Clinical Research Chart Cell

Installation Guide (Linux)

Version 1.0

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About this Guide

Informatics for Integrating Biology and the Bedside (i2b2) is one of the sponsored initiatives of the NIH Roadmap National Centers for Biomedical Computing (http://www.bisti.nih.gov/ncbc/). One of the goals of i2b2 is to provide clinical investigators broadly with the software tools necessary to collect and manage project-related clinical research data in the genomics age as a cohesive entity—a software suite to construct and manage the modern clinical research chart. This guide with the provided source code will help you deploy an i2b2 cell.

Document Version History

Date	Revision	Description	Author(s)
10/26/2007	1.0	Version 1.0	Raj Kuttan, Lori Phillips

1

Prerequisites

Required Software

If you installed the prerequisite software from the Hive Installation Guide you may skip this section.

a. Java JDK

JDK 5.0 (recommended)

Download JDK 5.0 Update 11 (jdk-1_5_0_11-linux-i586.bin) from http://java.sun.com/products/archive/

b. JBoss 4.2.0GA

Download 'jboss-4.2.0.GA.zip', from http://labs.jboss.com/jbossas/downloads.

a)Unzip jboss-4.2.0.GA.zip into a directory of your choice (/opt/jboss-4.2.0.GA or YOUR_JBOSS_HOME_DIR)

b)Set JBoss JVM to run with 1GB extended memory.

Edit 'YOUR_JBOSS_HOME_DIR/bin/run.conf' and change the JAVA_OPTS memory settings to that shown below. (-Xms512m, -Xmx1024m)

```
#
#  Specify options to pass to the Java VM.
#
if [ "x$JAVA_OPTS" = "x" ]; then
    JAVA_OPTS="-Xms512m -Xmx1024m
   -Dsun.rmi.dgc.client.gcInterval=3600000
   -Dsun.rmi.dgc.server.gcInterval=3600000"
fi
```

c) If default port 8080 is unavailable (another application is using this port), edit 'YOUR_JBOSS_HOME_DIR/server/default/deploy/jboss-web.deployer/ server.xml' file to reconfigure the non-SSL HTTP/1.1 Connector to another port such as 9090

```
<!—Define a non-SSL HTTP/1.1 Connector on port 9090 →
<Connector port="9090" address="${jboss.bind.address}"
         maxThreads="250" maxHttpHeaderSize="8192"
         emptySessionPath="true" protocol="HTTP/1.1"
         enableLookups="false" redirectPort="8443"
         acceptCount="100" connectionTimeout="20000"
         disableUploadTimeout="true" />
```

```
<!—Define an AJP 1.3 Connector on port 9009 →
<Connector port="9009" address="${jboss.bind.address}"
         maxThreads="250" maxHttpHeaderSize="8192"
         protocol="AJP/1.3 emptySessionPath="true"
         enableLookups=”false” redirectPort=”8443”/>
```

c. Apache Ant 1.6.5

Download 'Apache Ant version 1.6.5' (apache-ant-1.6.5-bin.zip) from http://archive.apache.org/dist/ant/binaries/

a)Unzip into a directory of your choice (/opt/apache-ant-1.6.5 or YOUR_ANT_HOME_DIR)

d. Apache Axis2 1.1

Download 'Apache Axis2 version 1.1', from http://ws.apache.org/axis2/download/1_1/download.cgi and select the download type WAR (Web Archive) Distribution.(axis2.war)

a)Create folder i2b2.war inside 'YOUR_JBOSS_HOME_DIR/server/default/deploy'

b)Unzip axis2.war inside 'YOUR_JBOSS_HOME_DIR/server/default/deploy/i2b2.war' folder.

e. Oracle Express Edition

a)Download Oracle Database 10gExpress Edition (Universal) 'oracle 10g EE' 'oracle-xe-univ-10.2.0.1-1.0.i386.rpm' from http://www.oracle.com/technology/software/products/database/xe/htdocs/102xelinsoft.html

b) Run 'rpm -i oracle-xe-univ-10.2.0.1-1.0.i386.rpm' as root

Run '/etc/init.d/oracle-xe configure' as root to configure the database

Select HTTP and listener ports (use defaults 8080/1521 if they are available)

Select 'Y'es to start on boot when asked

c) To verify that Oracle was properly installed, open a browser and enter http://yourHost:yourPort/apex. You should see an Oracle Database Express Edition login screen.

