web browser is closed. It is recommended that you log out of the application whenever dcm4chee-web is not in use. This will avoid the security issue of having an active, idle session.

3.3. Archive Content Administration

To administer the archive content (patient, study, and other clinical information) click on Folder in the header line of dcm4chee-web.

Patient	Name	Study	Date/Time	Study ID (@Media)	Series No (@media)	Patient ID	Mod	Series Description / Body Part / IUID	Acc.No.	Ref. Physician	Status	NoS:NoI	NoI
- AAPM^Test^Patterns													
			2002/11/17 06:11:59	2K-RESOL	OT			Resolution 2K	20022002	AAPM		6	14
			2002/11/17 12:13:35	1K-RESOL	OT			Resolution 1K	20022002	AAPM		6	14
			2002/11/17 12:13:35	1	OT			TG18-RH \ NA		HFHS \ TSHOW		3	
			2002/11/17 12:13:35	2	OT			TG18-RV \ NA		HFHS \ TSHOW		3	
			2002/11/17 12:13:35	1	ORIGINAL			MONOCHROME2 ?? 1024x1024x1 ?? 16bits	IMPAX	2.16.124.113543.6004.101.103.20021117.121335.1.002.001			
			2002/11/17 12:13:35	2	ORIGINAL			MONOCHROME2 ?? 1024x1024x1 ?? 16bits	IMPAX	2.16.124.113543.6004.101.103.20021117.121335.1.002.002			
			2002/11/17 12:13:35	3	ORIGINAL			MONOCHROME2 ?? 1024x1024x1 ?? 16bits	IMPAX	2.16.124.113543.6004.101.103.20021117.121335.1.002.003			
			2002/11/17 12:13:35	3	OT			TG18-PX \ NA		HFHS \ TSHOW		1	
			2002/11/17 12:13:35	4	OT			TG18-CK \ NA		HFHS \ TSHOW		1	
			2002/11/17 12:13:35	5	OT			TG18-LPH \ NA		HFHS \ TSHOW		3	
			2002/11/17 12:13:35	6	OT			TG18-LPV \ NA		HFHS \ TSHOW		3	
			2002/11/17 12:34:55	1K-NOISE	OT			Noise 1K	20022002	AAPM		2	4
			2002/11/17 16:23:33	1K-LUMIN	OT			Luminance 1K	20022002	AAPM		6	25
			2002/11/17 17:12:05	1K-GLARE	OT			Glare 1K	20022002	AAPM		3	13
			2002/11/17 18:55:52	2K-MULTI	OT			Multi Purpose 2K	20022002	AAPM		3	3
			2002/11/17 19:06:19	1K-MULTI	OT			Multi Purpose 1K	20022002	AAPM		3	3
			2002/11/17 19:26:13	2K-ANATM	OT			Anatomical 2K	20022002	AAPM		3	4

The folder window can be divided into three logical parts:

Study List

Information regarding patients, studies, series, and images.

Search Filter

Specifies matching criteria for listed studies.

Function buttons

Invoke operations on selected list entires.

3.3.1. Study List

The study list contains information on four levels:

- Patient - marked with green.
- Study - marked with light green.
- Series - marked with grey.
- Instance – marked with light grey.
- File – marked with white.

To expand the hierarchy of a line item, click on the + sign. To hide the hierarchy beneath a line item, click on the - sign.

In the figure above the patient AAPM Test Pattern has four studies containing several OT series. The second series has its instance-level hierarchy expanded, and contains three DICOM instances.

The label for a column can be seen at the top of each column. The information that is displayed at the **Patient** level:

Note: Patient-level information is always shown in bold type.

- Name
- Patient ID
- Birthdate
- Sex

At the **Study** level the information that is displayed:

- Date/Time
- Study ID
- Modalities
- Study Description/IUID (Instance Unique Identifier)

Clicking either Study Description or IUID allows the user to toggle between Study Description and IUID information within the column. If Study Instance UID becomes active, the Study ID search field will change to Study IUID, and vice versa.

- Accession Number
- Referring Physician
- Number of Series
- Number of Instances

The information at the **Series** level is:

- Date/Time
- Series Number
- Modality
- Series Description/Body Part/IUID (Series Instance Unique Identifier)

Clicking either Series Description/Body Part or IUID will toggle between the display of Series Description/Body Part and IUID information within the column.

- Vendor/Model
- Number of Images

3.3.2. Search Filter

To filter the records in the study list, search criteria can be specified above the columns labels. It is possible to search for Patient Name, Patient ID, Study ID, Study Data, Accession Number, Modality, or a combination thereof. To perform a search just press "Return" on the keyboard or click the New Search button. The result of

the search will be displayed in the list. If the list contains more than ten studies (records), the first ten records will be shown. To show the next ten records press the Next Search Result button or go back using the Previous Search Result button. Information regarding what is displayed, and the total amount of matching records can be seen in the status line – ex.:

"Displaying studies 1 to 10 of 29 matching studies"

The search can include a specific entry or part of an entry truncated with a question mark (?) or an asterisk (*). A search including a question mark will only search for one character where it is placed, opposite a search with an asterisk will include an unlimited amount of characters. It is possible to combine question marks and asterisk in the same search.

All fields are case sensitive – except the Patient Name Field.

The screenshot shows the dcm4chee web interface. At the top, there's a navigation bar with tabs: Folder, Trash, AE Management, Offline Storage, Worklist Console, MPPS Console, User Admin, Audit Repository, and Logout. Below this, a search bar contains the text "Displaying studies 1 to 16 of 16 matching studies." Below the search bar, there's a table with columns: Patient Name, Patient ID, Study ID, Study Date, Accession No., Modality, Patient Name, Study Date/Time, Study ID (@Media), Patient ID, Mod, Birthdate, Sex, Study Description / IUID, Acc.No., Ref. Physician, Vendor/Model, PPS Status, NoS, NoI. The table has one row of data: "AAPM^Test^Patterns", "2002/11/17 06:11:59", "2K-RESOL", "OT", "Resolution 2K", "2002/07/04", "0", "20022002", "AAPM", "6", "14".

3.3.3. Function Buttons

The buttons for functions in dcm4chee-web can be divided into two – the buttons placed in the header section of the window, and the buttons placed next to the entities in the folder.

3.3.3.1. Functions Buttons in the header section

3.3.3.1.1. New Search

After typing in the search string in the related fields, a click on this button will perform a search in the database. As an alternative, the "Return" button on the keyboard will also perform a search. For a more detailed description of the search field see Section 3.3.2, "Search Filter".

3.3.3.1.2. Previous Search Results

A click on this button will show the previous page in the search. If the first page or the one and only page in a search are shown, no activity is related to the button.

3.3.3.1.3. Next Search Results

A click on this button will show the next page of records in the search (if the total amount of records is larger than one page). If the last page or the one and only page in a search are shown, no activity is related to the button.

3.3.3.1.4. Add New Patient

To add a new patient, click this button and fill out the fields in the window. The fields are:

Patient ID

The ID of the patient – typically a person number, social security number, or another unique patient identifier generated or handled by a Hospital Information System, Patient Administration System, or a Radiology

Information System.

