

11/22/09 - Installing dcm4chee an Open Source PACS under Windows 7 with MySQL Database

dcm4chee.org

Open Source Clinical Image and Object Management

dcm4chee is an open source PACS software that can be used for storing, managing and retrieving medical images. It fully implements the DICOM protocol designed for healthcare. It is written in Java programming language for versatility and performance. It can run under Windows, Mac OS, and Linux. It supports different databases such as: PostgreSQL, MySQL, Oracle, SQL Server..etc

dcm4chee can be integrated with OsiriX, K-PACS, ClearCanvas...etc

Since many dental professionals use Windows as their primary operating system it would be easier to install dcm4chee under Windows. In addition, compression libraries such as JPEG 2000 LS are still not available under Windows 64 bit and Mac OS. So we will use 32bit version of Windows as our server's operating system. We will be using Windows 7 since it is going to be the main stream operating system ; however, the tutorial should also work for Windows Vista or XP.

MySQL database is an open source database and it is used by millions of users. In fact, Marcilan is powered by MySQL database. So we will use MySQL as our main database. Enough talk and take me to the tutorial! !

In this tutorial we will go in details and step by step installation of dcm4chee under Windows 7 Professional 32 bit and using MySQL database.

Note: For full more detailed information for installation dcm4chee for different operating system and databases, please refer to the link [here](#)

Minimum System Requirements:

JDK 6 or higher
 512 MB RAM
 200 MB hard disk space (additional to archive storage disk space)
 400 MHz CPU

Download:














1. Download the latest binary of dcm4chee (currently v 2.14.7) from [dcm4chee Source Forge](#) repository. Select the version that matches the database we will be using [dcm4chee-mysql-2.14.7.zip](#)

Browse Files for dcm4che, a DICOM Implementation in JAVA					
File/Folder Name	Platform	Size	Date ↓	Downloads	Notes/Subscribe
Subdirectory (view all files)					
dcm4chee		2.6 GB	2009-10-16	44,461	 
2.14.7		68.6 MB	2009-10-16	2,359	 
release-notes-dcm4chee-2.14.7.html		6.6 KB	2009-10-16	255	
dcm4chee-firebird-2.14.7.zip		9.5 MB	2009-10-16	355	
dcm4chee-mssql-2.14.7.zip		8.9 MB	2009-10-16	207	
dcm4chee-oracle-2.14.7.zip		8.9 MB	2009-10-16	103	
dcm4chee-db2-2.14.7.zip		8.9 MB	2009-10-16	47	
dcm4chee-hsql-2.14.7.zip		8.9 MB	2009-10-16	38	
dcm4chee-mysql-2.14.7.zip		9.4 MB	2009-10-16	861	
dcm4chee-psql-2.14.7.zip		9.3 MB	2009-10-16	161	
dcm4chee-audit-2.14.7-src.zip		21.7 KB	2009-10-16	95	
dcm4chee-2.14.7-src.zip		4.9 MB	2009-10-16	237	

2. Download the binary distribution of JBoss Application Server 4.2.3.GA from [their website](#) (Do NOT download v5 as it is incompatible!)

4.2.3.GA	Stable	95 MB	2008-07-18	LGPL	288809	Download	Notes
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After clicking the download button, select `jboss-4.2.3.GA-jdk6` which

File/Folder Name	Platform	Size	Date ↓	Downloads	Notes/Subscribe
Subdirectory (view all files)					
JBoss		299.5 MB	2008-07-18	364,765	 
JBoss-4.2.3.GA		299.5 MB	2008-07-18	364,765	 
jboss-4.2.3.GA-jdk6.zip.SHA-256		64 Bytes	2008-07-18	1,461	
jboss-4.2.3.GA-jdk6.zip.MD5		32 Bytes	2008-07-18	3,500	
jboss-4.2.3.GA-jdk6.zip		99.7 MB	2008-07-18	174,785	
jboss-4.2.3.GA-src.tar.gz.SHA-256		64 Bytes	2008-07-18	843	
jboss-4.2.3.GA-src.tar.gz.MD5		32 Bytes	2008-07-18	1,351	
jboss-4.2.3.GA-src.tar.gz		100.4 MB	2008-07-18	26,052	
jboss-4.2.3.GA.zip.SHA-256		64 Bytes	2008-07-18	1,194	
jboss-4.2.3.GA.zip.MD5		32 Bytes	2008-07-18	2,593	
jboss-4.2.3.GA.zip		99.5 MB	2008-07-18	152,986	

3. Download the latest binary distribution for MySQL from [MySQL website](#). The current GA (Stable) version for production use is 5.1. Click on the [link](#). Select Windows MSI installer.

Windows downloads (platform notes)

Windows Essentials (x86)	5.1.41	39.0M	Pick a mirror
MD5: 85a8323a874f908a2dd2c6aebd4f59ba Signature			
Windows MSI Installer (x86)	5.1.41	104.7M	Pick a mirror
MD5: d85c43554b422f288c2cc1a2cf952bc1 Signature			
Without installer (unzip in C:\)	5.1.41	113.2M	Pick a mirror
MD5: d3f94a766df6154660734a88b4c2ed5b Signature			

You are downloading:

mysql-5.1.41-win32.msi

Please take the time to let us know about you. Rest assured, your information will remain private.

If this is the first time you have downloaded from us, you will be sent a password to enable you to log into all of the MySQL.com sites, including forums and bugs.

If you already have a MySQL.com account, save time by logging in now.

Returning Users	New Users
<p><i>Save time by logging in</i></p> <p>Email: <input type="text"/></p> <p>Password: <input type="password"/></p> <p>Forgot your password?</p> <p><input type="button" value="Login"/></p>	<p>Proceed with registration</p> <p><input type="button" value="Proceed"/></p>

[» No thanks, just take me to the downloads!](#)

You can register if you are interested in receiving updates or you can skip the registration process.

4. Download Java Development Kit 6 (JDK6) from Sun website.
Download JDK 6 update 17 under Java SE Development Kit.

Java SE Development Kit (JDK)	
<p>JDK 6 Update 17</p> <p>This special release provides a few key fixes. » Learn more</p>	<p><input type="button" value="Download"/></p> <p>Docs ▾</p>

Download Java SE Development Kit 6u17

Platform:
Windows ▼

Language:
Multi-language

By selecting "Download" or "Continue" below, you hereby accept the terms and conditions of the [Java SE Development Kit 6u17 License Agreement](#).

Use Sun Download Manager ([Learn More](#))


Download »

File Size: 73.55 MB

Est. Download Time: 7 min

1.5 Mbps ▼

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[» Create a New Sun Online Account](#)
[» Skip this Step](#)

You can register to receive latest updates or skip the registration process.

5. Download the Audit Record Repository (ARR). The ARR maintains an audit log of all transactions within the archive. This is necessary for HIPAA and IHE. (If your country does not require dcm4chee-arr-mysql-3.0.8.zip).

Browse Files for dcm4che, a DICOM Implementation in JAVA

File/Folder Name	Platform	Size	Date ↓	Downloads	Notes/Subscribe
Subdirectory (view all files)					
📁 dcm4chee-arr		80.6 MB	2009-05-19	7,951	📄 📧
📁 3.0.8		16.6 MB	2009-05-19	1,339	📄 📧
📄 dcm4chee-arr-3.0.8-src.zip		208.2 KB	2009-05-19	131	📄
📄 dcm4chee-arr-psql-3.0.8.zip		2.6 MB	2009-05-19	224	📄
📄 dcm4chee-arr-oracle-3.0.8.zip		2.2 MB	2009-05-19	80	📄
📄 dcm4chee-arr-mysql-3.0.8.zip		2.7 MB	2009-05-19	649	📄
📄 dcm4chee-arr-mssql-3.0.8.zip		2.2 MB	2009-05-19	162	📄
📄 dcm4chee-arr-hsql-3.0.8.zip		2.2 MB	2009-05-19	41	📄
📄 dcm4chee-arr-firebird-3.0.8.zip		2.2 MB	2009-05-19	32	📄
📄 dcm4chee-arr-db2-3.0.8.zip		2.2 MB	2009-05-19	20	📄

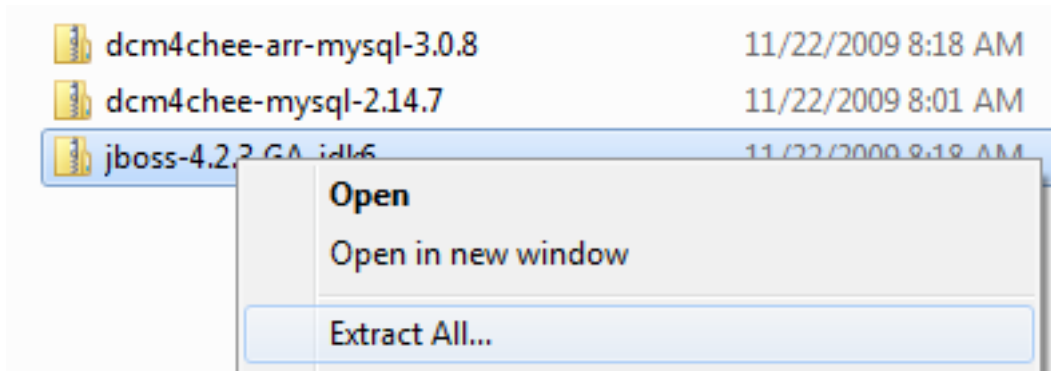
Installation:

1. Extracting the downloaded files and setting up the directories

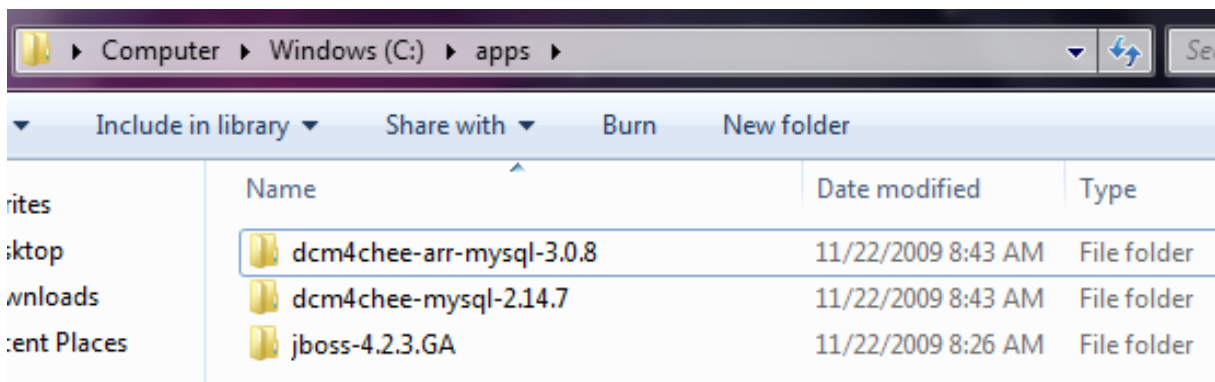
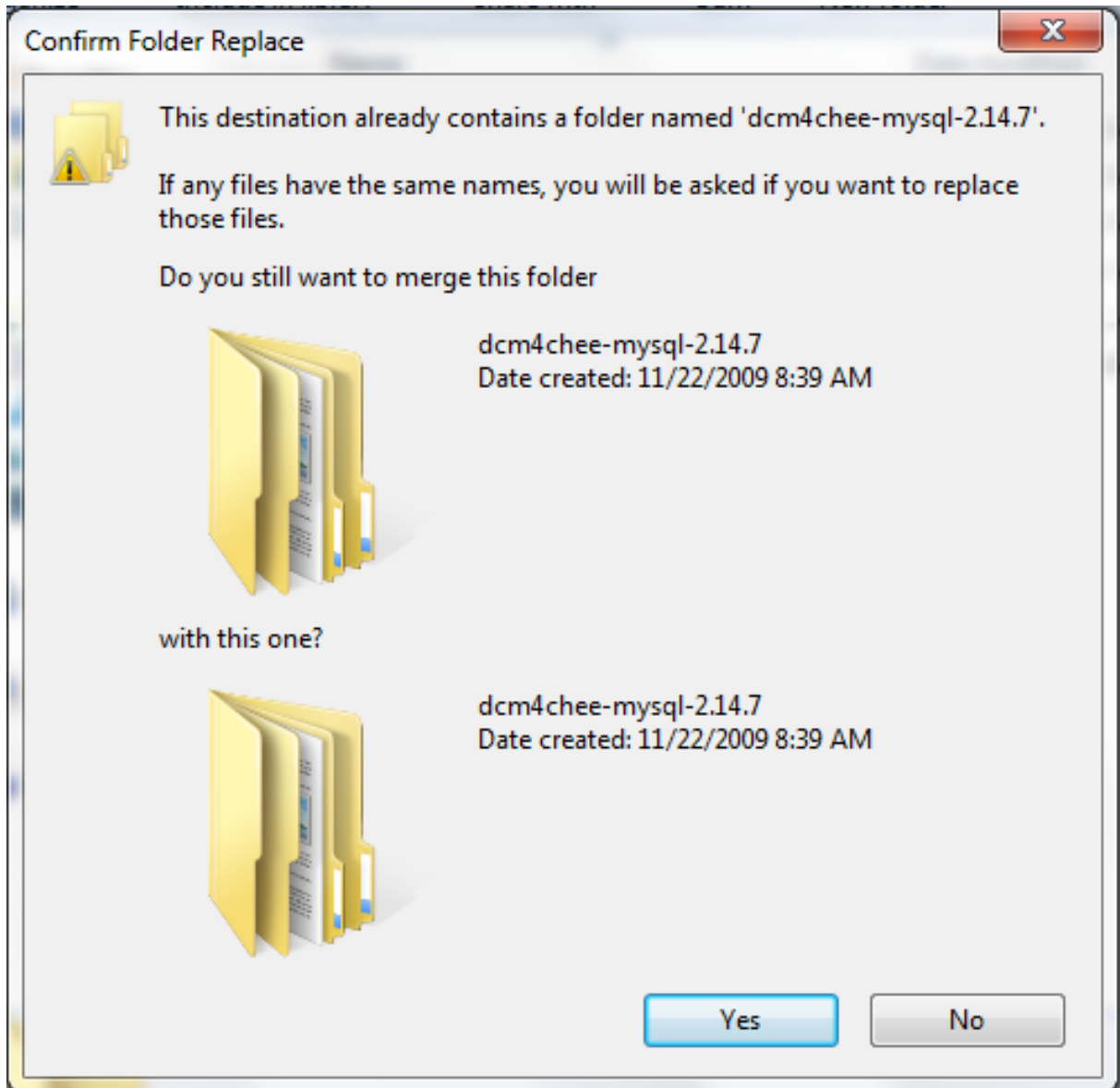
Create a new folder in C:\ and rename it to apps. The directory path should look like this C:\apps

