



i2b2 Installation Guide

i2b2 Database, Clients, and Server

Document Management

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i2b2 Installation 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 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 along with the provided source code will help you install the i2b2 server, Web Client, and Workbench.

Chapter 1. Introduction

The i2b2 installation guide is designed to assist users with installing and setting up i2b2 in your environment.

Chapter 1. Table of Contents

1.1 About this Guide

1.2 Installation Process

1.3 Next Steps

1.1 About this Guide

This guide is designed to assist users in the installation of the i2b2 software, which is comprised of the i2b2 database, the core i2b2 cells and both i2b2 clients (Web Client and Workbench). The environment that the i2b2 can be installed can consist of any number of configurations. For instance:

- The i2b2 database can be installed on an Oracle, PostgreSQL, and SQL Server.
- The i2b2 core cells (also known as the i2b2 server) can be installed on a machine that is running Microsoft Windows Server (Windows Server) or Linux.
- The i2b2 Workbench can be installed on a machine running Microsoft Windows (Windows) or Apple's Macintosh (Mac)

Chapter Sections

Since the overall installation process is the same regardless of the environment we have created a single installation guide. It is noted within the documentation when information is specific to a type of database or operating system. The document has been streamlined to provide consistency throughout the installation process. Each chapter will contain the following sections:

Section	Description
Prerequisites	Outlines the steps that need to be completed before starting the chapter.
Installation Overview	Outlines the steps that will be taken during that phase of the installation
Source Code and Working Directory	Outlines the following: <ul style="list-style-type: none">• Location of the files for that step of the installation reside.• Main directory you will be working in during that chapter.• Lists any additional directories and files that you will be editing during the installation.

Stopping Services	Walks users through the process of stopping any services that may be running.
Configuration	Walks users through editing all the configuration files that need to be updated with information that is specific to your environment.
Deployment	When appropriate this section will walk users through deploying the code.
Start Services	Walks users through the process of starting any services and how to verify that the web services you deployed are running.
Update Cell Data	When appropriate this section will walk users through updating their cell data in i2b2 Admin.
Verify Install	Outlines how to verify the installation is correct.
Next Steps	Outlines the next steps that need to be taken in order to finish the implementation.

Some chapters may have additional sections that are specific to the installation of that item. For instance the Data Installation will have a section on setting up database users. This section is not relevant to all the other chapters and therefore it is not included in the above list.

It is important that you follow this guide in the order that the steps are written. Some steps have to occur before others. For instance the PM Cell has to be installed before any other cells. The chapters are organized in the order in which the installation has to occur.

Guide Notations

Throughout the guide notations will be made to assist you with the installation. These notations fall into one of four categories and will appear in the documentation as follows:

Important

This notation is important to the installation process or may be a setting that needs to be defined in order for i2b2 to work correctly.

Note

This notation is a simple FYI.

Tip

This notation is a tip or recommendation that may make the installation process a little easier.

Warning

This notation is extremely important to the installation process and may prevent the installation from continuing if not followed.

1.2 Installation Process

Installation Overview

It is critical that you follow this guide in the order that the steps are written. Some steps have to occur before others. For instance the PM Cell has to be installed before any other cells. The chapters are organized in the order in which the installation has to occur.

For instance, Chapter 5 addresses the installation of the PM Cell; Chapter 6 address the installation of the Web Client and Chapter 7 address the installation of the Ontology Cell. The reason the Web Client is chapter 5 is because you need the Admin module, which is part of the web client

installed before you can finish installing the PM Cell. The reason you can't install the web client first is because the PM Cell needs to be deployed first. It is for this reason we highly recommend you follow the chapters in the order in which they are written.

Order of Installation

The following is a high level overview of the order that will be taken during this installation process. As stated earlier it is important that you don't jump around. It is also recommended that you review each chapter as there are steps within the chapters that need to be followed.