Issuer of Patient ID

Identifier of the assigning authority (system, organization, agency or department) that issued the Patient ID.

Patient Name

The name of the patient.

Sex

Choose sex between Female, Male, and Other (unknown) clicking on the arrow.

Birth Date

The birth date of the patient in the format yyyy/mm/dd

3.3.3.1.5. Merge Selected Patient

To merge two (or more) patients in dcm4chee-web, the patients must be marked (selected) by clicking the checkbox next to the patients. The boxes will now contain a checkmark. It is not possible to merge patients by a checkmark at the study or series level.

Patient	Name	Study ID	Birthdate	Sex	Accession No.	Ref. Physician	Status	NoS/NoI
<input checked="" type="checkbox"/>	AAPM^Test^Patterns	TG18-2002	2002/07/04	0				
<input checked="" type="checkbox"/>	#2002/11/17 06:11:59	2K-RESOL	OT	Resolution 2K	20022002	AAPM	6	14
<input checked="" type="checkbox"/>	#2002/11/17 12:13:35	1K-RESOL	OT	Resolution 1K	20022002	AAPM	6	14
<input checked="" type="checkbox"/>	#2002/11/17 12:34:55	1K-NOISE	OT	Noise 1K	20022002	AAPM	2	4
<input checked="" type="checkbox"/>	#2002/11/17 16:23:33	1K-LUMIN	OT	Luminance 1K	20022002	AAPM	6	25
<input checked="" type="checkbox"/>	#2002/11/17 17:12:05	1K-GLARE	OT	Glare 1K	20022002	AAPM	3	13
<input checked="" type="checkbox"/>	#2002/11/17 18:55:52	2K-MULTI	OT	Multi Purpose 2K	20022002	AAPM	3	3
<input checked="" type="checkbox"/>	#2002/11/17 19:06:19	1K-MULTI	OT	Multi Purpose 1K	20022002	AAPM	3	3
<input checked="" type="checkbox"/>	#2002/11/17 19:26:13	2K-ANATM	OT	Anatomical 2K	20022002	AAPM	3	4
<input checked="" type="checkbox"/>	Buc^Jérôme	SCSFREN					1	1
<input checked="" type="checkbox"/>	GSD^Test^Pattern	GSD^PATTERN				Riesmeier^Joerg	1	17
<input checked="" type="checkbox"/>	Mustermann^Max	210406	1983/07/19	M			1	228
<input checked="" type="checkbox"/>	#2000/02/17 11:28:16	1	CT	Abdomen AbdRoutine			1	172
<input checked="" type="checkbox"/>	#2004/05/05 12:07:55	2500000000455853	CT	Head^EGN Plg.	2500000000455853	EGN	2	185
<input checked="" type="checkbox"/>	#2004/05/05 15:51:55	419171576	MR	MR des Gehirns	2500000000456098	BAL	2	403
<input checked="" type="checkbox"/>	Test^Moritz	200406	1973/07/05	M			2	403
<input checked="" type="checkbox"/>	#2001/04/08 11:27:32	18871	CT	CTBK Becken	1884504	UN6N	2	403

After the patients have been marked in the folder list, click on the button "Merge Selected Patients". This shows the list of patients that will be merged. In the column Patient ID click the checkbox to mark which patient should be the remaining patient. Click Merge to merge the patients or Cancel to cancel the operation.

Patient ID	Issuer	Patient Name	Patient Sex	Birth Date
210406		Mustermann^Max	M	1983/07/19
200406		Test^Moritz	M	1973/07/05

Merge Cancel

3.3.3.1.6. Move Selected Items

To move one or several items, the source and the destination must be selected. To select a source or a destination just mark it in the checkbox next to the entity.

There are some selection rules for source and destination:

- The destination is always at the highest selected level in the hierarchic patient, study, series and instance.
- The source will always be the entity (or entities) at the lowest level in the hierarchic patient, study, series, and instance.
- Only one destination is allowed.
- The sources have to be only one hierarchic level under the destination.
- The destination must not be the parent of the sources.

3.3.3.1.6.1. To Move a Study to another Patient

1. Click the checkbox next to the study (or studies) to mark it.
2. Click the checkbox next to the patient (destination) to mark it.
3. Click the "Move Selected Items" button to perform the move.

3.3.3.1.6.2. To Move a Series to another Study

1. Click the checkbox next to the one (or several) series to mark it.
2. Click the checkbox next to the study (destination) to mark it.
3. Click the button "Move Selected Items" to perform the move.

3.3.3.1.6.3. To Move an Instance to another Series

1. Select the instance (or instances) by clicking on its checkbox.
2. Select the destination series (destination) by clicking on its checkbox.
3. Click the button "Move Selected Items" to perform the move.

3.3.3.1.7. Export Teaching Files

To export an entity or several entities (patient, study, series, or instance/image), click the checkbox next to the line or lines to mark the entity/entities.

Click the button "Export selected instances to Teaching File Sytem" to export the entity or entities marked.

In the next window you can select different export options and define optional included additional Teaching File Information.

Export 284 selected Instances:

Document Title: For Teaching File Export

Delay Reason: -

Disposition: -

Teaching File Structured Report Manifest Create ☐ Ignore ☒

Author: IMPAX^admin

Abstract:

Keywords:

History:

Findings:

Discussions:

Impressions:

Diagnosis:

Anatomy:

Pathology:

Organ system:

Category: Musculoskeletal

Level: -

Diagnosis confirmed: Yes ☐ No ☒

Clear Export Cancel

3.3.3.1.8. Provide and Register Imaging Document Set to an XDS-I Registry/Repository

To register an image document set click the checkbox next to the line or lines to mark the entity/entities.

In the next window you can edit your XDS-I metadata, which will be exported with selected entities as Key Objects.

Export 284 selected Instances:

KOS Document Title: CT of the head

Author Person: IMPAX

Author Role: Standard Role

Author Speciality: dcm4jboss

Author Institution: DCM4JBoss

Class Code: Angiography Result

Content Type: Content Type 1

Healthcare Type: Healthcare Type 1

Event Codes:

- Breast NOS
- Upper inner quadrant of breast NOS
- Lower inner quadrant of breast NOS
- Upper outer quadrant of breast NOS
- Lower outer quadrant of breast NOS
- Suprasternal notch
- Fontanel of skull, NOS
- Wrist joint NOS
- Ankle joint NOS
- Nose, NOS

Clear Export Cancel

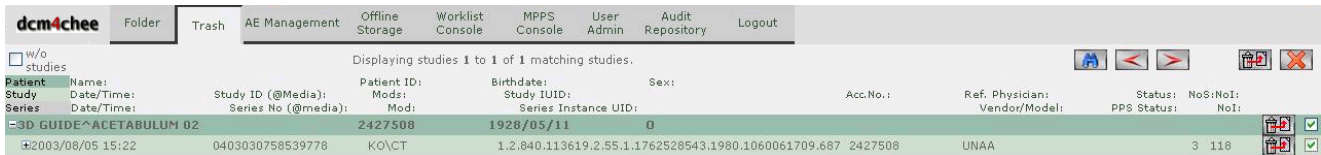
3.3.3.1.9. Move Selected Entities into the Trash

To delete an entity or several entities (patient, study, series, or instance/image) click the checkbox next to the line or lines to mark the entity/entities.