f. CVS client

If installing application source code from CVS, make sure $CVSROOT variable is pointed to phsi2b2appdev's /cvs/repository (ext:tomcat@phsi2b2appdev.mgh.harvard.edu:/cvs/repository)

g. Update your environment variables

Be sure to set the JAVA_HOME, ANT_HOME and JBOSS_HOME variables to the JAVA, ANT and JBOSS home directories you set up in steps a-c respectively. Examples are shown below.

```
# Sample environment variables
JAVA_HOME=/opt/java/jdk1.5.0_11
ANT_HOME=/opt/apache-ant-1.6.5
JBOSS_HOME=/opt/jboss-4.2.0.GA
PATH=$PATH:$ANT_HOME/bin:$JAVA_HOME/bin
export JBOSS_HOME
export ANT_HOME
export JAVA_HOME
```

2

Install

Installing the Clinical Research Chart Application

1. Download and extract the core server source code to a target area.

If this has been downloaded in a previous installation (e.g. PM or ONT), there is no need to repeat this step.

a) Set up a target source_directory.

b) Extract core server source code to the target source_directory.

2. Ensure that JBOSS is not running

a) ./$JBOSS_HOME/bin/shutdown.sh -S

3. Deploy edu.harvard.i2b2.common

If this has been deployed in a previous installation (eg. ONT), there is no need to repeat this step.

a) 'cd source_directory/edu.harvard.i2b2.common'

b) Edit the build.properties file and set jboss.home and axis2.war.name properties

```
jboss.home=YOUR_JBOSS_HOME_DIR
axis2.war.name=i2b2.war
```

c) 'ant clean deploy jboss_pre_deployment_setup'

4. Deploy edu.harvard.i2b2.crc

a) 'cd source_directory/edu.harvard.i2b2.crc'

b) Edit the build.properties file and set jboss.home and axis2.war.name properties

```
jboss.home=YOUR_JBOSS_HOME_DIR
axis2.war.name=i2b2.war
```

c) Edit the etc/spring/crc_application_directory.properties file and specify a location for the application properties directory. This location can be anything you desire but must be a directory path that your linux user has access permission for.

```
edu.harvard.i2b2.crc.applicationdir=/crcapp
```

d) Edit the etc/spring/crc.properties file and set database and project management properties

Set database connection properties

```
#####################################################
# Database connection properties for setfinder querys
#####################################################
queryprocessor.database.connection_string=jdbc:oracle:thin:@lo
calhost:1521:xe
queryprocessor.database.user=demodata_uname
queryprocessor.database.password=demodata_password
```

Set metadata schema name

```
#######################################
# METADATA schema name
#######################################
queryprocessor.db.metadataschema=i2b2metadata
```

Set Project Management property settings

```
queryprocessor.ws.pm.url=http://localhost:7070/axis2/rest/PMSe
rvice/getServices
# Flag to bypass project management cell
queryprocessor.ws.pm.bypass=false
queryprocessor.ws.pm.bypass.role=ADMIN
queryprocessor.ws.pm.bypass.project=Demo
```

e) Edit etc/jboss/crc-oracle-ds.xml and set database connection properties

```
<xa-datasource-property
name="URL">jdbc:oracle:thin:@localhost:1521:xe</xa-datasource-
property>
<xa-datasource-property name="User">demodata_uname</xa-
datasource-property>
<xa-datasource-property name="Password">demodata_password</xa-
datasource-property>
```

h)Edit etc/jboss/crc-oracle-jms-ds.xml and set JMS database connection properties

```
<connection-
url>jdbc:oracle:thin:@localhost:1521:xe</connection-url>
<driver-class>oracle.jdbc.driver.OracleDriver</driver-class>
<user-name>demodata_uname</user-name>
<password>demodata_password</password>
```