- Step 1:** Software and System Requirements
- Step 2:** Data Installation
- Step 3:** i2b2 Server-Common Install
- Step 4:** Project Management (PM) Cell Install
- Step 5:** i2b2 Administration Module Install
- Step 6:** i2b2 Web Client Install
- Step 7:** i2b2 Workbench Install
- Step 8:** Ontology Management (ONT) Cell Install
- Step 9:** Data Repository (CRC) Cell Install
- Step 10:** Workplace Framework (WORK) Cell Install
- Step 11:** File Repository (FR) Cell Install
- Step 12:** Identity Management (IM) Cell Install (*Optional*)
- Step 13:** Initial Setup of i2b2 in Admin

1.3 Next Steps

The next step is to proceed to the **Software Requirements** chapter where you will be setting up your environment with the necessary software from third parties such as JBoss and Apache Ant.

Chapter 2. Requirements

Software and System Requirements

The i2b2 has a number of software and system requirements which have been outlined in this chapter for you to review. Some of the requirements involve the installation of additional software from various third parties and when appropriate we have outlined the steps to install and configure it to work in your i2b2 environment.

Important Warning for Linux Users

SELinux (Security-Enhanced Linux) is a security module that is delivered with the operating system. The default setting for this feature is set to the highest level (strictest) of security. A number of i2b2 users have encountered various connection issues when this feature is turned on. Therefore, in order to avoid issues with your i2b2 installation, we recommend you **disable the SELinux feature**.

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2.2 Database Requirements

2.3 Browser Requirements

2.4 i2b2 Server Requirements

- 2.4.1 Java JDK
- 2.4.2 JBoss Application Server
 - 2.4.2.1 Recommended Ports
 - 2.4.2.2 JBoss Logging Configuration
 - 2.4.2.3 Run JBoss as a Linux Service
 - 2.4.2.4 Run JBoss as a Windows Service
- 2.4.3 Apache Ant
- 2.4.4 Apache Axis2
- 2.4.5 System Environment Variables
 - 2.4.5.1 Set Variables on Linux Machine
 - 2.4.5.2 Set Variables on Windows Machine

2.5 Web Server Requirements

- 2.5.1 Client URL Request Library (cURL)
- 2.5.2 Internet Information Services (IIS)
 - 2.5.2.1 Verify IIS 7.0 Installation
- 2.5.3 PHP
 - 2.5.3.1 PHP for Linux
 - 2.5.3.2 PHP for Windows

2.6 i2b2 Requirements

- 2.6.2 Download i2b2 Software

2.7 Next Steps

2.1 Chapter Overview

In this chapter we will be reviewing the following requirements and providing the steps to install and configure additional software needed to support i2b2.

1. Database Requirements
 - Reviews the Database Management Systems supported by the i2b2 and any other requirements
2. Browser Requirements
 - Web browsers supported by the i2b2.
3. i2b2 Server Requirements
 - Outlines the required software from 3rd party vendors.
 - Installation steps for installing the 3rd party software on your i2b2 Server.
 - Recommended configuration settings for the 3rd party software.
4. i2b2 Web Server Requirements
 - Outlines the software that has to be installed on the Web Server that will host your i2b2 Administration Module and Web Client.
 - Steps for installing the required software on either a Linux or Windows Server.
5. i2b2 Software

- Accessing and downloading the required i2b2 software.

2.2 Database Requirements

The i2b2 data is stored in a relational database in a **star schema** format. Currently, the i2b2 supports three different database management systems (DBMS); Only one of them is required to store your i2b2 data.

1. Oracle
2. PostgreSQL
3. SQL Server

The DBMS you choose to use is dependent on what works best for your institution. At this point in the installation all that we require is that you have a DBMS setup in your environment.

If you do not have a DBMS currently setup then you will need to do so at this point in the installation. The setup of the DBMS is specific to the version you are installing, therefore we recommend you follow the installation procedures documented by the vendor providing the software. The following table provides the links to the websites for each DBMS.