Copy jboss-4.2.3.GA-jdk6.zip, dcm4chee-mysql-2.14.7.zip and dcm4chee-arr-mysql-3.0.8.zip (if you have HIPAA or want to maintain ARR see step 5 of downloads above).

Extract all of them into separate categories. Do them one by one.



After you finish extraction all of them, go into each folder, select the folder you see, right click>Cut or CTRL+X and hit Backspace or move to the previous directory and right click>paste or CTRL+V. Windows will complain that the same folder name exist. Click Yes to proceed. This will save us time navigating in the command prompt (avoid double directories). Do this for jboss-4.2.3.GA-jdk6.zip, dcm4chee-mysql-2.14.7.zip and dcm4chee-arr-mysql-3.0.8.zip (if you require HIPAA or want to maintain ARR see step 5 of downloads above).



The final folder structure should look like this

2. Copy files from JBoss to DCM4CHEE

Copy files from JBoss to dcm4chee. Dcm4chee consists of components that run within the JBoss application server platform. This step will copy the JBoss runtime files to the dcm4chee directory. Make sure that the JBoss folder name in ?C:\apps' is ?jboss-4.2.3.GA' before you continue.

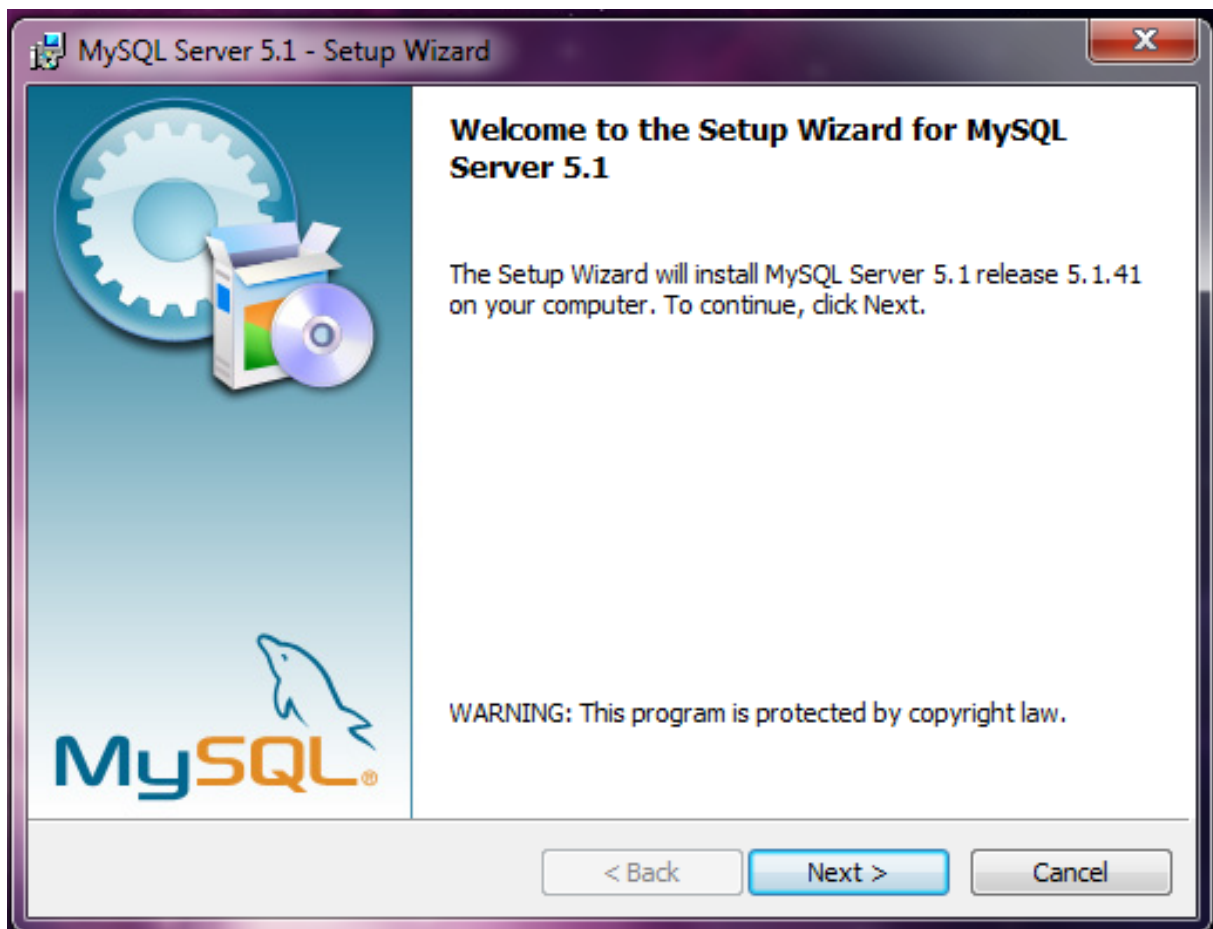
Navigate to: ?C:\apps\dcm4chee-mysql-2.14.7\bin'

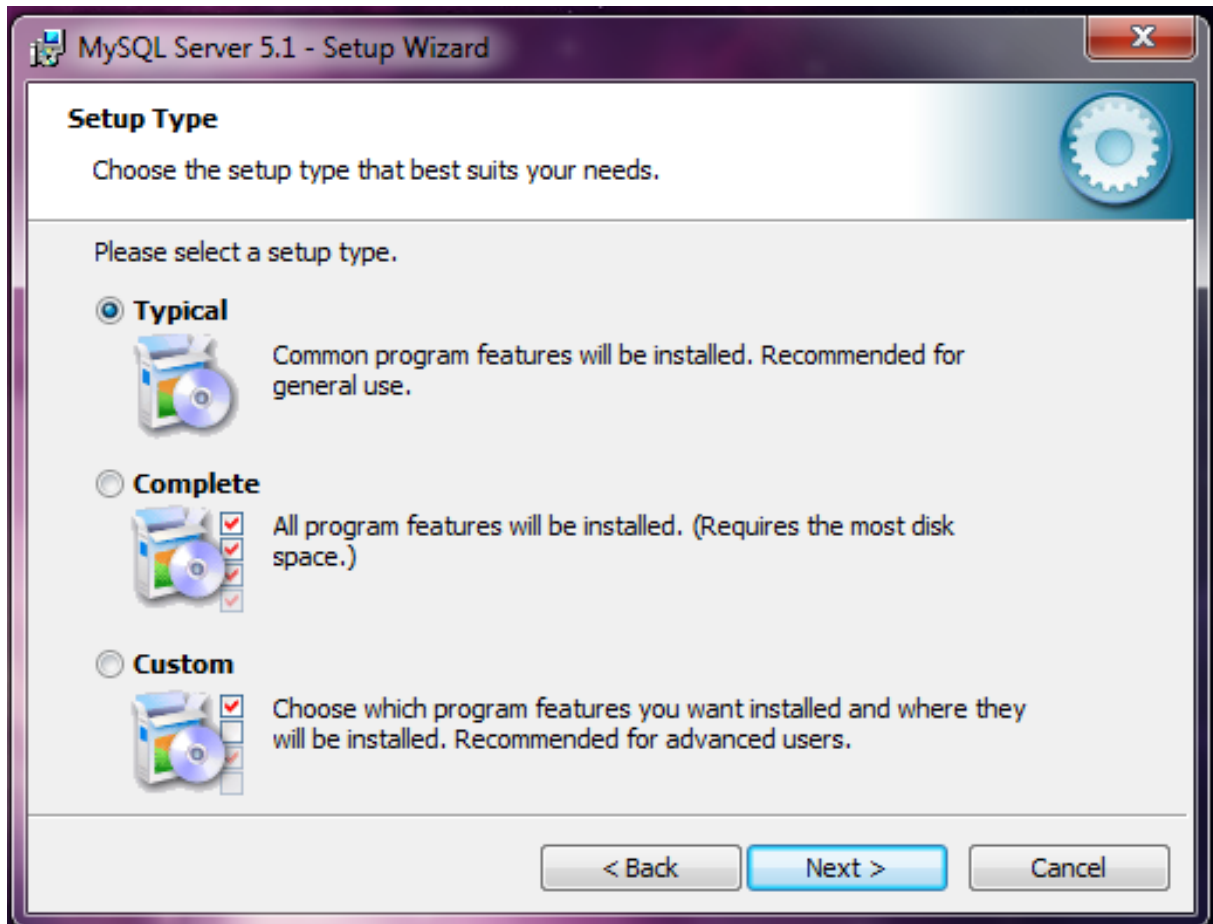
Type:

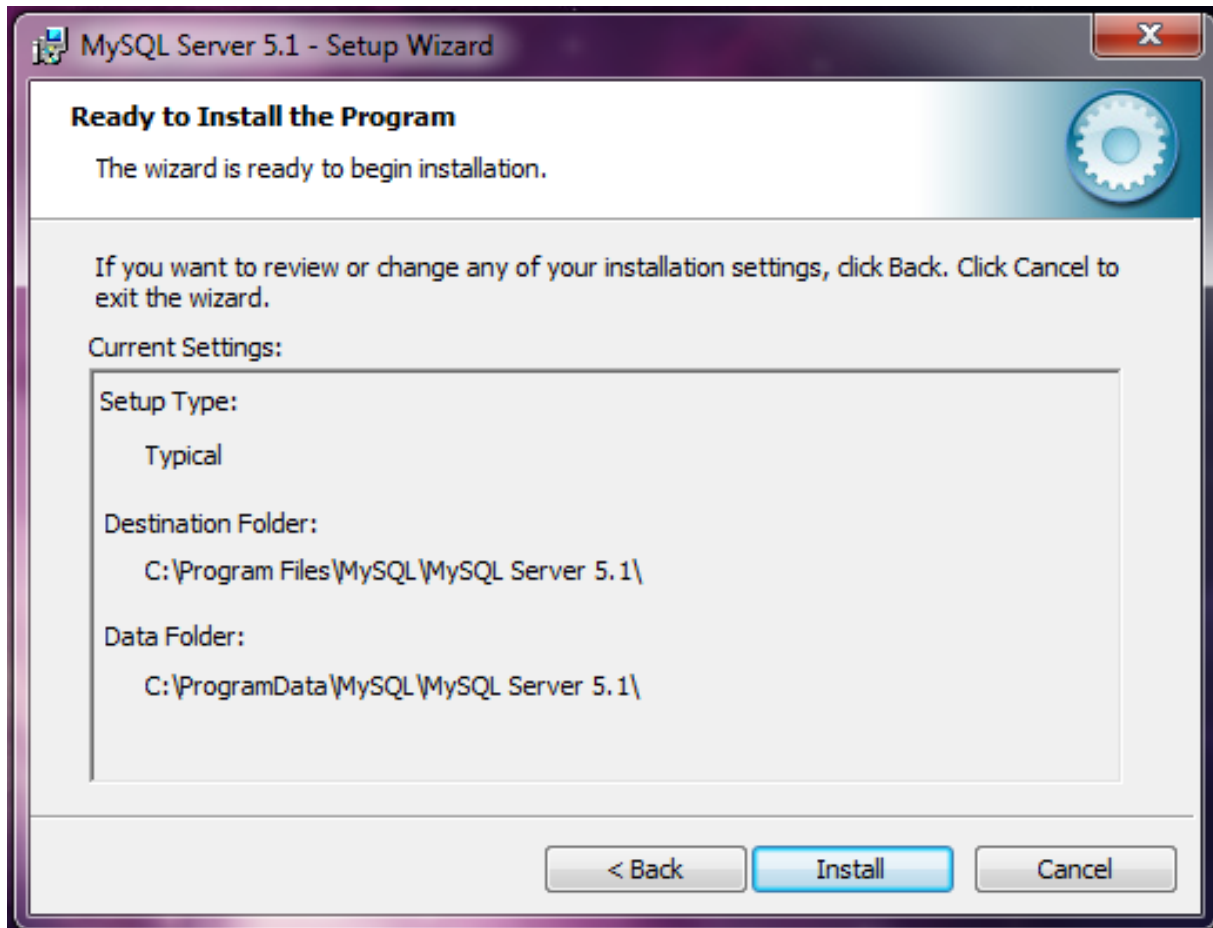
install_jboss.bat c:\apps\jboss-4.2.3.GA

```
Array
```