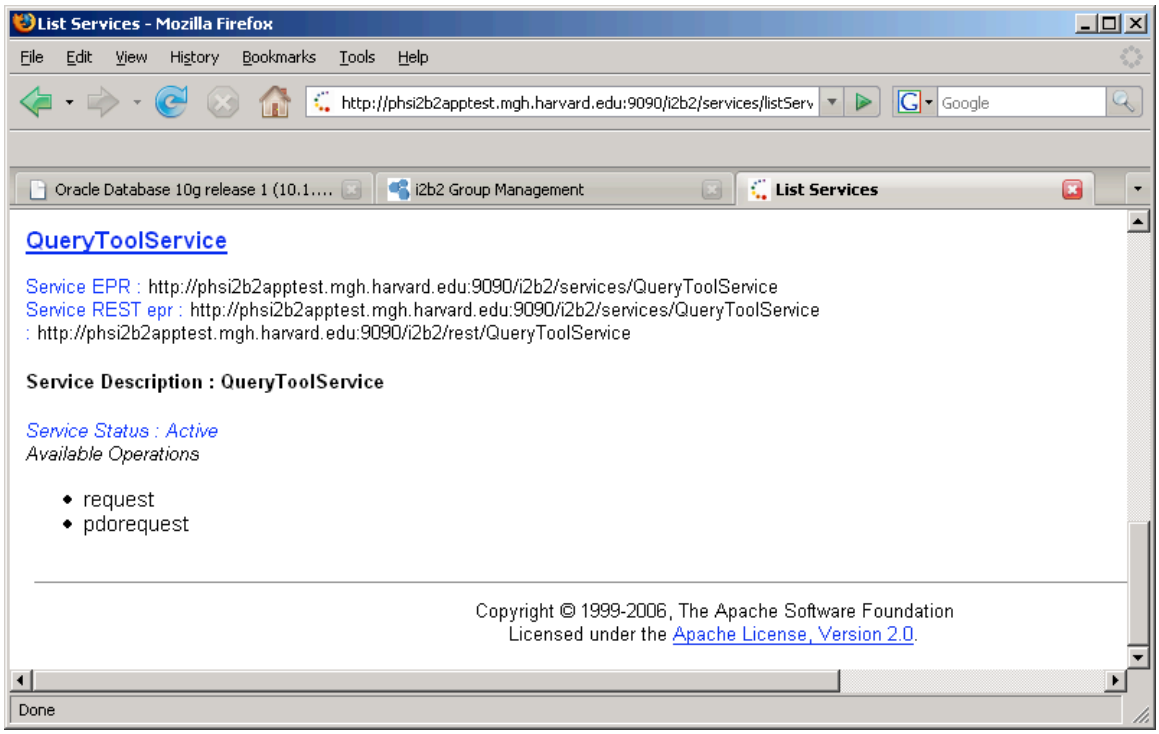
i) 'ant -f master_build.xml build-all deploy'

5. Start JBOSS

a) Run '$JBOSS_HOME/bin/run.sh –b 0.0.0.0'

6. Verify webservice is running

a) Check url 'http://yourHost:9090/i2b2/services/listServices' in a browser. Verify that QueryToolService is listed as active.


List Services - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://phsi2b2apptest.mgh.harvard.edu:9090/i2b2/services/listServ
Google
Oracle Database 10g release 1 (10.1....
i2b2 Group Management
List Services
QueryToolService
Service EPR : http://phsi2b2apptest.mgh.harvard.edu:9090/i2b2/services/QueryToolService
Service REST epr : http://phsi2b2apptest.mgh.harvard.edu:9090/i2b2/services/QueryToolService
: http://phsi2b2apptest.mgh.harvard.edu:9090/i2b2/rest/QueryToolService
Service Description : QueryToolService
Service Status : Active
Available Operations
request
pdorequest
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Done

Changing Server log level

By default JBOSS log will be in DEBUG mode, changing it to INFO mode will increase server performance.

a) Edit $JBOSS_HOME/server/default/conf/jboss-log4j.xml file and add the 'Threshold'<param>.

```
  <appender name="FILE"
class="org.jboss.logging.appender.DailyRollingFileAppender">
      <errorHandler
class="org.jboss.logging.util.OnlyOnceErrorHandler"/>
      <param name="File"
value="${jboss.server.home.dir}/log/server.log"/>
      <param name="Append" value="false"/>
      <param name="Threshold" value="INFO"/>
      <!-- Rollover at midnight each day -->
      <param name="DatePattern" value="'.'yyyy-MM-dd"/>

         <layout class="org.apache.log4j.PatternLayout">
         <!-- The default pattern: Date Priority [Category] Message\n -
->
         <param name="ConversionPattern" value="%d %-5p [%c] %m%n"/>

      . . . . .
      </layout>
   </appender>
```

To switch back to DEBUG mode, comment out the 'Threshold' <param> and wait a minute. THERE IS NO NEED TO RESTART JBOSS.