Click the button "Delete Selected Entities" to delete the entity or entities marked. Confirm or cancel the operation by clicking the appropriate button in the ensuing confirmation pop-up window.

3.3.3.1.10. Permanently Delete Selected Entities

If you want to permanently delete the entities, you have to select the Trash folder and select the entities, which you want to delete. then press the "Delete selected Entities" button to permanently delete the entities.



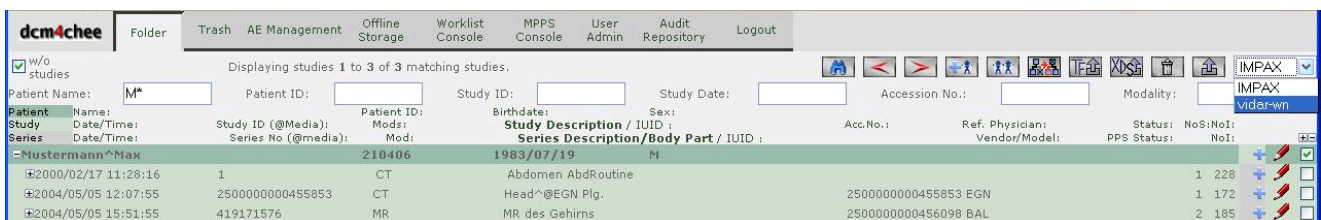
3.3.3.1.11. Undelete Selected Entities

To undelete entities in the Trash folder you have to press the "Undelete" button.

3.3.3.1.12. Send Selected Entities to Specified Destination

To send an entity or several entities (patient, study, series, or instance/image) to a DICOM destination click the checkbox next to the line or lines to mark the entity/entities.

From the drop-down menu choose which AE Title to send the entity or entities to.




Click the "Send Selected Entities to Specified Destination" button to send the entity or entities marked. Confirm or cancel the operation by clicking the appropriate button in the ensuing confirmation pop-up window.

3.3.3.2. Function buttons next to the entities in the folder

3.3.3.2.1. Edit Patient Attributes

Click the "Edit Patients Attributes" button to edit patient information.

dcm4chee	Folder	User Admin	Audit Repository	Logout
Patient ID:	2427508			
Issuer of Patient ID:				
Patient Name:	3D GUIDE^ACETABULUM 02			
Sex:	Other 			
Birth Date [yyyy/mm/dd]:	1928/05/11			
Update		Cancel		

Click the "Update" button to update the patient attributes or "Cancel" to quit without updating the attributes.

3.3.3.2.2. Edit Study Attributes

Click the "Edit Study Attributes" button to edit study information.

dcm4chee		Folder	Trash	AE Management	Offline Storage	Worklist Console	MPPS Console	GP Worklist Console	GPPPS Console	User Admin	Audit Repository	Logout
Patient ID:	SCSGERM											
Issuer of Patient ID:												
Patient Name:	Äneas^Rüdiger											
Study Instance UID:	1.3.6.1.4.1.5962.1.2.0.1045590001.7534.0											
Study ID:	<input type="text" value="SCSGERM"/>											
Accession Number:	<input type="text"/>											
Placer Order Number:	<input type="text"/>											
Filler Order Number:	<input type="text"/>											
Referring Physician:	<input type="text"/>											
Study Description:	<input type="text"/>											
Date/Time [yyyy/mm/dd hh:mm]:	<input type="text"/>											
Modalities in Study:	OT											
Number of Series:	1											
Number of Instances:	1											
Availability:	ONLINE											
Retrieve AETs:	DCM4CHEE											
Study Status Id:												
<input type="button" value="Update"/>		<input type="button" value="Cancel"/>										

Click the "Update" button to update the study attributes or "Cancel" to quit without updating the attributes.

3.3.3.2.3. Edit Series Attributes

Click the "Edit Series Attributes" button to edit series information.

dcm4chee		Folder	User Admin	Audit Repository	Logout
Patient ID:	210406				
Issuer of Patient ID:					
Patient Name:	Mustermann^Max				
Study ID:	2500000000455853				
Accession Number:	2500000000455853				
Study Date/Time:	2004/05/05 12:07:55				
Study Description:	Head^@EGN Plg.				
Series Instance UID:	1.3.12.2.1107.5.1.4.24026.4.0.3116257016531334				
Series Number:	<input type="text" value="2"/>				
Modality:	<input type="text" value="CT"/>				
Body Part Examined:	<input type="text" value="HEAD"/>				
Laterality:	<input type="text"/>				
Series Description:	<input type="text" value="EGN 1/1 1.0 H31s"/>				
Date/Time [yyyy/mm/dd hh:mm:ss]:	<input type="text" value="2004/05/05 12:09:39"/>				
Number of Instances:	172				
Availability:	ONLINE				
Retrieve AETs:	IMPAX				
<input type="button" value="Update"/>		<input type="button" value="Cancel"/>			

Click the "Update" button to update the series attributes or "Cancel" to quit without updating the attributes.

3.3.3.2.4. + Add New Study

To add a new study click the "Add New Study" button, and fill out the fields with the appropriate information. Due to the fact, that dcm4chee-web creates a Study Instance UID itself, no fields are mandatory.

All fields can contain alphanumeric characters, except the Date/Time field, where the format `yyyy/mm/dd` should be used.

dcm4chee		Folder	Trash	AE Management	Offline Storage	Worklist Console	MPPS Console	GP Worklist Console	GPPPS Console	User Admin	Audit Repository	Logout
Patient ID:	SCSGERM											
Issuer of Patient ID:												
Patient Name:	Äneas^Rüdiger											
Study Instance UID:												
Study ID:	<input type="text"/>											
Accession Number:	<input type="text"/>											
Placer Order Number:	<input type="text"/>											
Filler Order Number:	<input type="text"/>											
Referring Physician:	<input type="text"/>											
Study Description:	<input type="text"/>											
Date/Time [yyyy/mm/dd hh:mm]:	<input type="text"/>											
Modalities in Study:												
Number of Series:	0											
Number of Instances:	0											
Availability:												
Retrieve AETs:												
Study Status Id:												
<input type="button" value="Add Study"/> <input type="button" value="Cancel"/>												

Click the "Add Study" button to add the new study or "Cancel" to quit without adding a new study.

3.3.3.2.5. + Add New Series

To add a new series click the "Add New Series" button, and fill out the fields with the appropriate information. Due to the fact, that dcm4chee-web creates a Series Instance UID itself, only the modality field is mandatory.