DBMS	Website
Oracle	http://www.oracle.com/us/downloads/index.html
PostgreSQL	http://www.postgresql.org/download/
SQL Server	http://www.microsoft.com/en-us/sqlserver/default.aspx

2.3 Browser Requirements

A web browser is required to use the i2b2 Web Client and Administration Module. The following three browsers are currently supported:

- Firefox
- Microsoft Internet Explorer (I.E.)
- Safari

Important

JavaScript must be enabled in your web browser.

2.4 i2b2 Server Requirements

The i2b2 Hive and associated web services are the infrastructure used to integrate a collection of cells. The i2b2 Hive is comprised of a collection of cells representing unique functional units. The server in which these cells are installed is known as the i2b2 Server.

The cells that make up the i2b2 hive can exist on a single server or on multiple servers. If you have multiple i2b2 servers then each one will need to meet the requirements defined in this section.

2.4.1 Java JDK

Java Requirements

The i2b2 was developed using the Java platform and is needed to develop and deploy the i2b2 cells on the server. The i2b2 server requires the Java Development Kit (JDK) to be installed before you can deploy any i2b2 core cells.

Required Version: Java 7.0

Download from Website: <http://www.oracle.com/technetwork/java/javase/downloads/index.html>

Operating System	File Name
Linux x64	jdk-7u51-linux-i586.rpm OR jdk-7u51-linux-i586.tar.gz
Linux x64	jdk-7u51-linux-x64.rpm OR jdk-7u51-linux-x64.tar.gz
Windows x86	jdk-7u51-windows-i586.exe
Windows x64	jdk-7u51-windows-x64.exe

Java JDK Installation Steps

1. Go to the Java Website (see link shown above) and download the **Java JDK** file that is appropriate for your environment.
2. Locate the file you just downloaded.
3. The Java JDK file for Windows is an executable file. Click on the file name to launch the Windows Installer
4. The installer will guide you through the installation process.
5. By default the windows installer will install Java JDK to `C:\Program Files\Java\jdk1.7.0_51`. You can change this during the installation to a location of your choice.

Tip

You will want to make note of the location as it will be needed further along in the i2b2 installation. In the installation document whenever you see **YOUR_JAVA_HOME_DIR** it will need to be replaced with the location of your Java JDK.

For your convenience an installation Worksheet has been provided at the end of this document to track the setup locations.

Set Java Home Variable

After installing Java JDK you need to set the **JAVA_HOME** environment variable to point to the JDK installation directory. Steps on how to set this variable have been defined in the section called **Setting System Variables** which is located within this chapter.

Important

The install programs for JBoss, Apache Ant and Apache Axis2 require the **JAVA_HOME** variable be defined therefore you need to set it before continuing on to the other installations.

2.4.2 JBoss Application Server

JBoss Requirements

JBoss AS is a Java EE-based application server that can operate across platforms and is usable on any operating system that supports Java. The i2b2 requires JBoss AS 7 to be installed on the i2b2 Server as it is used to manage all application operations between the i2b2 clients, the cells on the i2b2 server and the i2b2 database.

Required Version: JBoss 7.1.1

Download from Website: [i2b2 Supported Software - JBoss AS 7.1.1.Final](#)

Operating System	File Name
Linux or Windows	jboss-7.1.1.Final.zip

Important

The version of JBoss AS 7 that has been tested and verified to work with the i2b2 software is available for download from the i2b2 Website. This has been setup as an automatic download and can only be accessed by clicking on the link shown above or the one listed in step 1.

Jboss 7.1.1 Installation Steps

1. Download the zip file for JBoss AS 7 by clicking on [Begin Download](#).
2. Locate the file (**jboss-7.1.1.Final.zip**) you just downloaded.
3. Extract all the items in the zip file into a directory of your choice.

Linux Example: /opt/jboss-as-7.1.1.Final

Windows Example: C:\opt\jboss-as-7.1.1.Final

Tip

You will want to make note of the location as it will be needed further along in the i2b2 installation. In the installation document whenever you see **YOUR_JBOSS_HOME_DIR** it will need to be replaced with the location of your JBoss. For your convenience an installation Worksheet has been provided at the end of this document to track the setup locations.