3

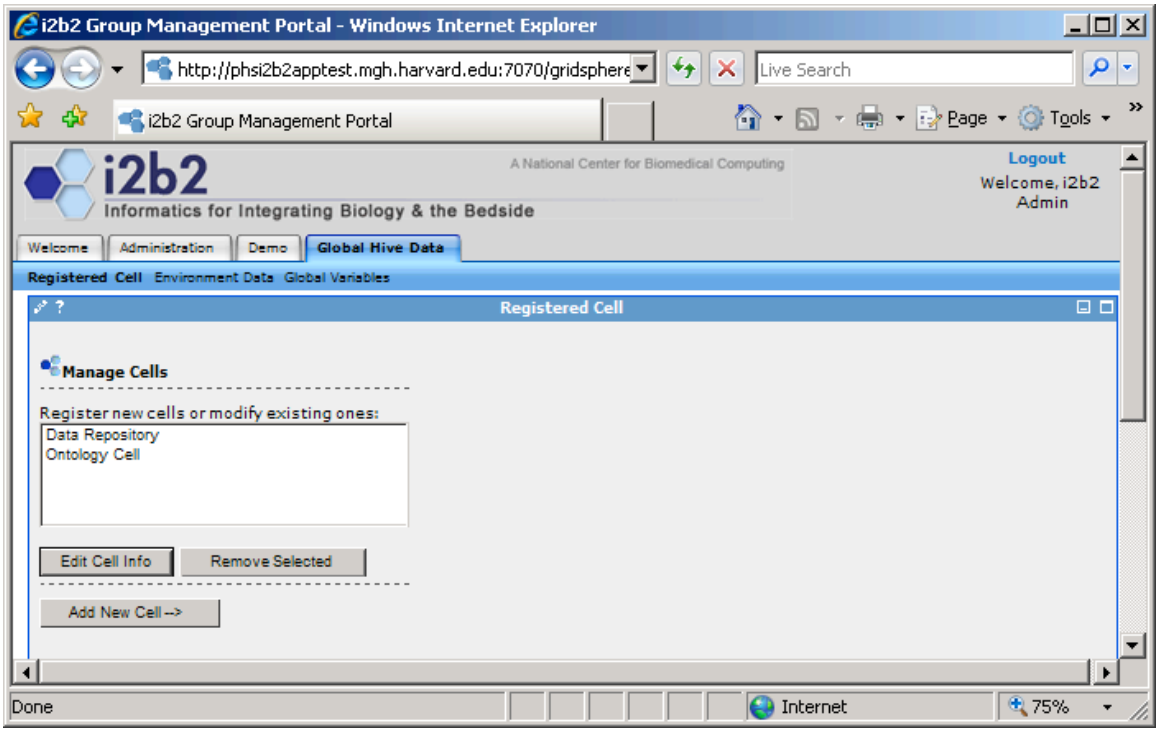
Verify Installation

CRC Cell Sanity Test via the i2b2Workbench

1. **Configure the i2b2Workbench to communicate with your CRC cell.**

This step is addressed in section 5, Global Hive Data of the Project Management (PM) Cell/gridsphere installation and set up. Please refer to this document if the CRC Cell has not yet been configured.

To verify this data, go to the site http://tomcatHost:tomcatPort/gridsphere. Once logged on, select 'Global Hive Data' from the primary navigation tab and 'Registered Cell' from the secondary navigation menu. If the CRC Cell has been configured you will see the following:

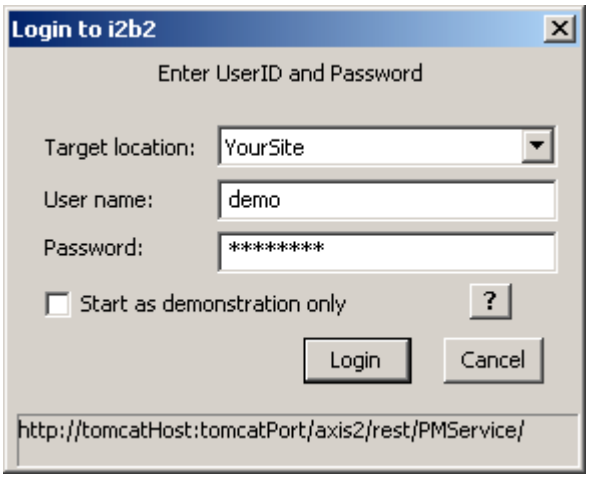


To verify cell data, select cell name and click on Edit Cell Info.