All fields can contain alphanumeric characters, except the Date/Time field, where the format `yyyy/mm/dd` should be used.

dcm4chee	Folder	User Admin	Audit Repository	Logout
Patient ID:	210406			
Issuer of Patient ID:				
Patient Name:	Mustermann^Max			
Study ID:	1			
Accession Number:				
Study Date/Time:	2000/02/17 11:28:16			
Study Description:	Abdomen AbdRoutine			
Series Instance UID:				
Series Number:	<input type="text"/>			
Modality:	<input type="text"/>			
Body Part Examined:	<input type="text"/>			
Laterality:	<input type="text"/>			
Series Description:	<input type="text"/>			
Date/Time [yyyy/mm/dd hh:mm:ss]:	<input type="text"/>			
Number of Instances:	0			
Availability:				
Retrieve AETs:				
<input type="button" value="Add Series"/> <input type="button" value="Cancel"/>				

Click the "Add Series" button to add the new series or "Cancel" to quit without adding a new series.

3.3.3.2.6. View Image

Click the "View Image" button to show the image. Icon appearances are dependent on the instance type/state.

3.3.3.2.7. View Report as HTML

Click the "View Report as HTML" button to show the structured report as HTML document. Icon appearances are dependent on the instance type/state.

3.3.3.2.8. View Report as PDF

Click the "View Report as PDF" button to show the structured report as pdf document. Icon appearances are dependent on the instance type/state.

3.3.3.2.9. View Waveform object

Click the "View WaveForm" button to show the WaveForm object as PDF. Icon appearances are dependent on the instance type/state.

3.3.3.2.10. Offline

Indicates that the instance is offline. Icon appearances are dependent on the instance type/state.

3.4. Application Entity (AE) Management

The AE Title, host names and port numbers of remote applications, to which the archive shall be able to connect, must be configured by the AE Management web page.

After clicking on AE Management, the following window will be shown:

dcm4chee					Folder	Trash	AE Management	Offline Storage	Worklist Console	MPPS Console	User Admin	Audit Repository	Logout
AE Title		Hostname		Port	Cipher								
IMPAX		localhost		11112									
vidar-wn		vidar-wn.gwi-ag.com		11112									

AE Title

The AE Title (AET) of the remote application

Hostname

Host name or IP-address of the host of the remote application.

Port

TCP port number of the remote application.

Cipher

TLS Cipher Suites which are supported on this connection. No entry implies a direct (unsecure) DICOM connection (without TLS).

To create a new connection click button  (Add New AET), and the window for creating a new AET opens.

dcm4chee					Folder	User Admin	Audit Repository	Logout
AE Title	<input type="text"/>							
Hostname	<input type="text"/>							
Port	<input type="text"/>							
Cipher Suites	<div>- <input type="button" value="v"/></div> <div>- <input type="button" value="v"/></div> <div>- <input type="button" value="v"/></div>							
<div>Echo</div> <div>Create</div> <div>Cancel</div>								

Fill in the appropriate information for AE Title, Hostname (or IP-Address), Port number, and Cipher (for TLS connections over an un-trusted network connection). Be careful to type in the right information - dcm4chee-web only checks if the Port number is a number (if not, the value is changed to "0"). Click on Create to create the entry in the AET-list or Cancel to leave without creating the entry in the AET-list.

For DICOM over TLS connections you can configure support of up to 3 different Cipher Suites:

SSL_RSA_WITH_NULL_SHA

No Encryption, only Entity Authentication by RSA based certificates & Data Integrity check by SHA hashing function

TLS_RSA_WITH_AES_128_CBC_SHA

Use AES_128_CBC for Encryption

SSL_RSA_WITH_3DES_EDE_CBC_SHA

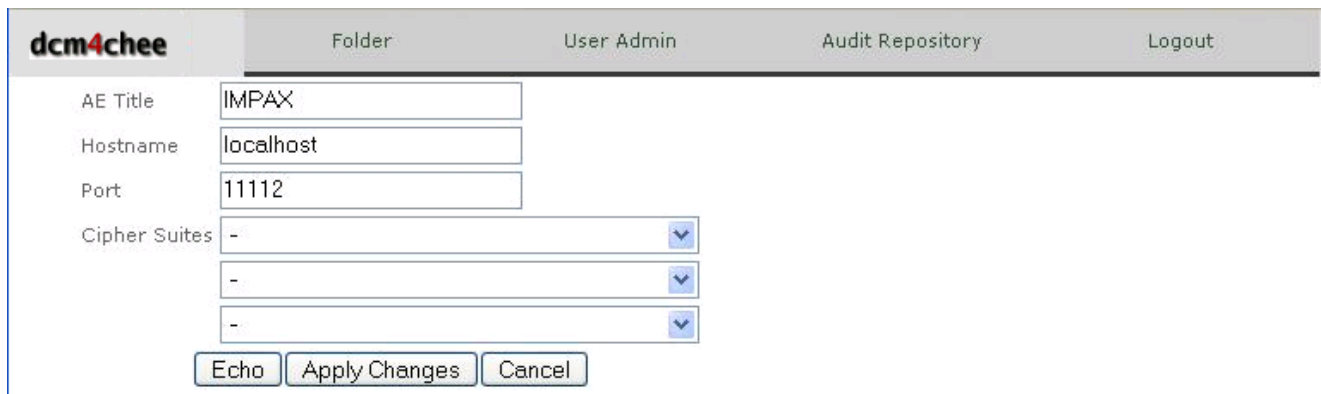
Use Triple DES EDE, CBC Encryption

The order defines the preferences e.g.:

1. TLS_RSA_WITH_AES_128_CBC_SHA
2. SSL_RSA_WITH_3DES_EDE_CBC_SHA
3. ...

Prefer AES Encryption, with Triple DES EDE, CBC Encryption being acceptable alternatives. Try to avoid using no Encryption (SSL_RSA_WITH_NULL_SHA).

To change an entry in the AET-list click on the  (Edit), and the information for this entry is shown.

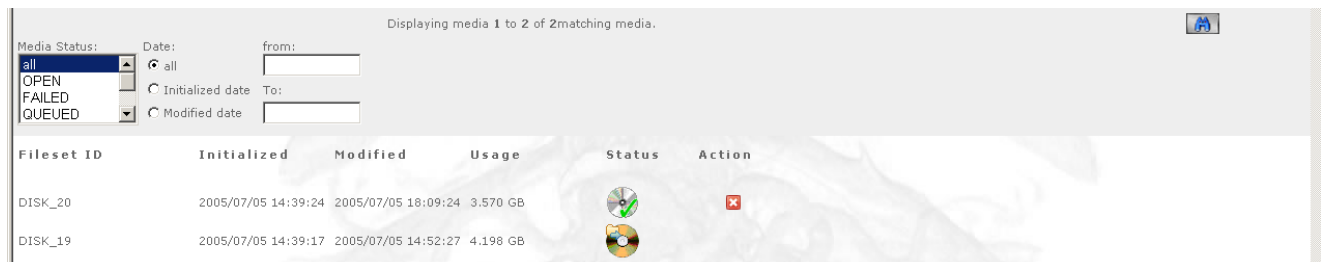





After changing the information click "Apply Changes" to apply the new information to the AET list or Cancel to leave without changing the information.