2.4.2.1 Recommended Ports

The i2b2 recommends you use the default port of 9090 for your http connection and 9009 for your AJP 1.3. If these ports are unavailable because another application is using them then you will need to edit the **standalone.xml** file to reconfigure them. This file is located in the following directory:

`YOUR_JBOSS_HOME_DIR\standalone\configuration\standalone.xml`

The two items to change in the *standalone.xml* file are:

1. Change the non-SSL HTTP/1.1 Connector to a port that is available in your system. (*example shown below*)

```
<socket-binding name="http" port="8080" />
```

2. Change the AJP 1.3 Connector to another port that is available in your system. (*example shown below*)

```
<socket-binding name="ajp" port="8008" />
```

Warning

The i2b2 install scripts are using port 9090 for JBoss. Therefore if you are changing the above ports in your standalone.xml file then you will need to make the same port changes to all the install scripts.

2.4.2.2 JBoss Logging Configuration

In JBoss AS 7 the server logging configuration is defined in the **standalone.xml** file. By default JBoss has included two handlers; One for logging to the console and another for logging to a file. In order to maximize the speed of your server and to prevent running out of space our recommendation is to have the level of logging set to a low level such as INFO.

Steps to Edit Logging Level

1. Go to the following directory:
`YOUR_JBOSS_HOME_DIR\standalone\configuration\standalone.xml`
2. Open the **standalone.xml** file to edit its contents.
3. Locate the **<profile>** section of the xml document.
4. The handlers are in the **urn:jboss:domain:logging:1.1** subsystem
5. Verify the level name for the **console-handler** is **INFO**. Change it if necessary.

```
<periodic-rotating-file-handler name="FILE">
  <formatter>
    <pattern-formatter pattern="%d{HH:mm:ss,SSS} %-5p [%c] (%t) %s%E%n"/>
  </formatter>
  <file relative-to="jboss.server.log.dir" path="server.log"/>
  <suffix value=".yyyy-MM-dd"/>
  <append value="true"/>
</periodic-rotating-file-handler>
```

6. Save the changes and close the file.

Note

If you need to troubleshoot an issue you can set the level to DEBUG. Remember to return it to INFO when you are done.

2.4.2.3 Run JBoss as a Linux Service

Setting up a Linux service to run your JBoss Web Server will allow the server to continuously run in the background, without any user interaction. Another advantage of a Linux service is that it will run no matter which user is logged onto the machine. This means you do not have to leave a user logged onto the server just to keep JBoss running. You can also configure the service to start automatically if the system is rebooted.

The information in this section will guide you through setting up JBoss AS 7 to run as a Linux Service.

Overview of Steps

These are the basic steps that will be taken to set up the Linux Service.

- Step 1:** Change Working Directory
- Step 2:** Copy JBoss Init Directory
- Step 3:** Create a New Directory
- Step 4:** Copy Configuration File to the New Directory
- Step 5:** Edit Configuration File
- Step 6:** Start JBoss and Verification

Overview of Directories Involved in the Process

The following is an overview of the directories that will be used and referenced during the process of setting up JBoss to run as a service.

Directory	Description
/etc	Standard Linux directory that contains the configuration files for the system.
/etc/init.d	Standard Linux directory that contains the startup scripts for various system services. These services are usually those that are to automatically start when the system is rebooted.
/jboss-as-7.1.1.Final/bin/init.d	JBoss directory that was created when JBoss was installed. It contains the configuration file and script to start JBoss as a service.

The remaining sections will outline the steps to setup JBoss to run as a Linux service.

Step 1: Change Working Directory

The **first step** is to log into the terminal and change your working directory to the **init.d** directory in your *JBoss directory*. The **init.d** directory in your JBoss directory contains the configuration file and script to start JBoss.

Steps to Change Working Directory

1. Open the terminal.
2. Enter the following command to change your directory to the **init.d** directory in your **JBoss** directory.