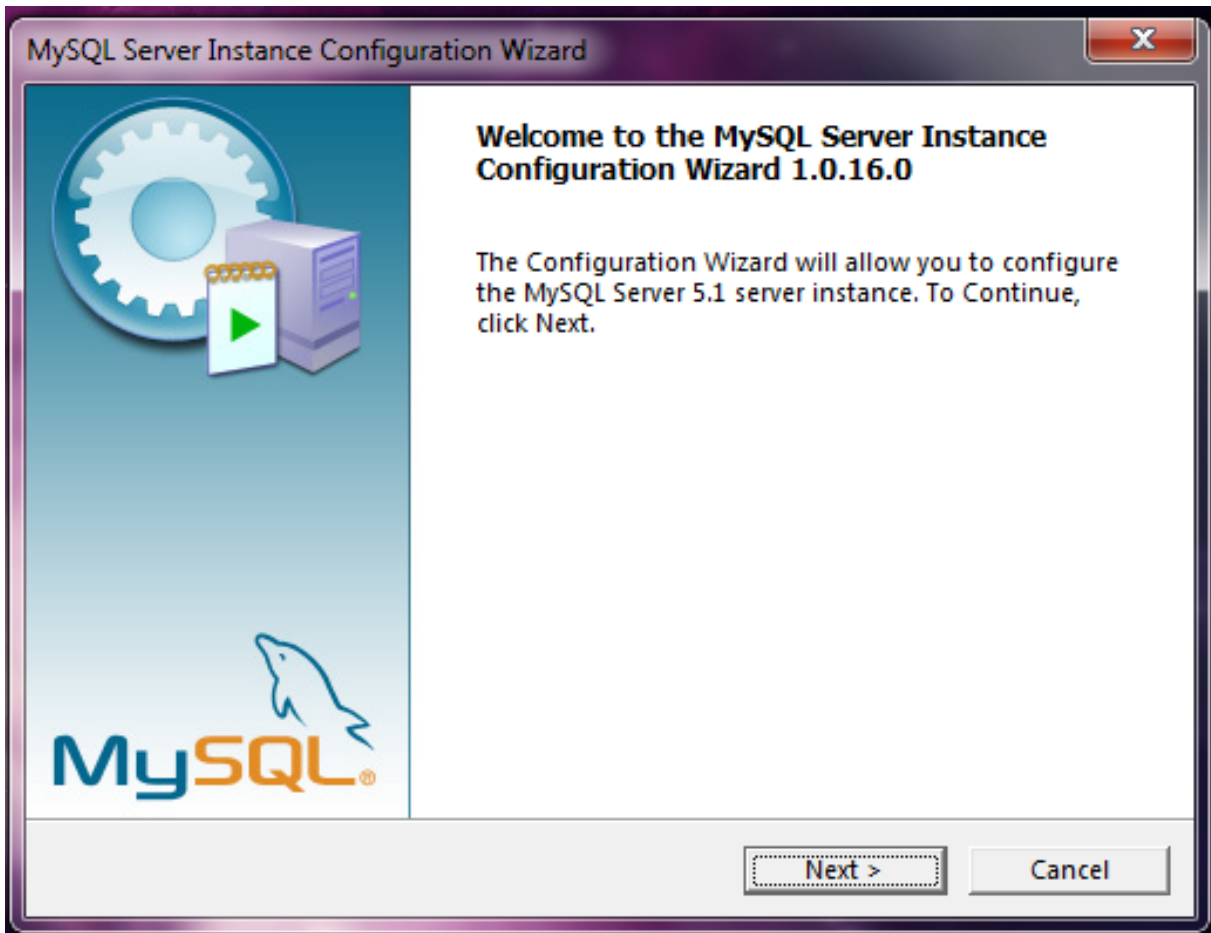
3. Installing MySQL database and creating dcm4chee database