2. Launch the i2b2Workbench (double-click on i2b2Workbench.exe)

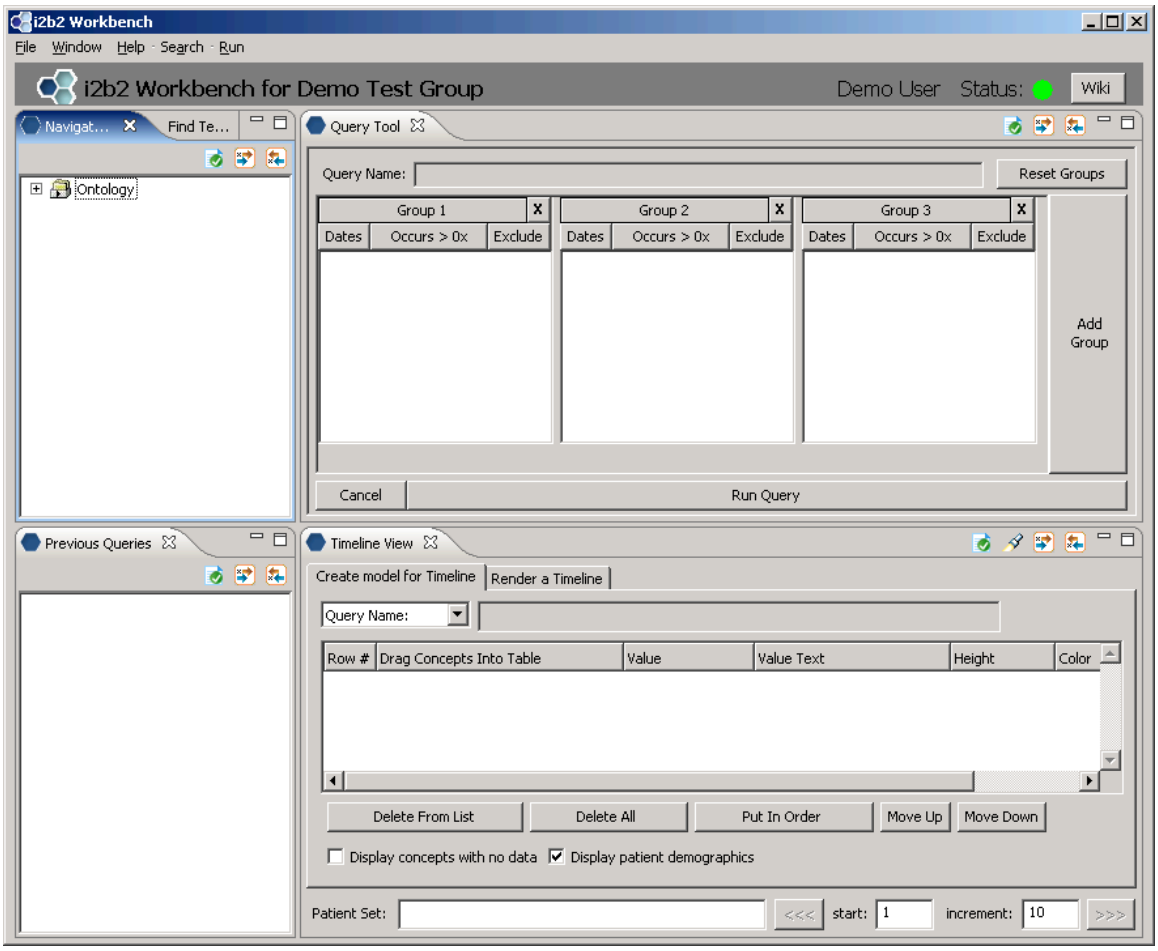
Login to i2b2:

a. Select your target location (YourSite)
b. Enter a valid username and password that you set up in gridsphere (demo/demouser)
c. The URL at the bottom of the login screen should be the address of your PM cell. If not, return to PM Cell installation procedures, section 7, Verify Installation.



3. Open the Query Tool, Previous Queries and Timeline views in the workbench

If all is configured properly, you will be greeted with the following



4. Possible problems

a. Error message appears in view window.

- ‘Data repository cell is unavailable’:

  CRC cell address in gridsphere is incorrect (see step 1 of this section) or
  CRC Cell may be down:
  Check url ‘http://yourHost:9090/i2b2/services/listServices’ in a browser.
  Verify that QueryToolService is listed as active.

- ‘Remote server is unavailable’:

  Server may be down.
  Check url ‘http://yourHost:9090/i2b2/services/listServices’ in a browser.
  Verify that QueryToolServiceService is listed as active.

- ‘PM service is not responding’:

  Project Management Cell is down or its address was not configured properly in section 2 step 4d.

- ‘Database error’:

  There are problems connecting to the database.
  Verify database configuration parameters in section 2 steps 4c-e.

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License

The i2b2 source code is licensed under the i2b2 Software License Software. This includes but not limited to all code in the edu.harvard.mgh.i2b2.* package namespace.