Change Directory Command

```
CD YOUR_JBOSS_HOME_DIR/bin/init.d
```

Example: `cd /opt/jboss-as-7.1.1.Final/bin/init.d`

Step 2: Copy the JBoss Init Directory

The **second step** in this process is to copy the JBoss Control Script called ***jboss-as-standalone.sh*** to the initialization directory on your Linux server. The `jboss-as-standalone.sh` file contains the start and stop commands for the JBoss Server and by copying it to your initialization directory the JBoss server will be able to start automatically when the system is rebooted.

Steps to Copy `jboss-as-standalone.sh` File

Assumptions: you are still logged into the terminal and the working directory is `/jboss-as-7.1.1.Final/bin/init.d`

1. Enter the following command to copy ***jboss-as-standalone.sh*** file from the JBoss directory.

Copy Command

```
cp jboss-as-standalone.sh /etc/init.d/jboss-as-standalone.sh
```

2. A copy of the file now resides in the standard `/etc/init.d` directory

Step 3: Create a New Directory

The **third step** in this process is to create a new directory in the standard `etc` directory. This new directory will contain the configuration file for when the JBoss service is started.

Create Directory Steps

1. Enter the following command to create a new directory called *jboss-as*.

Create Directory Command

```
mkdir /etc/jboss-as
```

2. A new directory called `jboss-as` now resides in the `/etc` directory.

Step 4: Copy Configuration File to New Directory

The **fourth step** is to copy the configuration file called *jboss-as.conf* to the directory you just created in the previous step. This file contains the general configuration for the init.d scripts.

Steps to Copy jboss-as.conf File

Assumptions: you are still logged into the terminal and the working directory is */jboss-as-7.1.1.1.Final/bin/init.d*

1. Enter the following command to copy **jboss-as.conf** file from your JBoss directory.

Copy Command

```
cp jboss-as.conf /etc/jboss-as/jboss-as.conf
```

2. A copy of the file now resides in the standard */etc/jboss-as* directory

Step 5: Edit Configuration File

The **fifth step** is to edit the *JBOSS_USER* in the *jboss-as.conf* file that you just copied to the *jboss-as* directory in your *etc* directory. The JBoss user is the person who owns the process of stopping and starting the JBoss server.

Steps to Update JBOSS_USER

1. Enter the following command to open the **jboss-as.conf** file in your */etc/jboss-as* directory.

Open Command

```
open /etc/jboss-as/jboss-as.conf
```

Important

If you are connected to the server remotely then you will need to alter the above command to open it with a text editor. Instead of **open** you would type **vi** or whatever editor command is appropriate for your environment.

Example: `vi /etc/jboss-as/jboss-as.conf`

2. Edit the **JBOSS_USER** to the name of the JBoss user who is the owner of the process.
3. Save the changes and close the file.

Step 6: Start JBoss and Verification

The **sixth** and **final step** is to start JBoss and verify it is running correctly.

1. Enter the following command to start your JBoss server.

Change Directory Command

```
/etc/init.d/jboss start
```

- The JBoss server will run the commands to start.
- Once it has finished you can open a web browser and enter the following address:
<http://localhost:9090/>
-
- The JBoss Welcome page will display if your JBoss server started correctly.



2.4.2.4 Run JBoss as a Windows Service

Setting up a Windows service to run your JBoss Web Server will allow the server to continuously run in the background, without any user interaction. Another advantage of a Windows service is that it will run no matter which user is logged onto the machine. This means you do not have to leave a user logged onto the server just to keep JBoss running. You can also configure the service to start automatically if the system is rebooted.

The information in this section will guide you through setting up JBoss AS 7 to run as a Windows Service.

Overview of Steps

These are the basic steps that will be taken to set up the Windows Service.

- Step 1:** Download Native Connectors and Copy Files to JBoss Directory
- Step 2:** Update the Service Batch File Settings
- Step 3:** Install the Service
- Step 4:** Update the Windows Service Properties
- Step 5:** Verify JBoss Service Started

Step 1: Download Native Connectors and Copy Files to JBoss Directory

The **first step** is to download the appropriate native connectors for your windows server and copy the files to your JBoss directory.