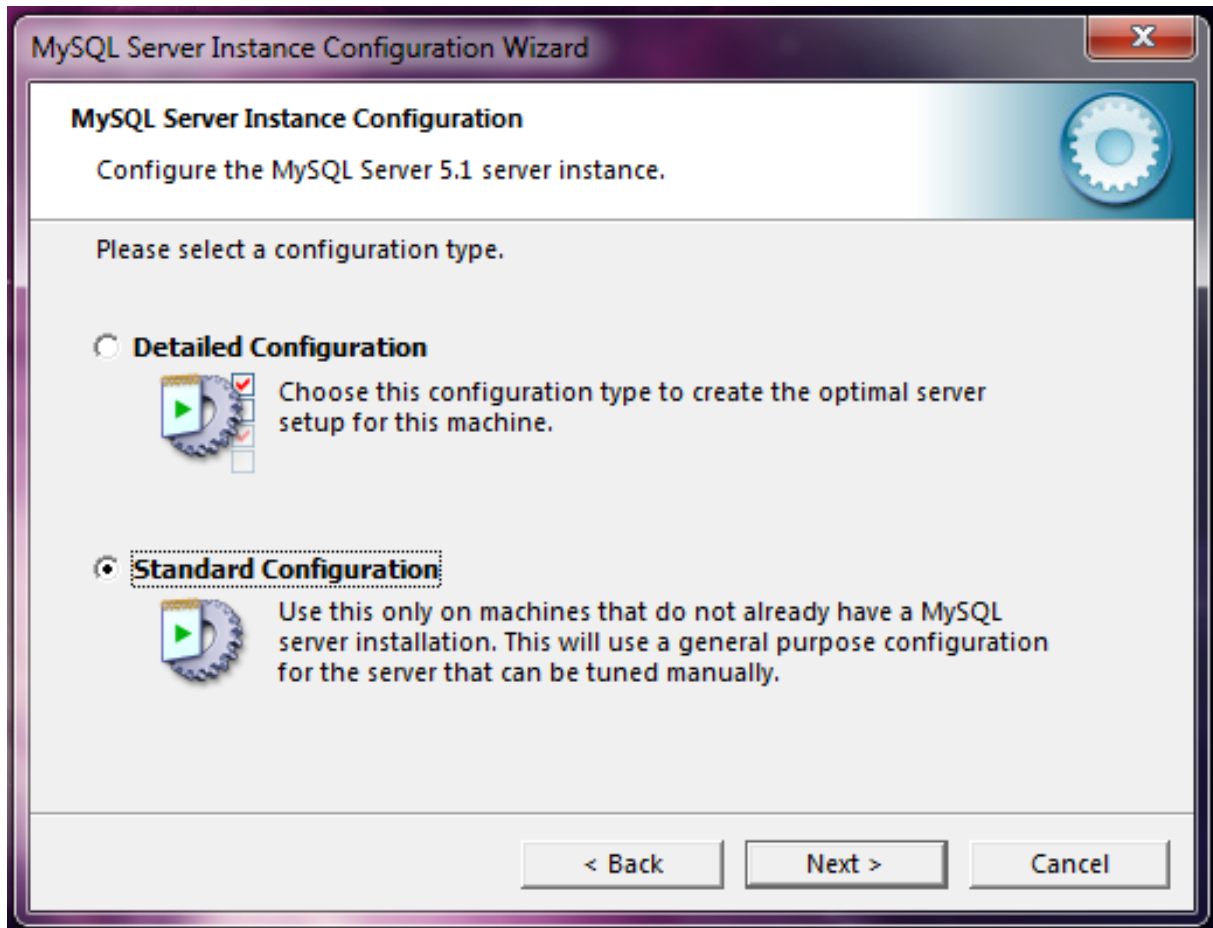






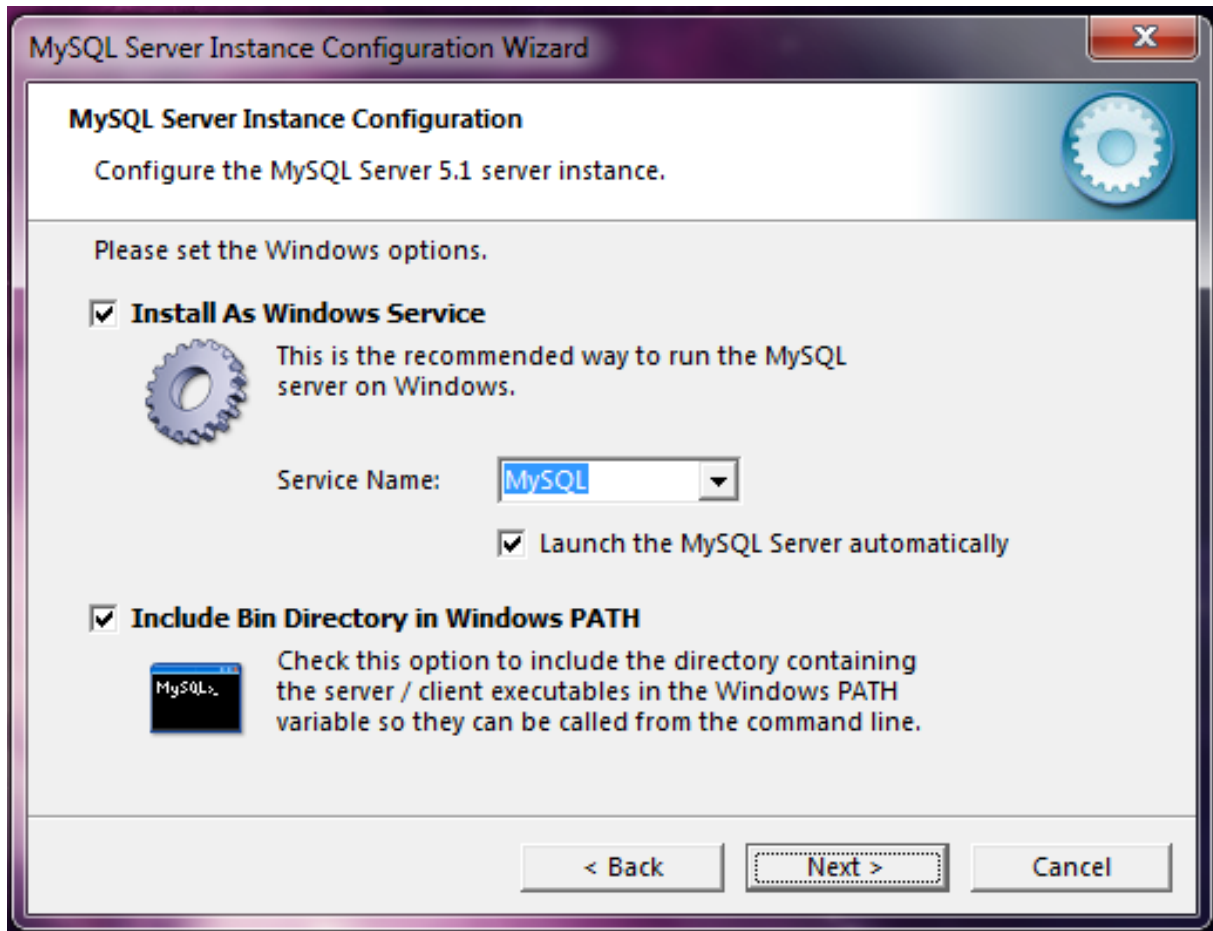


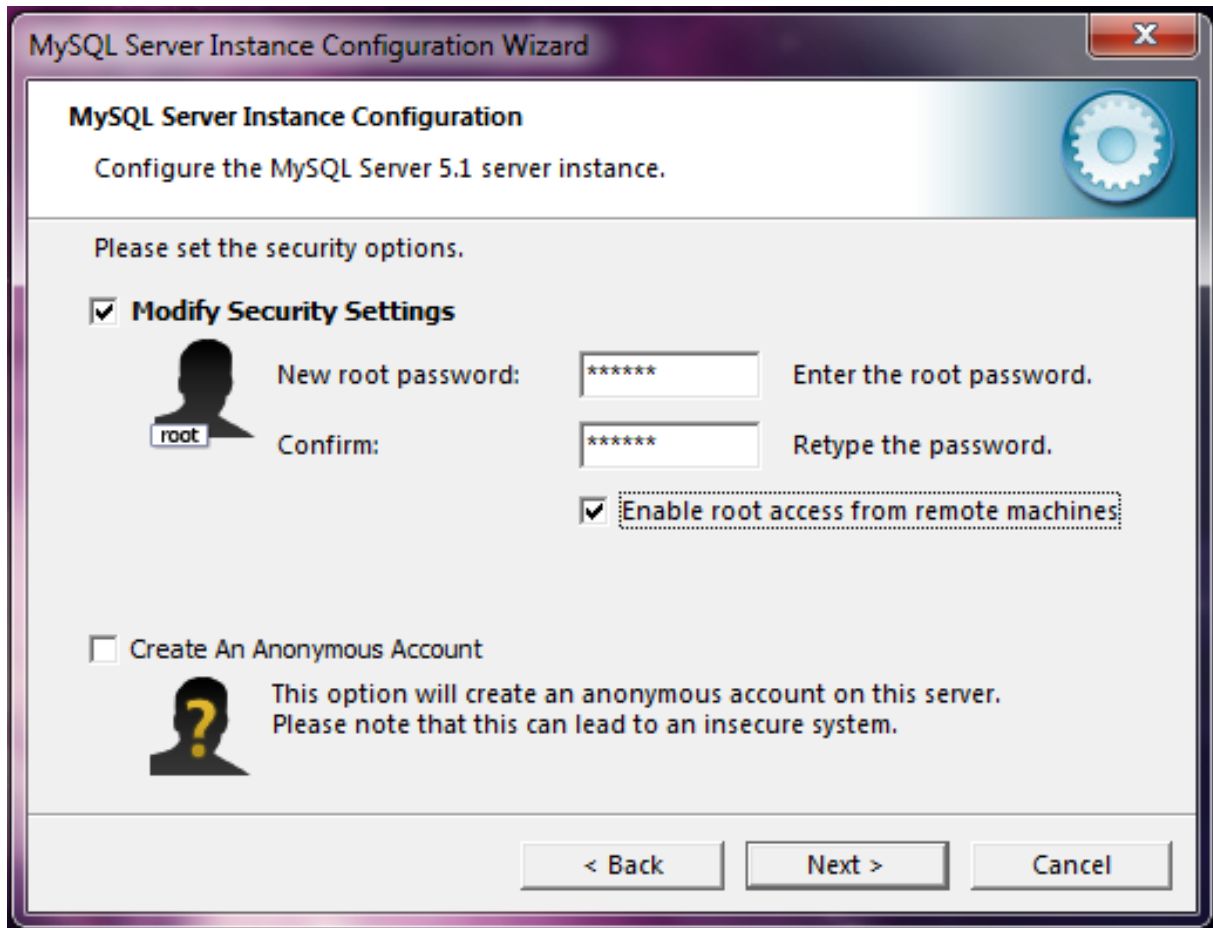
Install MySQL database and create dcm4chee database (Follow the screenshots)



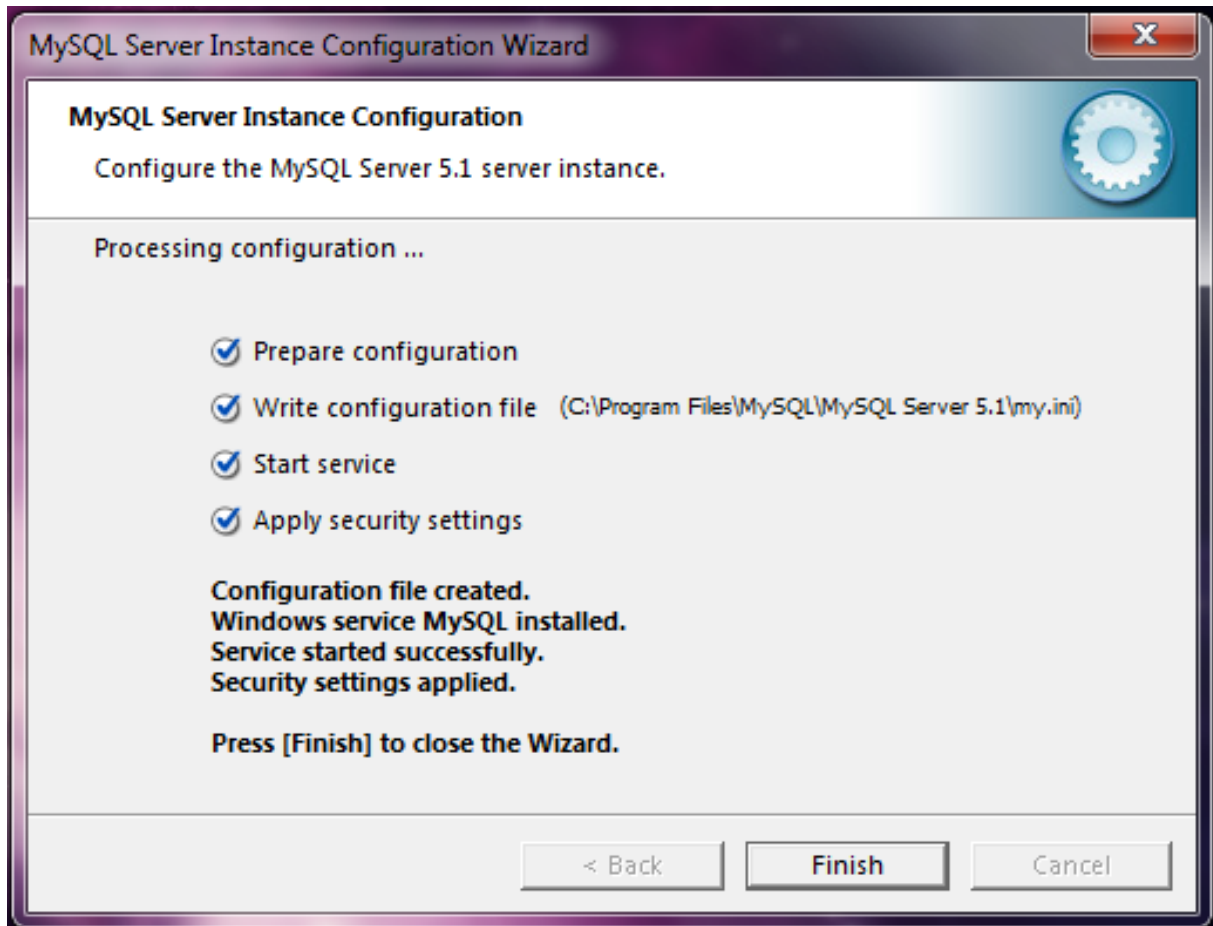
You can select Standard Configuration or Detailed Configuration. For easier setup follow the Standard or select Detailed if you know what you are doing.

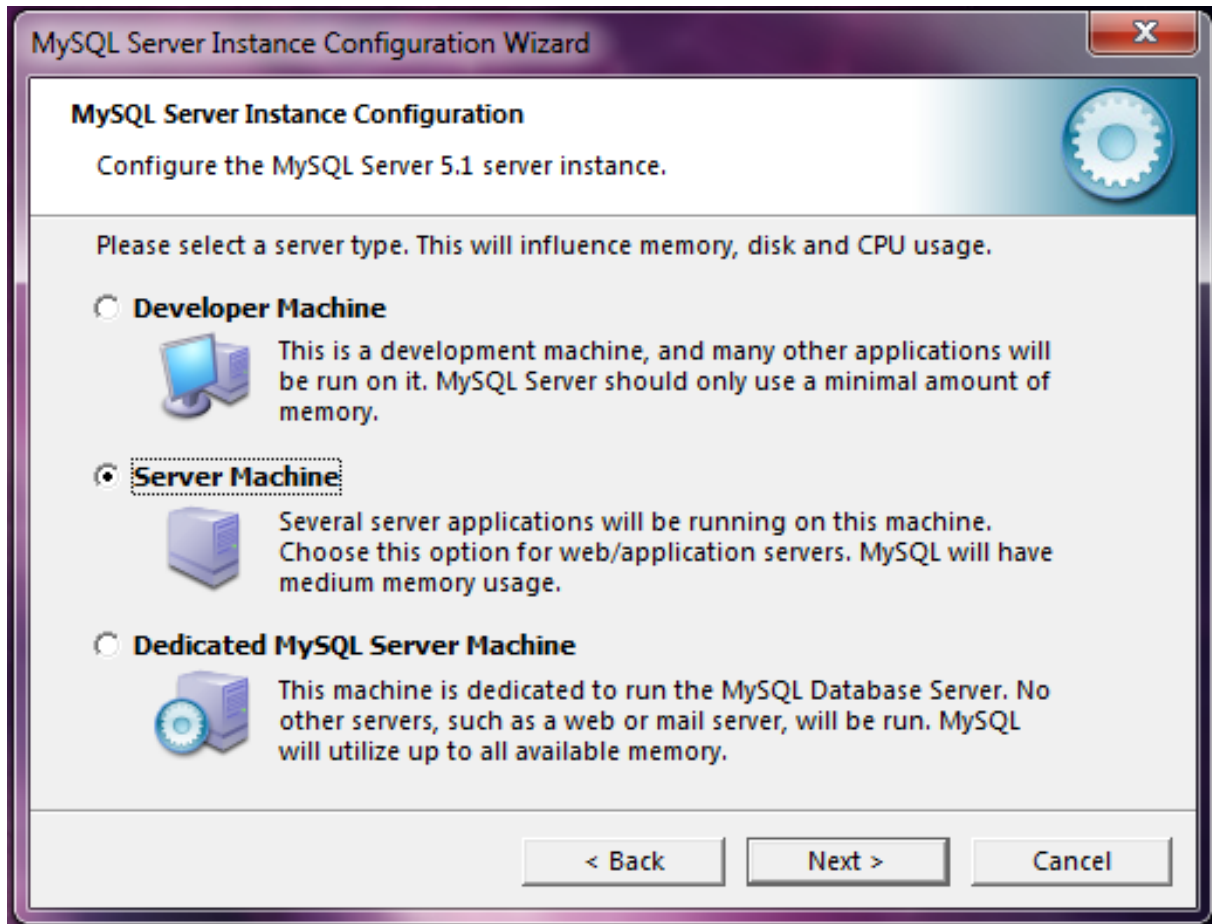
Check Install As Windows Service. This will allow MySQL to start automatically when Windows starts. Check also Include Bin Directory in Windows Path.





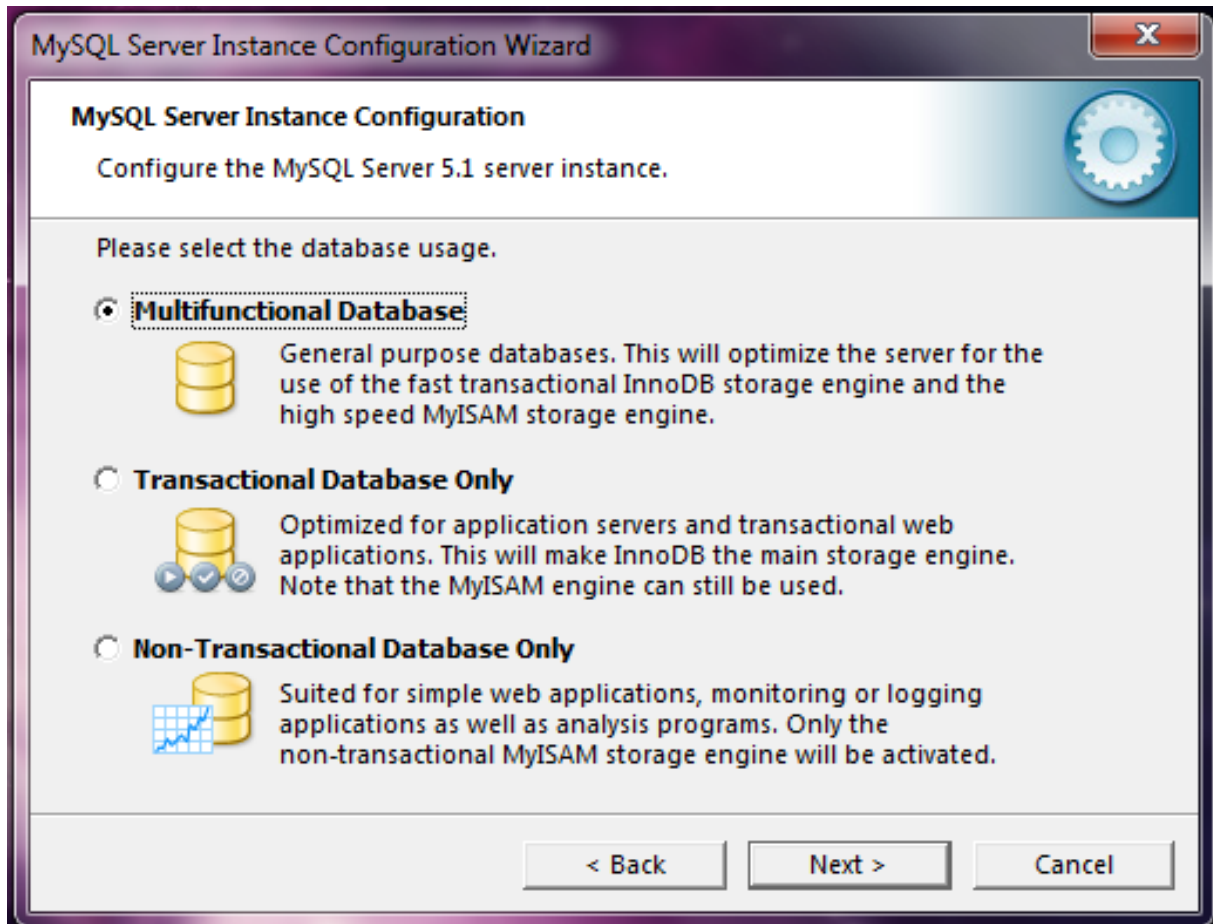
Put your root (administrator) password. Save this in a secure place! If you check Enable root access from remote machines, it will allow your IT admin or PACS admin to access the database remotely.

