

**CDMEDICEE Tutorial v.1**



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## CDMEDICEE Tutorial 2

### **What on earth is CDMEDICEE?**

Is a web interface to the dcm4chee PACS to access to DICOM studies images, in an easy and quick manner, derived from CDMEDICPACSWEB based on dcm4chee instead of CTN.

### **Advantages of use dcm4chee over CTN?**

The CTN software seems to be now unmaintained, and lacks of audit control, DICOM JPEG and Structured Report support, though it is faster storing (tested on the same hardware) the query and retrieve times are similar.

### **Prerequisites to install CDMEDICEE?**

A PC running Ubuntu 7.04, minimal server installation without GUI would be enough.

### **Where to download CDMEDICEE?**

Download dcm4chee-2.11.0.deb and cdmedicee-1.3.0.deb packages from Source Forge:

[http://sourceforge.net/project/showfiles.php?group\\_id=61662](http://sourceforge.net/project/showfiles.php?group_id=61662)

### **How much it cost?**

Nothing, it's free. If you don't like something you have the chance of changing it as it's open source!

### **There's is an in installation guide?**

Open a terminal as root, uncomment the lines of universe and multiverse repositories and then:

```
apt-get update; dpkg -i dcm4chee-2.11.0.deb cdmedicee-1.3.0.deb ; apt-get -f install
```

### **Which software is needed on the client side?**

Only a web browser, Safari on Macs, IE on Wins and Firefox on Linux boxes are OK, to see images, videos and DICOM information , and also to search and retrieve DICOM studies.

### **But, can I access to DICOM studies?**

Yes but you'll need a DICOM viewer as OsiriX on Macs, K-PACS on Wins and Aeskulap on Linux boxes and also on Linux you'll need a DIOCM SCP as storescp, listening on port 11112 , from OFFIS DCMTK is needed.

### **So, can I access to the CDMEDICEE PACS from everywhere?**

Provides you have Internet access, yes but if you want to receive DICOM files you must have your computer DICOM listener on port 11112 redirected to your Internet router using NAT, if it is not possible at your location, you always can access to the studies images and videos in jpeg and mp4 formats respectively.

### **Is CDMEDICEE secure?**

It is using https with SSL 128 bit, like Internet banking, and you must authenticate as CDMEDICEE user, so you can access to al studies stored in the dcm4chee PACS or as a Reference Physician so you can only have access to your own Patient's studies stored on the dcm4chee PACS, and previously, in the modality the studies were acquired, must figure the same Reference Physician as used like user granted to access the CDMEDICEE.

### **Which languages are supported?**

For now English, but is quite simple to translate to any language, you must only change the values of the variables stored on `/usr/local/etc/cdmedicee.lang` (41 short lines, Please send me a copy!).

### **Is CDMEDICEE really easy to use?**

The concept of CDMEDICEE is to be minimalistic and straightforward to use, having also help on line, to clarify any doubt.

### **How can people reach form Internet my CDMEDICEE Web page?**

You must redirect the port 443 of the CDMEDICEE box to the Router using NAT, you must know the Internet IP of your router while installing the CDMEDICEE software, and you must give the following URL to the granted people to access the CDMEDICEE:

[https://your\\_internet\\_router\\_IP/cgi-bin/cdmedicee](https://your_internet_router_IP/cgi-bin/cdmedicee)

### **How a Reference Physician access is granted?**

You must go to the directory `/etc/httpd` and use the following command line in a Terminal:  
`sudo htpasswd .htpasswd "Reference Physician Name as it figure on DICOM Modalities"`

### **But this seems to be a FAQ, where's the Tutorial?**

The Tutorial starts on page two, so read on and you'll get acquaintance with the easy use of CDMEDICEE, so let's start.

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After login as CDMEDIC user you'll have access to all studies stored on dcm4chee PACS, in the other hand it is possible to grant access to Reference Physicians always if the login name corresponds exactly to the Reference Physician stored on DICOM files, and they will have a restricted access only to their own patient's studies.

The header of main CDMEDICEE web page, you have fields to narrow the search of studies, and it is convenient to at least select one search criteria before press "Find Studies" button.