Download from Website: <http://www.jboss.org/jbossweb/downloads/jboss-native-2-0-10>

Operating System	File Name
------------------	-----------

Windows 32-bit	binaries 2.0.10-windows x86 (<i>jboss-native-2.0.10-windows-x86-ssl.zip</i>)
Windows 64-bit	binaries 2.0.10-windows x64 (<i>jboss-native-2.0.10-windows-x64-ssl.zip</i>)

Steps to Download and Copy Files

1. Go to the JBoss website (*see link shown above*) and download the appropriate zip file for your environment.
2. Locate the file you just downloaded (*jboss-native-2.0.10-windows-x86-ssl.zip* or *jboss-native-2.0.10-windows-x64-ssl.zip*)
3. Open the zip file and copy the contents of the **bin** folder into the bin folder in your JBoss directory.

Example: C:\opt\jboss-as-7.1.1.Final\bin

Step 2: Update the Settings in the Service Batch File

One of the files you copied to your JBoss directory was **service.bat** and this file is configured for JBoss AS 5 platform. The i2b2 Server is using JBoss AS 7 so you will need to edit service.bat with a few modifications.

Steps to Modify service.bat

1. Go to *YOUR_JBOSS_HOME_DIR*\bin.
Example: C:\opt\jboss-as-7.1.1.Final\bin
2. Locate the **service.bat** file and open it in *Edit Mode*.
3. Update the SVCNAME, SVCDISP and SVCDESC with the correct version information.

Current Setting	New Settings
SVCNAME=JBAS50SVC	SVCNAME=JBAS70SVC
SVCDISP=JBoss Application Server 5.0	SVCDISP=JBoss Application Server 7.0.0.Final
SVCDESC=JBoss Application Server 5.0 GA/Platform: Windows x64	SVCDISP=JBoss Application Server 7.0.0.Final /Platform: Windows x64

Tip

If you are installing multiple servers you may want to update these settings with something that is more meaningful. The SVCDISP will appear in your Windows Services list so if you are installing multiple servers on the same windows machine you may want to update these settings with something that is more meaningful.

Example: If you have a development and production environment you may want to update the settings to one of the following.

SVCDISP=JBoss Application Server 7.0.0.Final Development
SVCDISP=JBoss Application Server 7.0.0.Final Production

4. To prevent memory loss issues you need to modify the **JAVA_OPTS** setting to increase the memory.

Current Setting	New Setting
JAVA_OPTS=-Xrs	JAVA_OPTS=-Xmx1024M -Xms512M -XX:MaxPermSize=512M -Xrs

5. In JBoss AS 7 the **run.bat** and **run.log** files were replaced with **standalone.bat** and **standalone.log** therefore you need to edit the settings in **service.bat** to call the correct files. You can do a search and replace in the file to find **run.bat** and **run.log**
6. Comment out all **call shutdown** calls by entering **REM** at the beginning of the line.

Example:

REM call shutdown -S < .s.lock >> shutdown.log 2>&1

Step 3: Install the Service

The **third step** in this process is to install the service.

Installation Steps

1. Open the Windows Command Prompt as an Administrator.
2. Enter the following command to change your directory to the bin directory in your JBOSS directory.

Change Directory Command

```
CD YOUR_JBOSS_HOME_DIR\bin
```

Example: C:\opt\jboss-as-7.1.1.Final\bin

Note

If you have set your JBOSS_HOME system variable you can replace the JBoss directory path with %JBOSS_HOME%.

Example: CD %JBOSS_HOME%\bin

3. Enter the following command to install the service.

Change Directory Command

```
service install
```

4. Provided there are no errors the service will be installed.

Step 4: Update the Windows Service Properties

The **fourth step** is to update the properties of the service you just installed. During this step we will set the JBoss service to start automatically and we will start the service to make sure it was installed correctly.