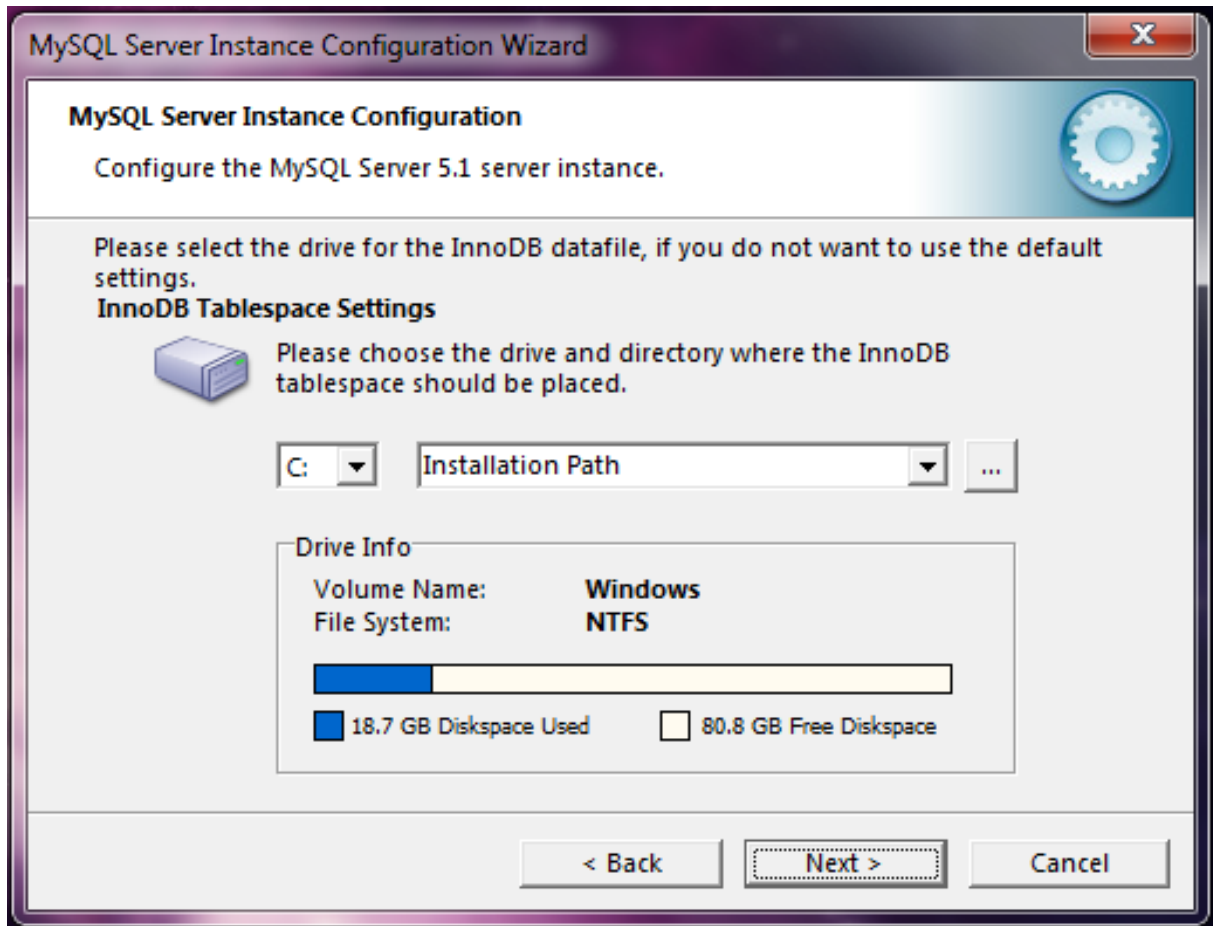


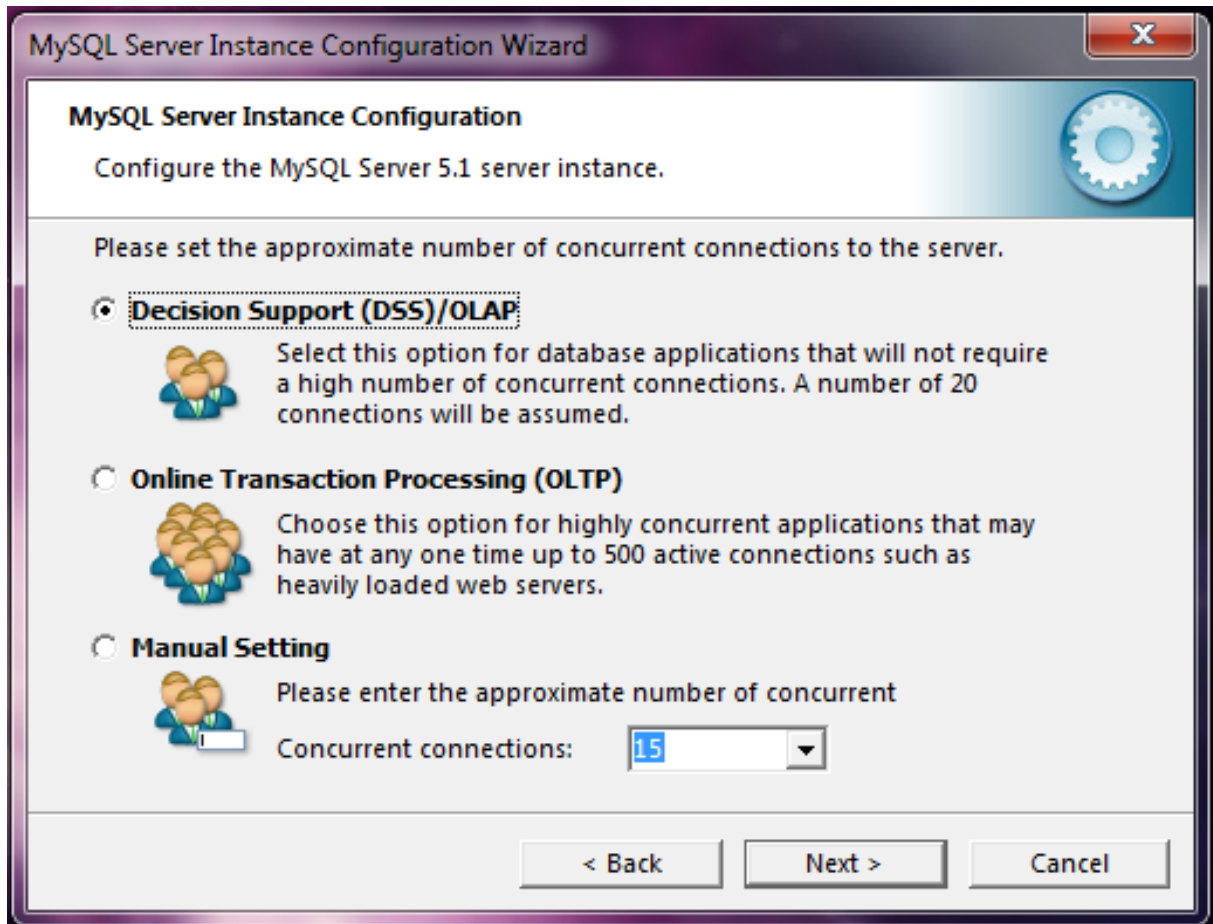


If you decide to go for Detailed Configuration. You will get the following screens.
(Skip if you followed the Standard Configuration)

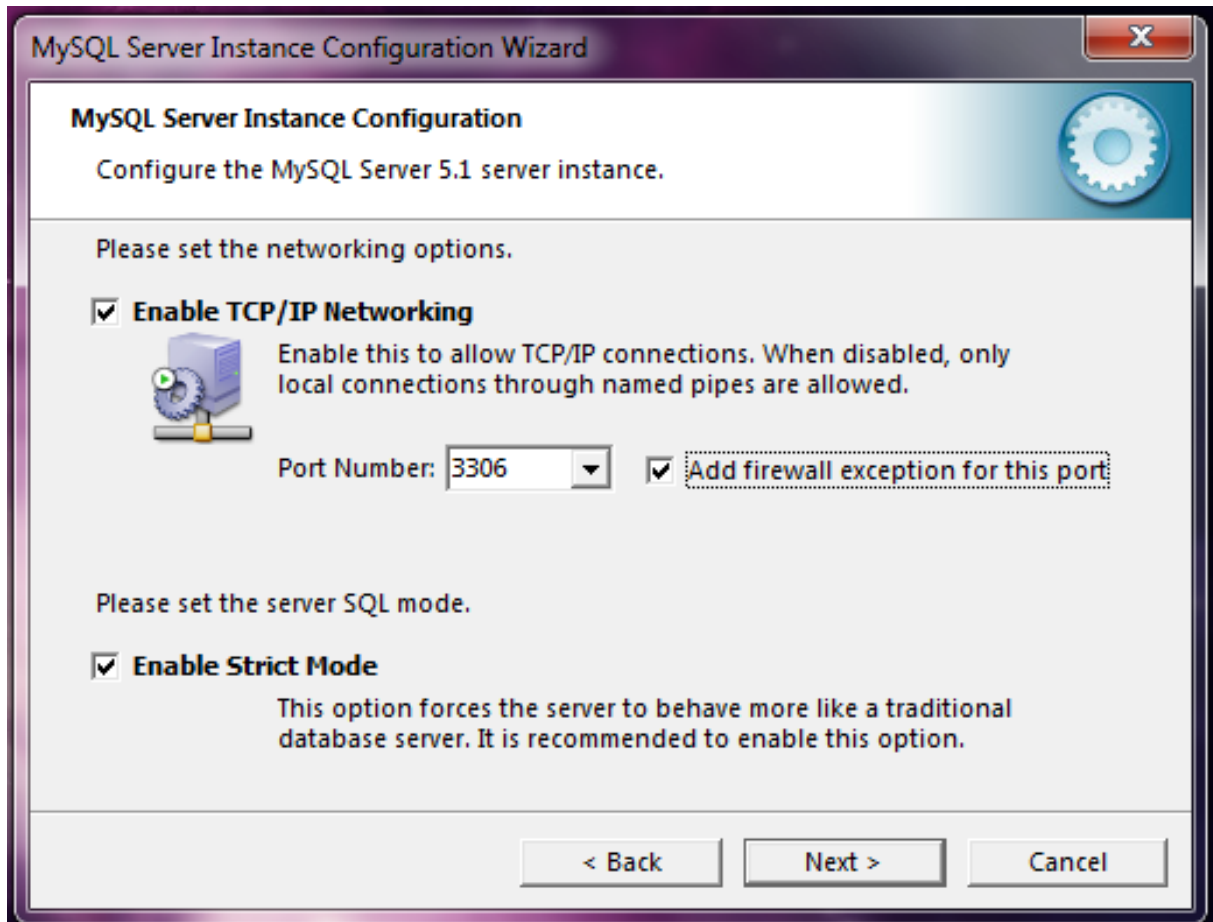
Since we will be running JBoss server and MySQL, we select: Server Machine