The screenshot shows the CDMEDICEE web application interface. At the top, there is a navigation bar with links like CARRERAS, MORON, CERCO, ALGECIRAS, cdmicee, CINE, Map24, Radio, CDMEDIC, Forums, and Cases. Below this is a search form with the following fields:

- PATIENT NAME** and **STUDY DESCRIPTION** (text input fields)
- Select AE Title, Select Modality, Select Institution (dropdown menus)
- FROM DATE (01/01/1993) TO DATE (01/08/2007) OR Choose other time criteria (dropdown)
- Default Values, DESTINATION AE (80.37.138.172), Find Studies (button)

Below the search form, the text "Found studies:" is displayed. Underneath, there is a table of found studies:

Patient	Patient ID	Sex	Birth Date	STUDY DATE	Study Description	Institution	Send To
PATIENT HEART MRI <sup>AAAA</sup>	0010099822P	F		2005-11-18 12:52:32	HEART	CERCO SEVILLA	80.37.138.172
PATIENT XA <sup>AAAA</sup>	5786	F		2007-02-02 12:21:23	ANGIO	INSTIT. CORACAO TRIANGULO	80.37.138.172

At the bottom of the page, there is a logo for CDMEDIC, which is a stylized 'M' with a caduceus symbol inside a circle, and the text "CDMEDIC" and "Pablo Sau" below it.

The query of "PATIENTNAME" and "STUDY DESCRIPTION" fields are not case sensitive and you can use the sign % for wild card.

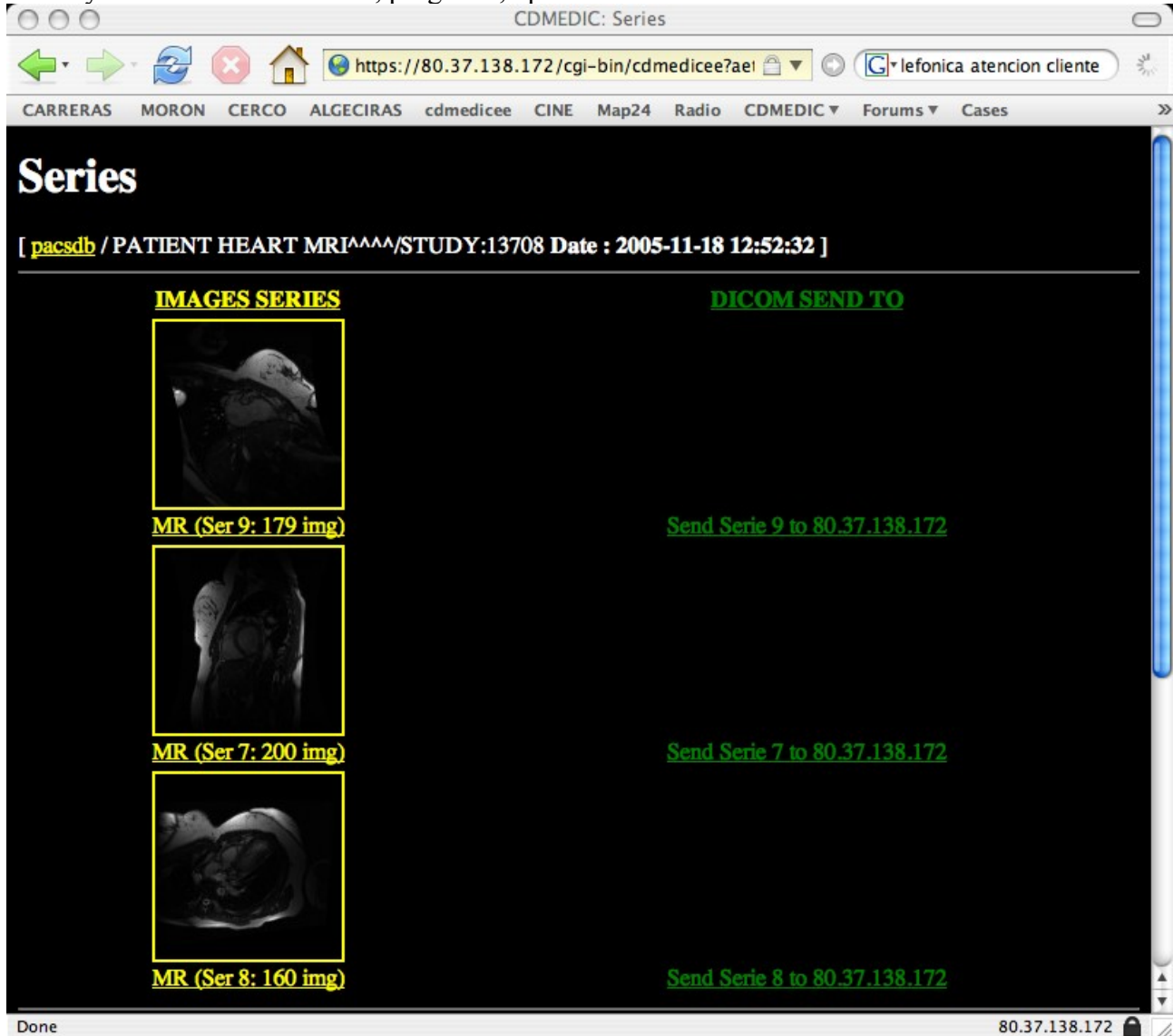
The "Select AE Title", "Select Modality" and "Select Institution" drop menus items are populated from data stored in PACSDB.