Steps to Update Properties

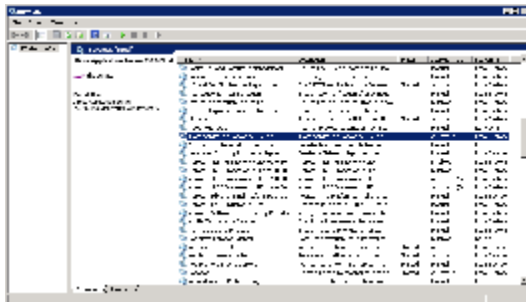
1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.

c. Click on **Administrative Tools**

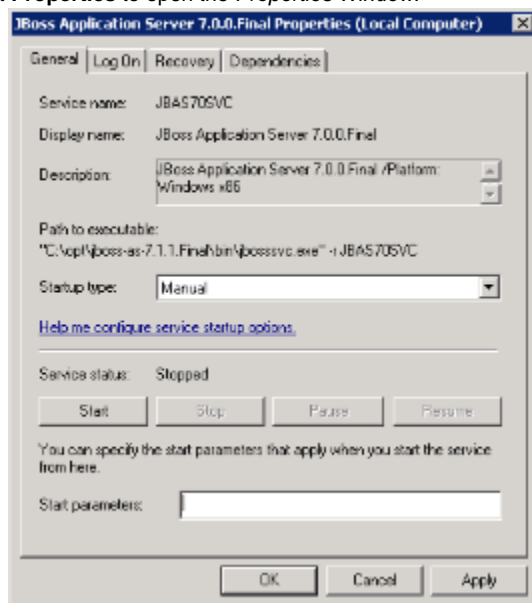
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

Important

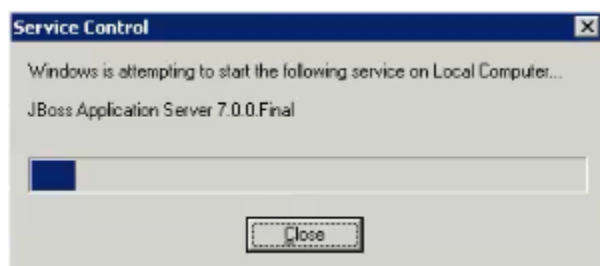
The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.



4. Using the mouse, *right click* on the name of the service to display the pop-up menu.
5. Select **Properties** to open the *Properties Window*.



6. At **Startup Type** select *Automatic* from the drop-down list.
7. Click on **Start** to start the JBoss services.
8. A dialog window will open displaying the progress of starting the service.



9. Once the startup process is complete click on **OK** to save the changes.

Step 5: Verify JBoss Server Started

The **fifth** and **final step** is to verify the Windows service started your JBoss server.

Verification Steps

1. Open a web browser and enter the following address:
<http://localhost:9090/>
2. The JBoss Welcome page will display if your JBoss server started correctly.



2.4.3 Apache Ant

Apache Ant Requirements

Apache Ant is a Java library and command-line tool that is used by the i2b2 to drive processes defined in the i2b2 build files.

Required Version: Apache Ant 1.8.4

Download from Website: [i2b2 Supported Software](#)

Operating System	File Name
Linux and Windows	apache-ant-1.8.4-bin.zip

Important

The version of Apache Ant that has been tested and verified to work with the i2b2 software is available for download from the i2b2 Website. This has been setup as an automatic download and can only be accessed by clicking on the link shown above or the one listed in step 1.

Ant Installation Steps

1. Download the zip file for Apache Ant by clicking on [Begin Download](#).
2. Locate the file (**apache-ant-1.8.4-bin.zip**) you just downloaded.
3. Extract all the items in the zip file into a directory of your choice.

Linux Example: /opt/apache-ant-1.8.4

Windows Example: C:\opt\apache-ant-1.8.4

Tip

You will want to make note of the location as it will be needed further along in the i2b2 installation. In the installation document whenever you see **YOUR_ANT_HOME_DIR** it will need to be replaced with the location of your Apache Ant.