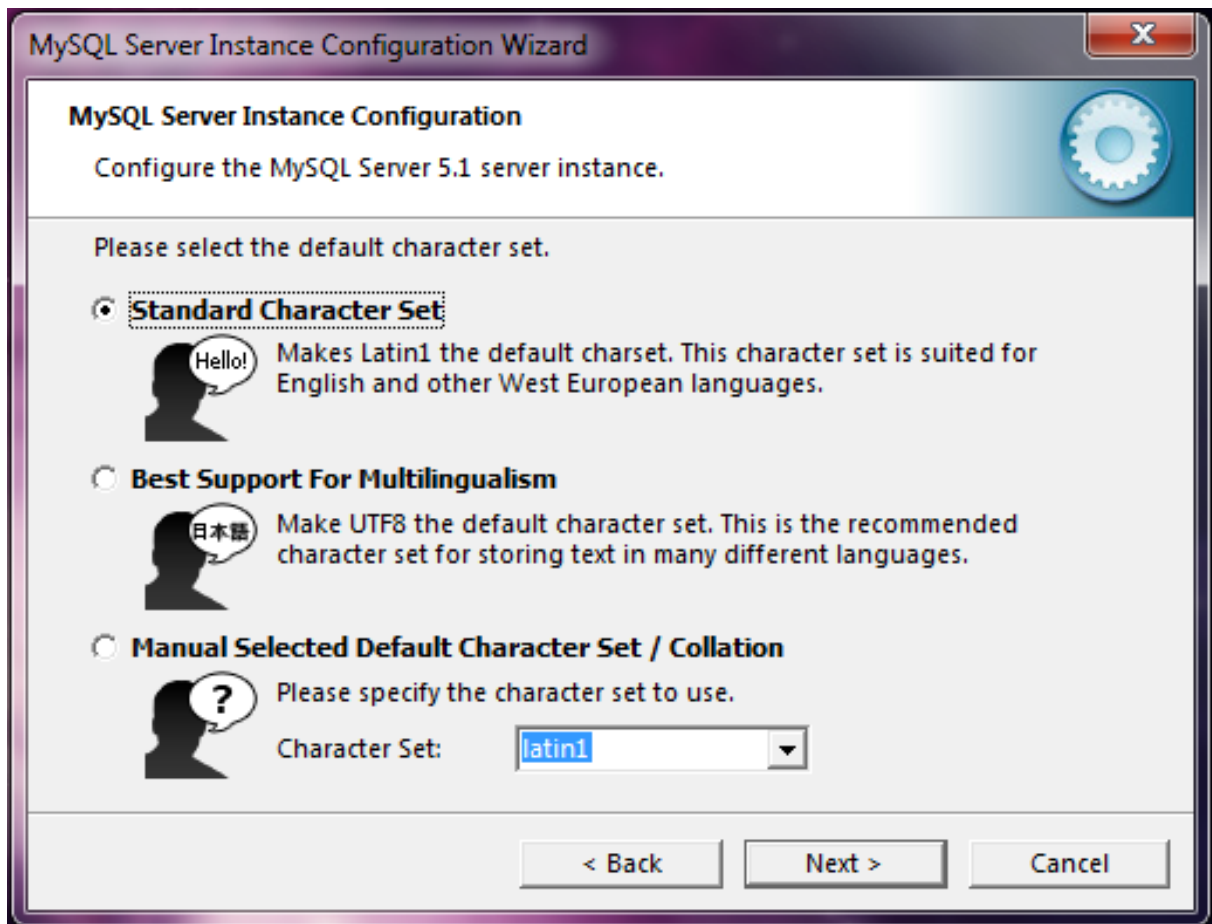






Select the option based on your concurrent number of users





If you are going to use non-latin characters like: Japanese, Chinese, Farsi...etc, select Best support for multilingualism otherwise select Standard Character set.

The rest is the same as in Standard installation.

Now we need to create a database for dcm4chee. To do so we initiate the pacddb database instance using `dcm4chee-mysql-2.14.7/sql/create.mysql`

Go to command prompt and type:

```
mysql -uroot -p
```

```
C:\>mysql -u root -p
Enter password: *****
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 59
Server version: 5.1.41-community MySQL Community Server (GPL)

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
mysql>
```

Input your MySQL root password. Now you will get: mysql>

Type the following line by line including the ; at the end and press Enter key at the end of each line.

```
create database pacsdb;
grant all on pacsdb.* to
'pacs'@'localhost' identified by 'pacs';
quit
mysql -upacs -ppacs pacsdb <
c:/apps/dcm4chee-mysql-2.14.7/sql/create.mysql
```

```
Administrator: C:\Windows\System32\cmd.exe - mysql -upacs -ppacs pacsdb
C:\>mysql -uroot -p
Enter password: *****
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 88
Server version: 5.1.41-community MySQL Community Server (GPL)

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> create database pacsdb;
Query OK, 1 row affected (0.02 sec)

mysql> grant all on pacsdb.* to 'pacs'@'localhost' identified by 'pacs';
Query OK, 0 rows affected (0.07 sec)

mysql> \q
Bye

C:\>mysql -upacs -ppacs pacsdb < dcm4chee-mysql-2.13.6/sql/create.mysql
The system cannot find the path specified.

C:\>mysql -upacs -ppacs pacsdb < dcm4chee-mysql-2.14.7/sql/create.mysql
The system cannot find the path specified.

C:\>mysql -upacs -ppacs pacsdb < c:/apps/dcm4chee-mysql-2.14.7/sql/create.mysql
```

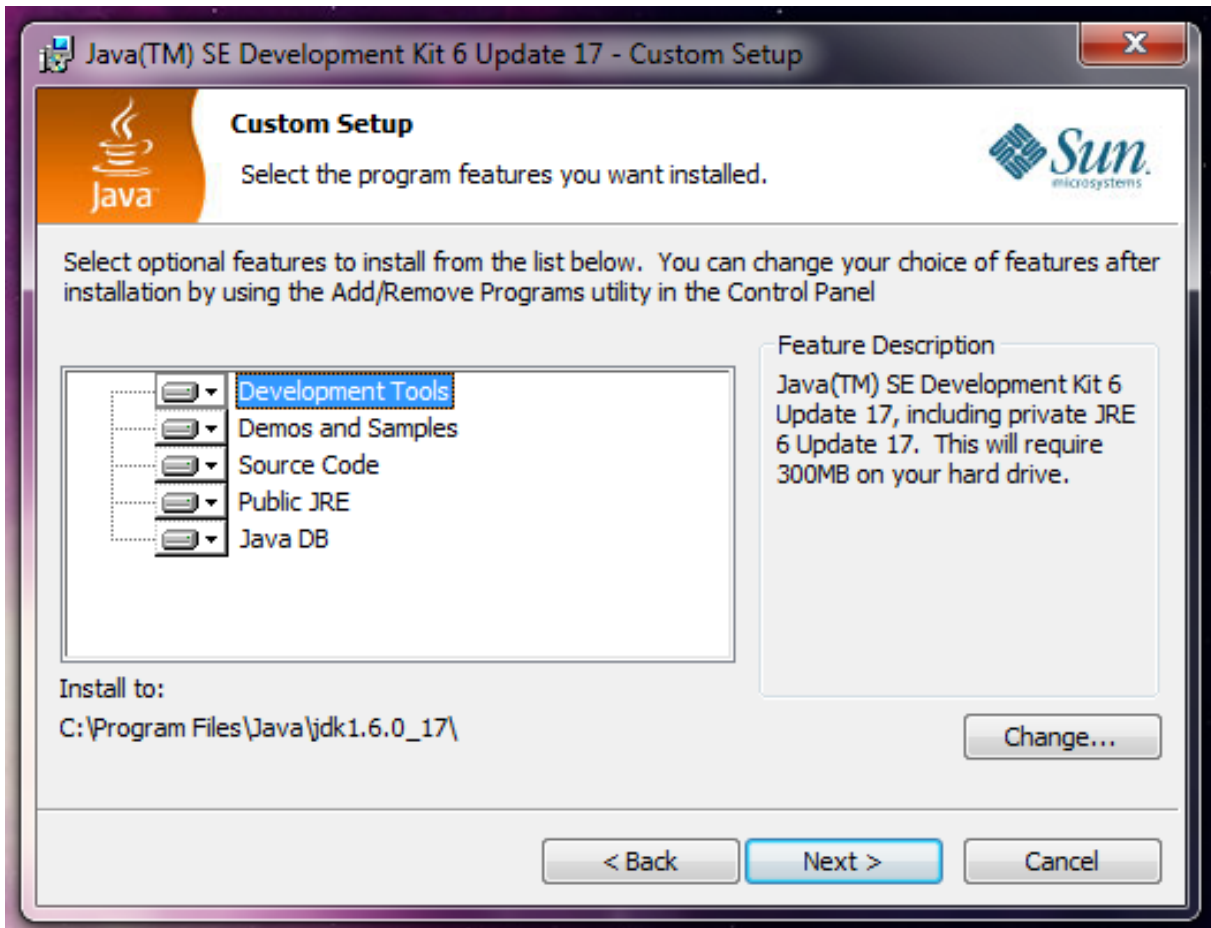
For more information, refer to dcm4chee MySQL database setup [here](#). **Deploy the Audit Record Repository (ARR)**

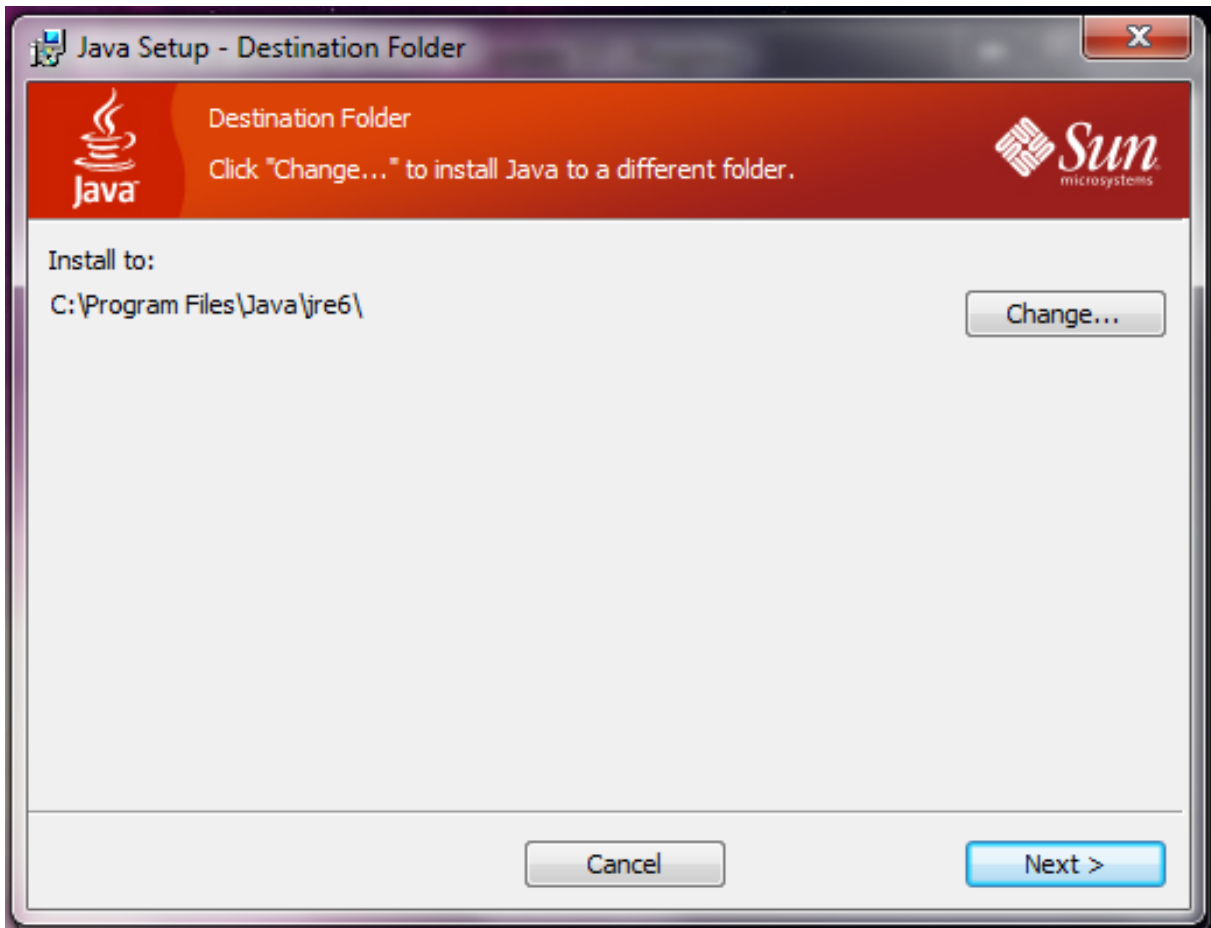
Execute the command `install_arr.bat` in the command prompt in the bin directory of dcm4chee and include the path to dcm4chee-arr-3.0.8 as seen in the screenshot.

```

```

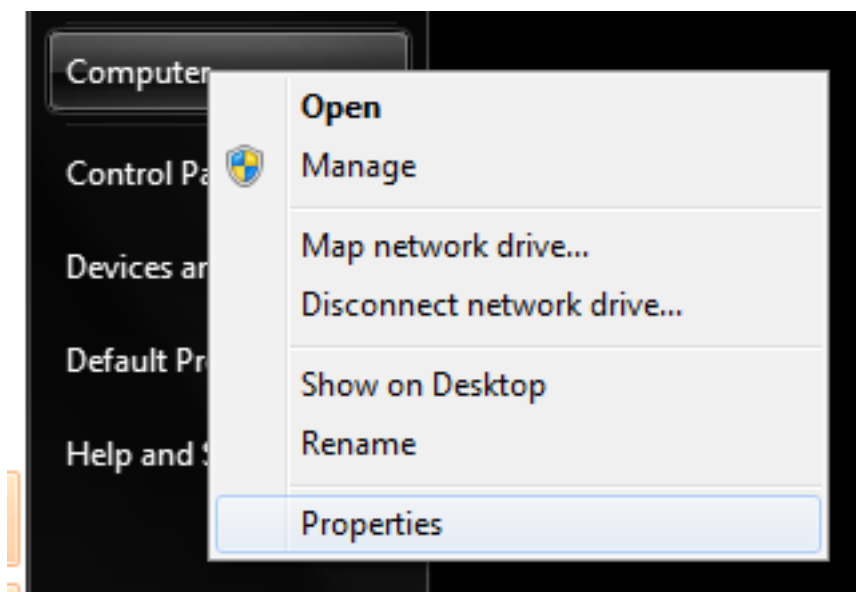
5. Installing Java Development Kit and Setting up the environment variable for JAVA_HOME to JDK location