The default value of "DESTINATION AE" is the current IP of the host on which the Web Browser is running, intended for roaming operation and the rest of items are the PACS configured AE Titles. The links under "Send to", send the Study using DICOM protocol to the selected AE Title, if none is selected then the DICOM is sent to the current IP at port standard (11112) using DICOM JPEG LOSSLESS transfer syntax.

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The “Date + Time” link opens the Series Web page where you can browse series, see next picture. If you click the “Pablo Sau” link, you mailer program will be opened so you can send me suggestions or problems that you could encounter.

The CDMEDIC logo has a link to Source Forge web site were the CDMEDIC project is hosted, where you can find information, programs, updates and forums.



The header of the Series Web page, shows a link to current data base main page, the Patient's Name, Study Number and Date Time of the Series.

The central image of multi-slice/multi-frame series are displayed in 128x128 pixel resolution.

If you click on the Images you'll get all the images of the selected series, and depending on your configuration you'll see still images in a film fashion (jpeg) or videos (mp4).

You can choose in the CDMEDICEE configuration to get the videos on mp4 format for the video series, the heart MRI ones are split by slice position and animated at the same Patient's heart bit rate and the XA are shown at 15 fps.

For the still images the Window/Level is grabbed from the DICOM information if present if not an histogram algorithm is applied, you can choose in the configuration the number of images limit to generate a video instead of still images to save bandwidth.

All images and videos are shown in its actual spatial resolution, except the images of the Series web page that are of 128\*128 pixel.

The links under the images tell you the Modality and the number of images of the series and if you click on it you'll see the DICOM information of them.

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The links under “DICOM SEND TO” again send single series to the above mentioned destinations. This is an example of a Heart MRI Series videos (mp4) split by slice position:



This is an example of still images(jpeg) from MRI Brain T1 Series:



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From the Image Web page it is possible to save the images and videos clicking the image/video with the right button, choose your appropriate folder and file name, this can save many time to include them in presentations.

Note about web page link colours, green unvisited and yellow already visited.

The CDMEDICEE is written in perl using DBI mysql and bash scripts, for converting DICOM to jpeg and sending DICOM studies a small subset of the OFFIS dcmTk is used and for the mp4 creation ffmpeg is used.

You can define at installation if you want the pages to be created as accessed or use the option that prepares in advance the web pages when the computer is idle with the interval of time you defined. For any doubt, criticism, suggestion or feature request email me to <Pablo Sau> [psau@cadpet.es](mailto:psau@cadpet.es) or also you can post a message in Source Forge CDMEDIC forums:

[http://sourceforge.net/forum/forum.php?forum\\_id=207766](http://sourceforge.net/forum/forum.php?forum_id=207766)

### Summary:

CDMEDICEE is intended as a complement to the dcm4chee PACS, to offer the possibility to Reference Physicians to access to images and videos of the DICOM studies of their Patient's, saving time and money and for Radiologists a quick manner to get images and videos for their presentations and to get DICOM data to their workstations and personal computers, that in the case of Macs running OsiriX, are nearly equivalents.

So the perfect combination for a free Radiological work flow could be by now dcm4chee + CDMEDICEE + OsiriX.

That's all by the moment!

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Links of interest:

DCM4CHEE <http://www.dcm4che.org/confluence/display/ee2/Home>

OSIRIX <http://www.osirix-viewer.com/>

FFMPEG <http://ffmpeg.mplayerhq.hu/>

OFFIS DCMTK <http://dicom.offis.de/dcmTk.php.en>

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NOTE: For mp4 generation ffmpeg is used, with potential legal implications on some countries, see ffmpeg legal FAQ in <http://ffmpeg.mplayerhq.hu/legal.html>.

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