To delete an entry, click the  (Delete) icon and click OK in the ensuing confirmation pop-up window. To cancel the deletion click the Cancel button.

3.5. Offline Storage

This page shows the information of the off-line storage filesets (media).



Fileset ID	Initialized	Modified	Usage	Status	Action
DISK_20	2005/07/05 14:39:24	2005/07/05 18:09:24	3,570 GB		
DISK_19	2005/07/05 14:39:17	2005/07/05 14:52:27	4,198 GB		

There are several search parameters to choose between or combine.

In the Media Status pull down list it is possible to choose one or more (using SHIFT or CTRL keys on the keyboard together with a click on the left mouse button) of the following statuses:

all

List all File Sets.

OPEN

Search for open file set – file set that are not scheduled for media creation, and therefore new studies can be added for offline storage

FAILED

Search for filesets, that failed for one or another reason during media creation.

QUEUED

Search for filesets, that are queued – scheduled for media creation.

TRANSFERRING

Search for filesets, that are transferring – transfer files to media creation server.

CREATING

Search for filesets, that are during creation for the time being.

COMPLETED

Search for filesets, that are completed

It is also possible to search for items in a specific time interval. The search can be for all activities, for media initialization dates, or for media modification dates. The time interval should be in the format: yyyy/mm/dd hh:mm:ss.

The six columns in the window show:

Fileset ID

The ID of the fileset

Initialized

The date and time where the media content was scheduled

Modified

The last date and time where the scheduled media content was modified

Usage


The usage of the media (in KB, MB, or GB)


Status

Shows status of the file set:




Action

 Schedule open file set for media creation.

 Delete file set - so associated files will be reassigned to another file set for media storage.

A new search is performed by either pressing the  (New Search) or the Enter key at the keyboard.

3.5.1. Manual Offline Archiving

If dcm4chee's Media Creation Service is configured to manual activation of the burning process, the administrator will receive an e-mail with information about the media. The administrator can see the status at the webpage and start the burning process by activating the start button .

3.5.2. Automatic Offline Archiving

Media Status: Date: From: Displaying media 1 to 8 of 8 matching media.

Media Status:

all

OPEN

FAILED

QUEUED

Date:























☒ all



☐ Initialized date

☐ Modified date

from:

To:

Fileset ID	Initialized	Modified	Usage	Status	Action
DISK_11	2005/04/21 14:04:21	2005/04/21 14:04:21	668.513 MB		 
DISK_10	2005/04/21 14:04:21	2005/04/21 14:14:26	381.830 MB		 
DISK_9	2005/04/19 10:28:27	2005/04/21 14:14:26	447.337 MB		 
DISK_8	2005/04/19 10:28:27	2005/04/19 10:28:32	551.622 MB		 
DISK_7	2005/04/19 09:42:37	2005/04/19 10:38:12	594.967 MB		 
DISK_6	2005/04/19 09:42:37	2005/04/19 10:28:32	583.430 MB		 
DISK_4	2005/04/15 10:52:16	2005/04/15 11:30:54	382.574 MB		
DISK_2	2005/04/15 10:32:28	2005/04/15 11:18:52	544.165 MB		

If a media has a status of failed  you may try a manual restart of the burning process by activating the start button .

3.6. Worklist Console

This console is the tool to administrate the modality worklist information.

MWL Information												
Admin ID	Item	Item ID	Item Name	Power	Power ID	Power Name	Shard Name	Shard Power ID	Shard Name	Admin ID	Power ID	Power Name
1	Item 1	10000000000000000000	Item 1	10000000000000000000	10000000000000000000	Item 1	10000000000000000000	10000000000000000000	Item 1	10000000000000000000	10000000000000000000	Item 1
2	Item 2	10000000000000000000	Item 2	10000000000000000000	10000000000000000000	Item 2	10000000000000000000	10000000000000000000	Item 2	10000000000000000000	10000000000000000000	Item 2
3	Item 3	10000000000000000000	Item 3	10000000000000000000	10000000000000000000	Item 3	10000000000000000000	10000000000000000000	Item 3	10000000000000000000	10000000000000000000	Item 3
4	Item 4	10000000000000000000	Item 4	10000000000000000000	10000000000000000000	Item 4	10000000000000000000	10000000000000000000	Item 4	10000000000000000000	10000000000000000000	Item 4
5	Item 5	10000000000000000000	Item 5	10000000000000000000	10000000000000000000	Item 5	10000000000000000000	10000000000000000000	Item 5	10000000000000000000	10000000000000000000	Item 5
6	Item 6	10000000000000000000	Item 6	10000000000000000000	10000000000000000000	Item 6	10000000000000000000	10000000000000000000	Item 6	10000000000000000000	10000000000000000000	Item 6
7	Item 7	10000000000000000000	Item 7	10000000000000000000	10000000000000000000	Item 7	10000000000000000000	10000000000000000000	Item 7	10000000000000000000	10000000000000000000	Item 7
8	Item 8	10000000000000000000	Item 8	10000000000000000000	10000000000000000000	Item 8	10000000000000000000	10000000000000000000	Item 8	10000000000000000000	10000000000000000000	Item 8
9	Item 9	10000000000000000000	Item 9	10000000000000000000	10000000000000000000	Item 9	10000000000000000000	10000000000000000000	Item 9	10000000000000000000	10000000000000000000	Item 9
10	Item 10	10000000000000000000	Item 10	10000000000000000000	10000000000000000000	Item 10	10000000000000000000	10000000000000000000	Item 10	10000000000000000000	10000000000000000000	Item 10

By use of one or several search fields it is possible to search for specific information in the database. The search fields are:

Patient

The patient name

Date _____

The date and time (format: yyyy/mm/dd hh:mm) where the search should begin.

to

The date and time (format: yyyy/mm/dd hh:mm) where the search should end

Modality




Type of modality (e.g. MR, CT, CR, and US)

Station AET

The specific Application Entity Title of the modality

Accession No

The specific accession number for a study

The available functions are the  (New Search) button that will perform the search (alternative: press the Enter key) and the  (Delete) button next to the records in the folder information. Pressing  will delete the record.

The modality worklist (MWL) information is shown in the table. The columns of the table are:

ID

Scheduled Procedure Step ID

Study IUID

Study Instance Unique Identifier

Req. Proc. ID

Requested Procedure ID

Acc. No.

Accession Number

Filler/Placer Order

Filler Order Number and the Placer Order Number.

Proc. Desc.

Requested Procedure Description.

SPS Desc.

Scheduled Procedure Step Description.

Start Date

Scheduled Start Date/Time for this Procedure Step.

Ref. Physician

Name of the Referring Physician

Station

Name of scheduled device (modality) for this Procedure Step.

Adm. ID

Admission ID (Visit Number)

Patient

The name (and ID) of the patient

Birthdate

The date of birth for the patient

Sex

The sex of the patient

3.7. MPPS Console

This console is the tool to administrate the modality performed procedure step worklist information. The window is divided into three logical parts. The content of each part will be described below the figure.