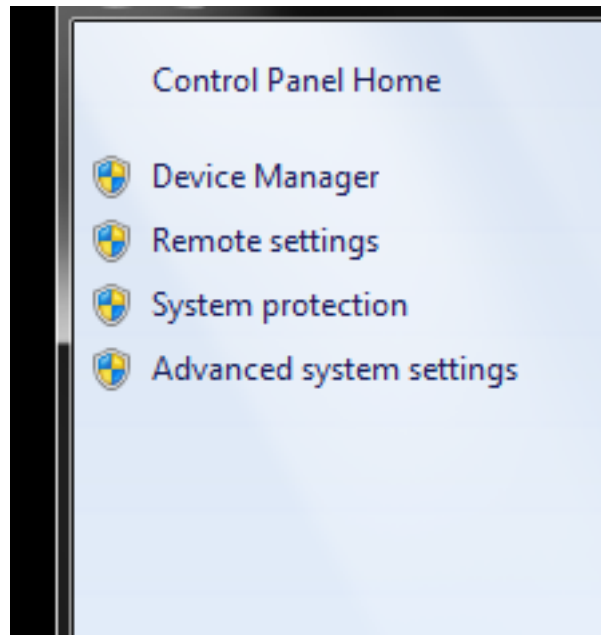


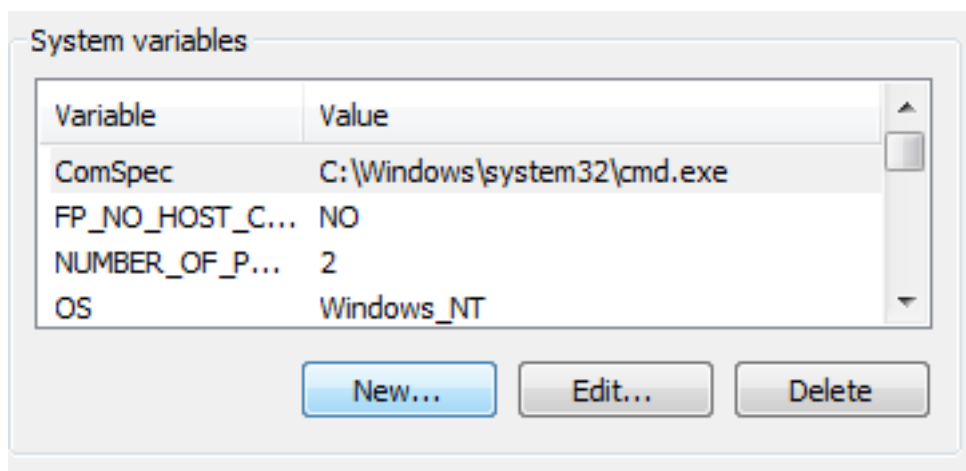
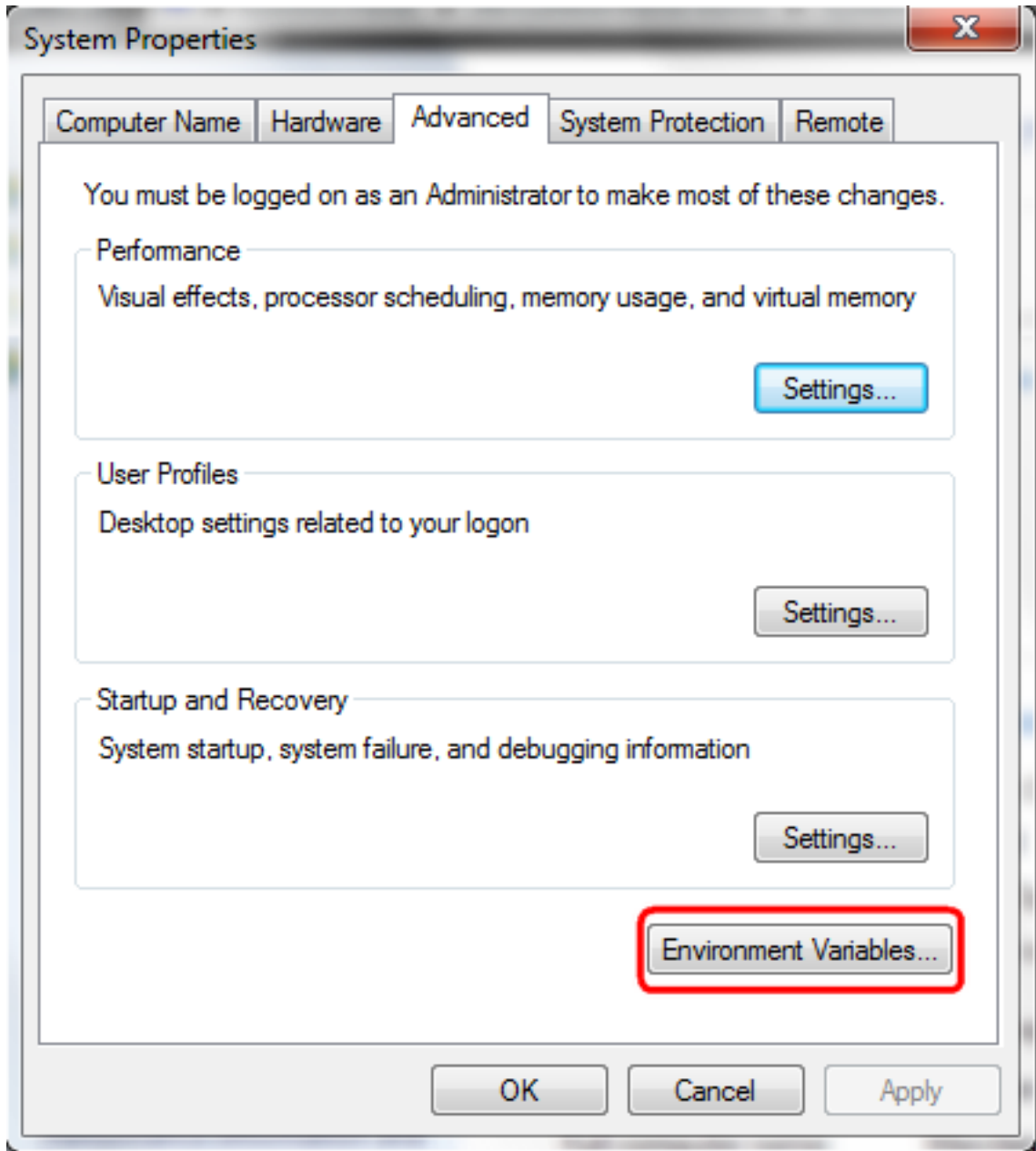


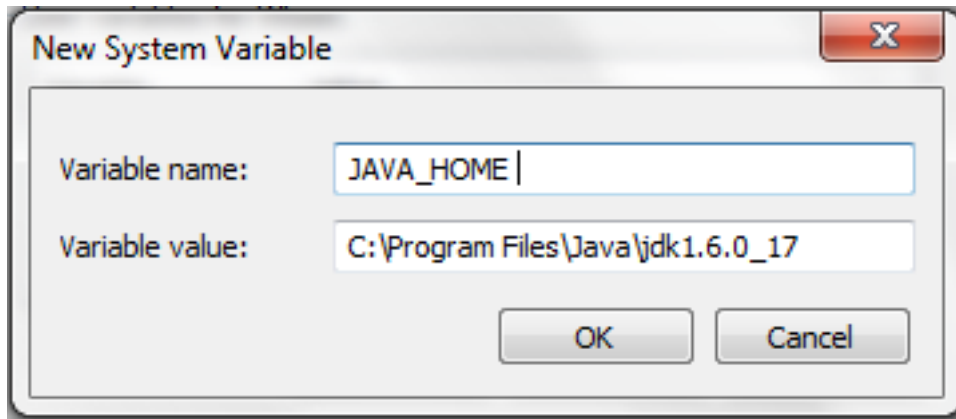


To set up the environment variable to JDK location, right click on my computer>Properties>Advanced System Settings> Environment Variables









Here we are referring to the installed version of JDK 6 update 17. If you are using a different version go and check your program files under Java.

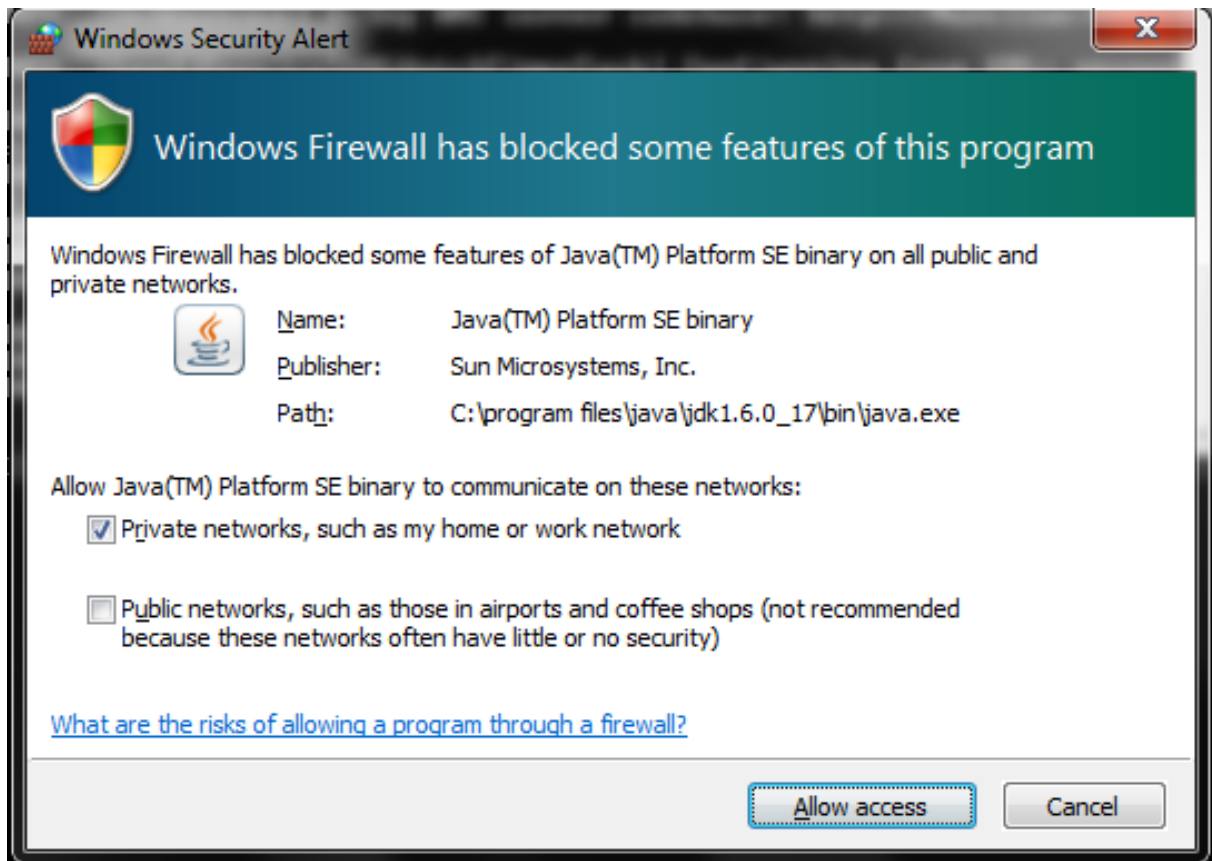
Click Ok. Now Reboot your Windows for changes (Environment variables) to take effect.