MPPS Worklist: Displaying procedure step 1 to 20 of 1229 matching procedure steps.

Patient: Date: to: Modality: Station AET: Acc. No.: (☐ unscheduled) Status: [ANY]

Acc. No.	Status	StudyUID	Proc. Desc.	Start Date	Station	NoI	Patient
	COMPLETED	1.3.46.670589.26.400017.1.20050422.110645.31542		2005/04/22 11:10	VM01[CR]	1	Notfall-PACS
	COMPLETED	1.3.46.670589.26.400017.1.20050422.115010.31544		2005/04/22 11:50	VM01[CR]	2	Xxxx^Yyyy
	COMPLETED	1.3.46.670589.26.400017.1.20050422.115307.31545		2005/04/22 11:55	VM01[CR]	1	Xxxx^Yyyy
	COMPLETED	1.3.46.670589.26.400017.1.20050422.115307.31546		2005/04/22 11:57	VM01[CR]	2	Xxxx^Yyyy
	COMPLETED	1.3.46.670589.26.400017.1.20050422.120715.31548		2005/04/22 12:08	VM01[CR]	2	Xxxx^Yyyy
	COMPLETED	1.3.46.670589.26.400017.1.20050422.121010.31549		2005/04/22 12:14	VM01[CR]	1	Xxxx^Yyyy
	IN PROGRESS	1.3.12.2.1107.5.3.4.1000.1.20050610101843		2005/06/10 10:22	bndl - FLC_WK_SCU[RF]0	0	Xxxx^Yyyy
236266	IN PROGRESS	1.2.4.0.13.1.432252867.236266.2GGP		2005/06/10 11:19	bndl - FLC_WK_SCU[RF]	0	Xxxx^Yyyy
236266	IN PROGRESS	1.2.4.0.13.1.432252867.236266.1ENTEROK		2005/06/10 11:59	bndl - FLC_WK_SCU[RF]	0	Xxxx^Yyyy
	IN PROGRESS	1.3.12.2.1107.5.3.4.1000.1.20050610120555		2005/06/10 12:06	bndl - FLC_WK_SCU[RF]0	0	Emergency^48
236388	IN PROGRESS	1.2.4.0.13.1.432252867.236388.2IRR		2005/06/10 13:22	bndl - FLC_WK_SCU[RF]	0	Xxxx^Yyyy
236388	IN PROGRESS	1.2.4.0.13.1.432252867.236388.1HO		2005/06/10 13:28	bndl - FLC_WK_SCU[RF]	0	Xxxx^Yyyy
236266	IN PROGRESS	1.2.4.0.13.1.432252867.236266.3RPG		2005/06/10 13:44	bndl - FLC_WK_SCU[RF]	0	Xxxx^Yyyy
236415	IN PROGRESS	1.2.4.0.13.1.432252867.236415.1ERCP		2005/06/10 14:10	bndl - FLC_WK_SCU[RF]	0	Xxxx^Yyyy
	IN PROGRESS	1.3.12.2.1107.5.3.4.1000.1.20050610185135		2005/06/10 18:55	bndl - FLC_WK_SCU[RF]0	0	Xxxx^Yyyy
	IN PROGRESS	1.3.12.2.1107.5.3.4.1000.1.20050612130742		2005/06/12 13:10	bndl - FLC_WK_SCU[RF]	0	Xxxx^Yyyy
	IN PROGRESS	1.3.12.2.1107.5.3.4.1000.1.20050613080616		2005/06/13 08:52	bndl - FLC_WK_SCU[RF]	0	Xxxx^Yyyy
	IN PROGRESS	1.3.12.2.1107.5.3.4.1000.1.20050613080813		2005/06/13 09:25	bndl - FLC_WK_SCU[RF]	0	Xxxx^Yyyy
	IN PROGRESS	1.3.12.2.1107.5.3.4.1000.1.20050613080935		2005/06/13 09:45	bndl - FLC_WK_SCU[RF]	0	Xxxx^Yyyy
	IN PROGRESS	1.3.12.2.1107.5.3.4.1000.1.20050613105634		2005/06/13 11:22	bndl - FLC_WK_SCU[RF]	0	Xxxx^Yyyy

By using one or several search fields it is possible to search for specific information in the database. The search fields are:

Patient

The patient name.

Date

The date and time (format: yyyy/mm/dd hh:mm) when the search should begin.

to

The date and time (format: yyyy/mm/dd hh:mm) where the search should end.

Modality

Type of modality (e.g. MR, CT, CR, and US).

Station AET

The specific Application Entity Title of the modality.

Accession No.

The specific accession number for a study. If box is checked the search will include unscheduled examinations.


Status


[ANY]: Will include all types in the search.

IN PROGRESS: Will only include procedures, that are in progress, in the search.

COMPLETED: Will only include procedures, that are completed, in the search.

DISCONTINUED: Will only include procedures, that are discontinued, in the search.

The available functions are the  (New Search) button that will perform the search (alternative: press the

Enter key) and the  (Next Search Results) button, which will show the next page of records in the search result.

The information regarding the modality performed procedure step worklist (MPPS) are shown in the table. The columns in the table are:

Acc. No.

The accession number of the study.

Status

IN PROGRESS: Will only include procedures, that are in progress, in the search.

COMPLETED: Will only include procedures, that are completed, in the search.

DISCONTINUED: Will only include procedures, that are discontinued, in the search.

Study IUID

The Study Instance UID.

Proc. Desc.

Description of the performed procedure.

Start Date

The date and time, when the procedure step started.

Station

Name of device (modality) on which this Procedure Step was performed.

NoI

The number of instances.





Patient

The patient name.

3.8. User Administration

To create, change or delete a user click on User Admin.

The first window gives a list of users defined in the system.

dcm4chee										Folder	Trash	AE Management	Offline Storage	Worklist Console	MPPS Console	User Admin	Audit Repository	Logout
User ID		Roles																
admin		WebUser <input checked="" type="checkbox"/>		McMUser <input checked="" type="checkbox"/>		Datacare <input type="checkbox"/>		WebAdmin <input checked="" type="checkbox"/>		Admin <input checked="" type="checkbox"/>			AuditRep <input checked="" type="checkbox"/>					
user		WebUser <input checked="" type="checkbox"/>		McMUser <input checked="" type="checkbox"/>		Datacare <input type="checkbox"/>		WebAdmin <input type="checkbox"/>		Admin <input type="checkbox"/>			AuditRep <input type="checkbox"/>					

WebUser:

A user in this role is allowed to use this web interface.

McMUser:

This role is used to allow access to the Media Creation Console (Offline Storage).

DatacareUser:

A user in this role has Datacare rights (edit/merge/delete) in the web interface.

WebAdmin:

This role is used to allow access to AET and User management.

The user must be also in role WebUser!

Admin:

This role is used to allow configuration access via JMX console.

AuditRep:

Members of this role are allowed to access the Audit Repository.

Roles are shown for each user. The four roles that can be combined for a user are:

WebUser

A user in this role is allowed to use this web interface.

WebAdmin

A user in this role has administrative rights within the web interface. To have WebAdmin rights the user also has to have the WebUser rights.


Admin

This role is used to allow configuration access via the JMX Console.

AuditRep

Members of this role are allowed to access the Audit Repository.

3.8.1. Create a new user

To add a new user click  (add new user) and fill in the appropriate information in the following window:

dcm4chee							Folder	Trash	AE Management	Offline Storage	Worklist Console	MPPS Console	User Admin	Audit Repository	Logout
User ID	<input type="text"/>														
Password	<input type="password"/>														
retype Password	<input type="password"/>														
WebUser	<input type="checkbox"/>														
McMUser	<input type="checkbox"/>														
Datacare	<input type="checkbox"/>														
WebAdmin	<input type="checkbox"/>														
Admin	<input type="checkbox"/>														
AuditRep	<input type="checkbox"/>														
		<input type="button" value="Create"/> <input type="button" value="Cancel"/>													

The entries are:

User ID


The user ID for the user should have.

Password

The belonging password.

Retype Password

The password again.

The roles for the user can be checked with a  in the appropriate checkboxes:

WebUser

A user in this role is allowed to use this web interface.

WebAdmin

A user in this role has admin rights in the web interface. To have WebAdmin rights the user also has to have the WebUser rights.

Admin

This role is used to allow configuration access via the JMX Console.


AuditRep

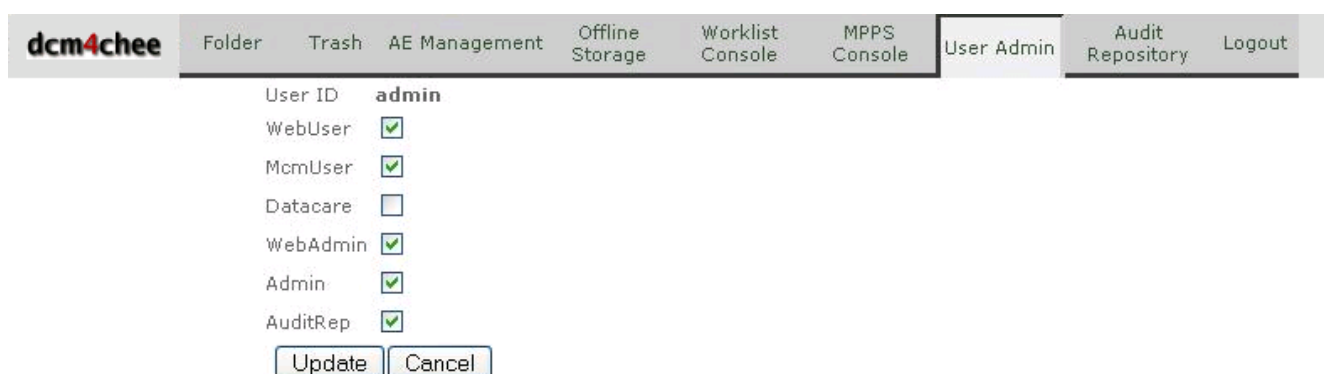
Members of this role are allowed to access the Audit Repository.

Press Create to create the new user or Cancel to quit without creating the user.


ATTENTION: Modifications of User Configuration may take up to half an hour to become effective!

3.8.2. Edit/Update a User Profile

To edit a user profile click at the  (Edit) next to the user.



dcm4chee		Folder	Trash	AE Management	Offline Storage	Worklist Console	MPPS Console	User Admin	Audit Repository	Logout
User ID	admin									
WebUser	<input checked="" type="checkbox"/>									
McmUser	<input checked="" type="checkbox"/>									
Datacare	<input type="checkbox"/>									
WebAdmin	<input checked="" type="checkbox"/>									
Admin	<input checked="" type="checkbox"/>									
AuditRep	<input checked="" type="checkbox"/>									
		<input type="button" value="Update"/> <input type="button" value="Cancel"/>								

The roles are checked or unchecked by clicking in the appropriate box. A  in the box indicates that the user has this role. The different roles are:

WebUser

A user in this role is allowed to use this web interface.

WebAdmin

A user in this role has admin rights in the web interface. To have WebAdmin rights the user also has to

have the WebUser rights.

Admin

This role is used to allow configuration access via the JMX Console.

AuditRep

Members of this role are allowed to access the Audit Repository.

To update the user profile press Update or Cancel to quit without changing the roles for the user.

ATTENTION: Modifications of the User Configuration may take up to half an hour to become effective!

3.8.3. Delete a user

To delete a user from dcm4chee-web click the  (Delete) next to the user.

A confirmation pop-up window will appear. Press OK to delete the user or Cancel to quit without deleting the user.

ATTENTION: Modifications of the User Configuration may take up to half an hour to become effective!

3.9. Audit Repository

The "Audit Record Repository List View" is divided into three logical parts:

- The Search Section
- The List Section
- The Selection Section

dcm4chee
Folder
AE Management
Audit Repository

Audit Record Repository List View

☐ Update view

Results: from 1 to 30 (of 1189)

	Audit Event	Host	Timestamp (local)	Information	
Results to return:	UserAuthenticated	impax	2006-06-01 10:54:52.549+0200	Username:admin	(xml)
Patient Name:	UserAuthenticated	impax	2006-06-01 09:45:35.000+0200	Username:admin	(xml)
	UserAuthenticated	impax	2006-06-01 09:45:35.000+0200	Username:admin	(xml)
Patient ID:	UserAuthenticated	impax	2006-06-01 08:42:32.000+0200	Username:admin	(xml)
	InstancesStored	impax	2006-06-01 08:42:32.000+0200	Username:admin	(xml)
AE Title:	InstancesStored	impax	2006-06-01 08:07:33.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
	InstancesStored	impax	2006-06-01 08:07:33.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
Username:	InstancesStored	impax	2006-06-01 08:07:33.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
	InstancesStored	impax	2006-06-01 08:07:33.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
Host:	InstancesStored	impax	2006-06-01 08:07:32.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
	InstancesStored	impax	2006-06-01 08:07:32.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
TimeStamp	InstancesStored	impax	2006-06-01 08:07:32.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
from:	InstancesStored	impax	2006-06-01 08:07:32.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
	InstancesStored	impax	2006-06-01 08:07:32.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
to:	InstancesStored	impax	2006-06-01 08:07:32.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
Type	InstancesStored	impax	2006-06-01 08:07:32.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
<input type="checkbox"/> ActorConfig	InstancesStored	impax	2006-06-01 08:07:32.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
<input type="checkbox"/> ActorStartStop	InstancesStored	impax	2006-06-01 08:07:32.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
<input type="checkbox"/> AuditLogUsed	InstancesStored	impax	2006-06-01 08:07:31.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
<input type="checkbox"/> BeginStoringInstances	InstancesStored	impax	2006-06-01 08:07:31.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
<input type="checkbox"/> DICOMInstancesDeleted	InstancesStored	impax	2006-06-01 08:07:31.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
<input type="checkbox"/> DICOMInstancesUsed	InstancesStored	impax	2006-06-01 08:07:31.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
<input type="checkbox"/> DicomQuery	InstancesStored	impax	2006-06-01 08:07:31.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
<input type="checkbox"/> Export	InstancesStored	impax	2006-06-01 08:07:31.000+0200	AET:LOCAL Patient Name:3D GUIDE^ACETABULUM 02 Patient ID:2427508	(xml)
<input type="checkbox"/> Import					
<input type="checkbox"/> InstancesSent					
<input type="checkbox"/> InstancesStored					
<input type="checkbox"/> NetworkEntry					
<input type="checkbox"/> OrderRecord					
<input type="checkbox"/> PatientRecord					
<input type="checkbox"/> ProcedureRecord					
<input type="checkbox"/> SecurityAlert					

3.9.1. List Section

The list section shows the result from the search and selection done in the left side of the window. The columns

in the list are:

Audit Event

The type of the event logged in the audit repository and shown in the list.