6. Launching DCM4CHEE

```
C:\apps\dcm4chee-mysql-2.14.7\bin>run.bat
```

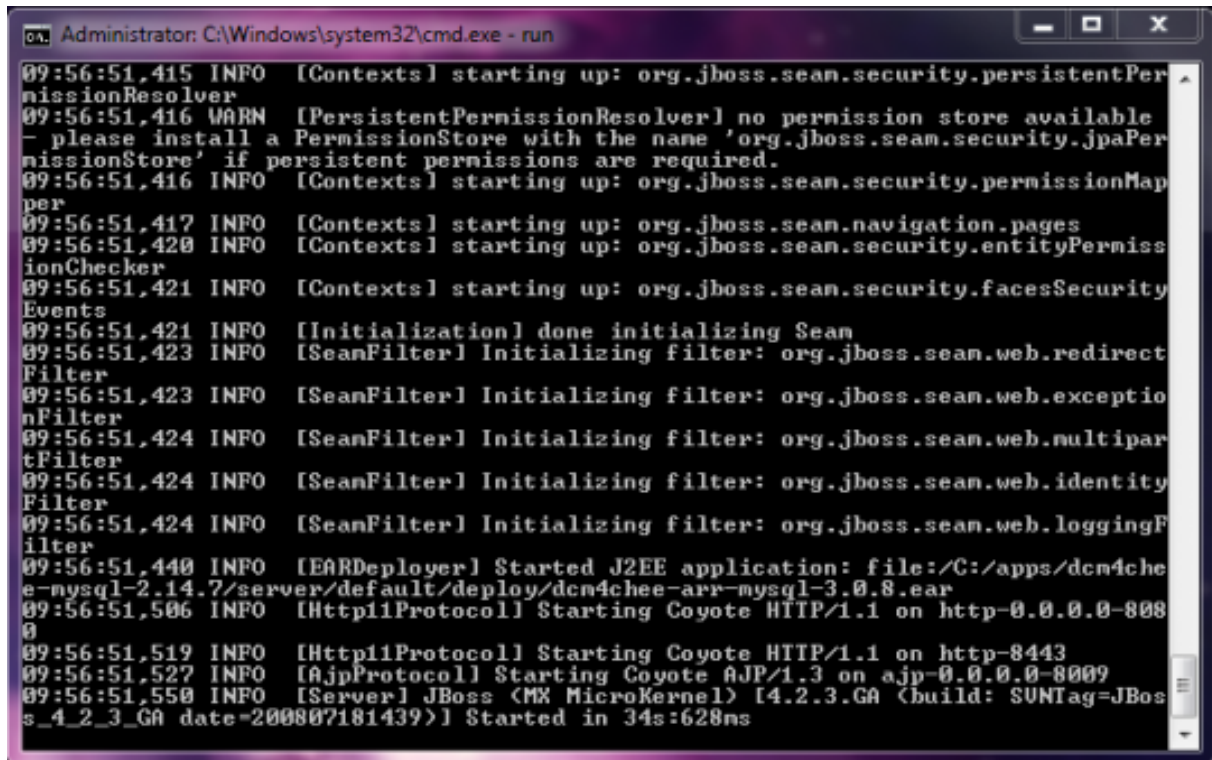
We are ready to test all the work we did previously. Go to command prompt again and navigate to dcm4chee-mysql-2.14.7/bin then execute run.bat

Allow access for Java through Windows Firewall



In the command prompt you will notice lines moving up quickly. (It might take a minute or two to finish loading). You shouldn't see any errors like access denied or couldn't create connection. Otherwise, something has gone wrong from the previous

If everything is right you will see a window similar to this:

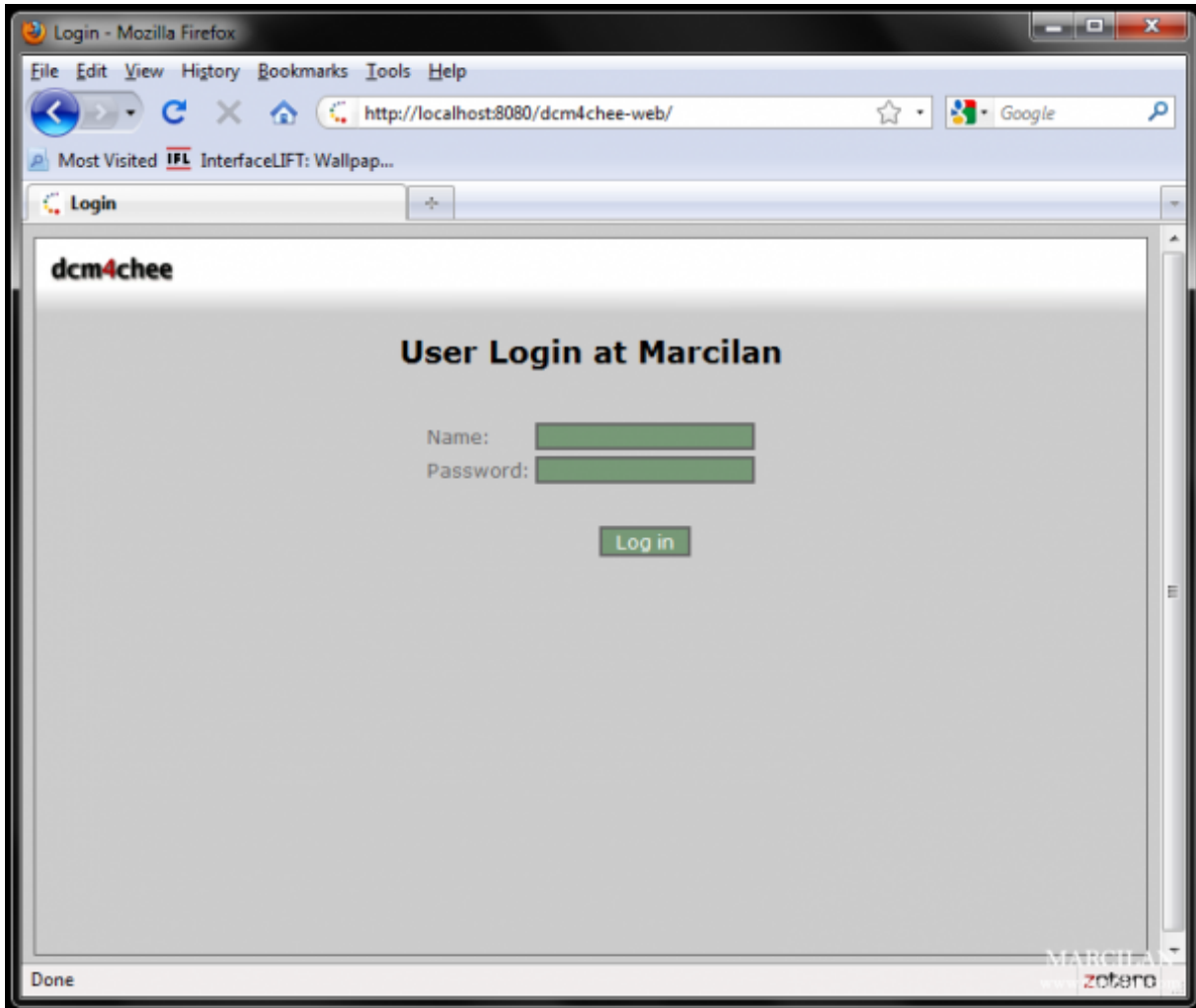
A screenshot of a Windows command prompt window titled "Administrator: C:\Windows\system32\cmd.exe - run". The window displays a series of log messages from JBoss. The messages include: [Contexts] starting up: org.jboss.seam.security.persistentPermissionResolver; [PersistentPermissionResolver] no permission store available - please install a PermissionStore with the name 'org.jboss.seam.security.jpaPermissionStore' if persistent permissions are required.; [Contexts] starting up: org.jboss.seam.security.permissionMapper; [Contexts] starting up: org.jboss.seam.navigation.pages; [Contexts] starting up: org.jboss.seam.security.entityPermissionChecker; [Contexts] starting up: org.jboss.seam.security.facesSecurityEvents; [Initialization] done initializing Seam; [SeamFilter] Initializing filter: org.jboss.seam.web.redirectFilter; [SeamFilter] Initializing filter: org.jboss.seam.web.exceptionFilter; [SeamFilter] Initializing filter: org.jboss.seam.web.multipartFilter; [SeamFilter] Initializing filter: org.jboss.seam.web.identityFilter; [SeamFilter] Initializing filter: org.jboss.seam.web.loggingFilter; [EARDeployer] Started J2EE application: file:/C:/apps/dcm4chee-mysql-2.14.7/server/default/deploy/dcm4chee-arr-mysql-3.0.8.ear; [Http11Protocol] Starting Coyote HTTP/1.1 on http-0.0.0.0-8080; [Http11Protocol] Starting Coyote HTTP/1.1 on http-8443; [AjpProtocol] Starting Coyote AJP/1.3 on ajp-0.0.0.0-8009; [Server] JBoss (MX MicroKernel) [4.2.3.GA (build: SUNTag=JBoss_4_2_3_GA date=200807181439)] Started in 34s:628ms.

```
09:56:51,415 INFO [Contexts] starting up: org.jboss.seam.security.persistentPer
missionResolver
09:56:51,416 WARN [PersistentPermissionResolver] no permission store available
- please install a PermissionStore with the name 'org.jboss.seam.security.jpaPer
missionStore' if persistent permissions are required.
09:56:51,416 INFO [Contexts] starting up: org.jboss.seam.security.permissionMap
per
09:56:51,417 INFO [Contexts] starting up: org.jboss.seam.navigation.pages
09:56:51,420 INFO [Contexts] starting up: org.jboss.seam.security.entityPermiss
ionChecker
09:56:51,421 INFO [Contexts] starting up: org.jboss.seam.security.facesSecurity
Events
09:56:51,421 INFO [[Initialization] done initializing Seam
09:56:51,423 INFO [SeamFilter] Initializing filter: org.jboss.seam.web.redirect
Filter
09:56:51,423 INFO [SeamFilter] Initializing filter: org.jboss.seam.web.exception
nFilter
09:56:51,424 INFO [SeamFilter] Initializing filter: org.jboss.seam.web.multipart
Filter
09:56:51,424 INFO [SeamFilter] Initializing filter: org.jboss.seam.web.identity
Filter
09:56:51,424 INFO [SeamFilter] Initializing filter: org.jboss.seam.web.loggingF
ilter
09:56:51,440 INFO [EARDeployer] Started J2EE application: file:/C:/apps/dcm4che
e-mysql-2.14.7/server/default/deploy/dcm4chee-arr-mysql-3.0.8.ear
09:56:51,506 INFO [Http11Protocol] Starting Coyote HTTP/1.1 on http-0.0.0.0-808
0
09:56:51,519 INFO [Http11Protocol] Starting Coyote HTTP/1.1 on http-8443
09:56:51,527 INFO [AjpProtocol] Starting Coyote AJP/1.3 on ajp-0.0.0.0-8009
09:56:51,550 INFO [Server] JBoss (MX MicroKernel) [4.2.3.GA (build: SUNTag=JBos
s_4_2_3_GA date=200807181439)] Started in 34s:628ms
```

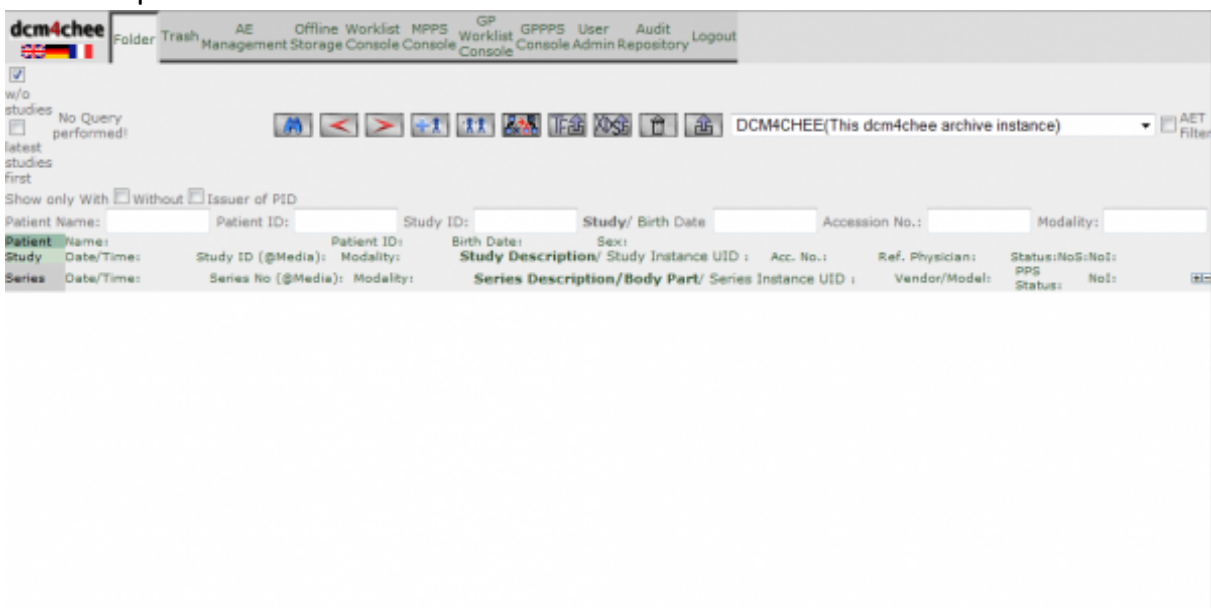
Check the last line. Started!!

7. Login into the web interface

Now keep the command prompt open. Open your web browser and go to <http://localhost:8080/dcm4chee-web/>



You should get dcm4chee web interface
Now for the username type: admin
and the password is also: admin



Cross your fingers!

Congratulations! you just managed to install a web server, setup a database, and deploy a fully functional free PACS that can be used to interface with your Cone Beam CT (CBCT) machine, CT, MRI, ..etc and your viewing software in your imaging center or dental school for all your imaging needs. In part 2 of the tutorial we will see how to make dcm4chee starts automatically with Windows to avoid the console window all together.