Host

The name of the host that sent the audit message.

Timestamp

The timestamp of the event. The format is: yyyy-mm-dd hh:mm:ss.sss

Information

A short description of the event.

3.9.2. Search Section

In the search section it is possible to search for one of the following values, or for a combination of the following values. It is not possible to type in part of a search value or to truncate a value in the search fields. If a value is unknown, it is possible to use the search facility in the folder part to find the exact value to use in this section.

Results to return

Typing in a figure in this field indicates how many results that should be shown on one page in the list.

Patient Name

The exact name of the patient that should be used in the search.

Patient ID

The exact patient ID that should be used in the search.

AE Title

The exact AE Title that should be used in the search.

Username

The exact username that should be used in the search.

Host

The hostname that should be used in the search.

TimeStamp

The two values (from and to) for exact time stamp, should be used in the search. The format is "yyyy-mm-dd hh:mm:ss.sss" – only whole values can be typed in (no truncation).

3.9.3. The selection section

In this section you can filter your results by choosing (one or several) audit log event types:

ActorConfig

Generated for any configuration changes related to the actor.

ActorStartStop

Start-up and shutdown of any actor. Is distinct from hardware power-up and shutdown.

AuditLogUsed

The audit trail repository has been accessed or modified by something other than the arrival of audit trail messages.

BeginStoringInstances

Begin storing SOP Instances for a study. This may be a mix of instances.

DICOMInstancesDeleted

SOP Instances are deleted from a specific study.

DICOMInstancesUsed

Study is created, modified, or accessed. This report on addition of new instances to existing studies as well as creation of new studies.

DicomQuery

A query has been received.

Export

Any export of PHI on media, either removable physical media such as CD-ROM or electronic transfer of files such as email. Any printing activity, paper or film, local or remote, that prints PHI.

Import

Any import of PHI on media, either removable physical media such as CD-ROM or electronic transfers of files such as email.

InstancesStored

Instances for a particular study have been stored on this system.

NetworkEntry

Mobile machine joins or leaves secure domain.

OrderRecord

Order record created, accessed, modified or deleted.

PatientRecord

Patient record created, modified, or accessed.

ProcedureRecord

Procedure record created, modified, accessed or deleted.

SecurityAlert

A secure node authentication failure has occurred during TLS negotiation, e.g. invalid certificate.

StudyDeleted

Shows events that have deleted studies.

UserAuthenticated

Shows events related to user authentication.

3.9.4. Audit Record Detail View

To see the detailed information from the list section click one of the events in the first column (Audit Event) or the XML-hyperlink.

The Audit Record Detailed View shows the host name, time and parameters for the event. The parameters will be different for different types of events.

Audit Record Detail View:

Host	Time	Parameters
impax	2006-06-01T09:45:35+02:00	UserAuthenticated LocalUsername: admin Action:Login

The information can also be shown in XML format.

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
- <IHEYr4>
- <StudyDeleted>
  <ObjectAction>Delete</ObjectAction>
  <SUID>1.4.9.1.4.177731.1997110813155361.485251844849</SUID>
- <Patient>
  - <PatientID>
    <![CDATA[ F33485/97  ]]>
  </PatientID>
  - <PatientName>
    <![CDATA[ ABENTHUNG^MARTHA  ]]>
  </PatientName>
</Patient>
- <User>
  - <LocalUser>
    <![CDATA[ admin  ]]>
  </LocalUser>
</User>
  <NumberOfInstances>1</NumberOfInstances>
</StudyDeleted>
<Host>localhost</Host>
<TimeStamp>2005-07-12T10:36:55+02:00</TimeStamp>
</IHEYr4>
```

Appendix A. Building from Source Code

A.1. Building the dcm4chee Archive

In order to build all components of the dcm4chee archive application you will need to download and install:

1. Ant 1.6.x [<http://ant.apache.org>]
2. XDoclet 1.2.3 [<http://xdoclet.sourceforge.net>]
3. JBoss 4.0.3SP1 [<http://labs.jboss.com/jbossas/download>] (you have to fetch a binary package (e.g jboss-4.0.3SP1.zip) and unpack it, running the installer does not work!)
4. Apache FOP 0.20.5 [<http://xmlgraphics.apache.org/fop/>]
5. Jakarta Cactus 1.7 for J2EE 1.3 [<http://jakarta.apache.org/cactus/>] (only needed to build test suite for dcm4jboss-ejb - not need to build application)
6. [Only Windows] Patch utility for Windows [e.g. <http://gnuwin32.sourceforge.net/packages/patch.htm>] (needed in PATH for build of Oracle and DB2 version)

Create an environment variable pointing to the Ant home directory (ANT_HOME) and add the \$ANT_HOME/bin directory to your PATH.

The build scripts (dcm4jboss-all/dcm4jboss-xxx/build.xml) assumes following locations of XDoclet, JBoss, Apache FOP and Jakarta Cactus:

```
xdoclet.home=${user.home}/xdoclet-1.2.3

jboss.home=${user.home}/jboss-4.0.3SP1

fop.home=${user.home}/fop-0.20.5

cactus.home=${user.home}/jakarta-cactus-13-1.7
```

Instead of modifying the build script directly, you may adjust these values to your build environment by renaming the file dcm4jboss-all/dcm4jboss-xxx/build.properties.default to dcm4jboss-all/dcm4jboss-xxx/build.properties and modify the values in it.

if no patch utility is available [Windows] you have also to disable Oracle and DB2 build by setting oracle.nobuild=true and db2.nobuild=true in dcm4jboss-all/dcm4jboss-arr/build.properties and dcm4jboss-all/dcm4jboss-ejb/build.properties.

Change the working directory:

```
cd dcm4jboss-all/dcm4jboss-build
```

and invoke:

```
ant dist
```

to build all components and pack them in binary distribution packages:

target/dcm4chee-standalone-db2-%version%.zip

target/dcm4chee-standalone-hsql-%version%.zip

target/dcm4chee-standalone-mssql-%version%.zip

target/dcm4chee-standalone-mysql-%version%.zip

target/dcm4chee-standalone-oracle-%version%.zip

target/dcm4chee-standalone-psql-%version%.zip