For your convenience an installation Worksheet has been provided at the end of this document to track the setup locations.

2.4.4 Apache Axis2

Apache Axis 2 Requirements

The Apache Axis2 is a Web Services / SOAP / WSDL engine used by the i2b2 web services.

Required Version: Apache Axis2 1.6.2

Download from Website: [i2b2 Supported Software - Apache Axis2](#)

Operating System	File Name
Linux and Windows	axis2-1.6.2-war.zip

Important

The version of Apache Axis2 that has been tested and verified to work with the i2b2 software is available for download from the i2b2 Website. This has been setup as an automatic download and can only be accessed by clicking on the link shown above or the one listed in step 1.

If you are not downloading the zip file from the i2b2 site it is important to note there are several different types of distributions, it is important that you download the WAR (Web Archive) distribution.

Axis2 Installation Steps

Important

The steps for setting up Axis2 can be a little cumbersome in that it involves a lot of extracting and renaming of files. In order to deploy i2b2.war correctly it is recommended that you follow each step as it is written and pay close attention to which file and folder you are working in.

1. Download the **WAR distribution** for Apache Axis 2 by clicking on [Begin Download](#)
2. Locate the file (**axis2-1.6.2-war.zip**) you just downloaded.
3. Extract all the items in the zip file into a directory of your choice.

Linux Example: /opt/axis2-1.6.2-war

Windows Example: C:\opt\axis2-1.6.2-war

4. Go to your **JBoss deployments folder** (*YOUR_JBOSS_HOME_DIR*standalone\deployments)
5. Create a **folder** called **i2b2.war**
6. Create an empty **text file** called **i2b2.war.dodeploy**
7. Locate the **axis2-1.6.2-war.zip** file you downloaded
8. Extract only the file called **axis2.war** to your JBoss deployments folder
9. Once the file is extracted rename the *axis2.war* file to **axis2.zip**.
10. Extract all the files in **axis2.zip** to the **i2b2.war** folder you created in the first step (*YOUR_JBOSS_HOME_DIR*standalone\deployments\i2b2.war)
11. Delete the zip file (axis2.zip).
12. i2b2.war will be deployed the next time you start JBoss.

2.4.5 System Environment Variables

Set System Environment Variables

In order to ease the installation process we recommend you set the following environment variables. The commands given throughout the document are based on the following environment variables defined on your machine.

Environment Variables

JAVA_HOME=[the location of your Java JDK directory](#)
JBOSS_HOME=[the location of your JBoss directory](#)
ANT_HOME=[the location of your Ant directory](#)
PATH=[add the path for your Java's bin folder and Ant bin folder.](#)
export [Your Java, JBoss and Ant Home Directories](#)

Note

Changes to the system PATH variable are not necessary for servers running Windows. JAVA_HOME, JBOSS_HOME and ANT_HOME still need to be set.

Also the need to **export** the new variables is only required on Linux machines; it is not applicable to Windows.

Example Settings for Linux Machine

Environment Variables

JAVA_HOME=[/opt/java/jdk1.6.0](#)
JBOSS_HOME=[/opt/jboss-as-7.1.1.Final](#)
ANT_HOME=[/opt/apache-ant-1.8.2](#)
PATH=[\\$PATH:\\$ANT_HOME/bin:\\$JAVA_HOME/bin](#)
export [JAVA_HOME](#)
export [JBOSS_HOME](#)
export [ANT_HOME](#)

Please proceed to the section called **Set Variables on Linux Machine** if you are unfamiliar with how to set the above system variables on your Linux server.

Example Settings for Windows Server

Environment Variables
JAVA_HOME= \opt\java\jdk1.7.0 JBOSS_HOME= \opt\jboss-as-7.1.1.Final ANT_HOME= \opt\apache-ant-1.8.2 PATH=%PATH;%ANT_HOME\bin;%JAVA_HOME\bin

Please proceed to the section called **Set Variables on Windows Machine** if you are unfamiliar with how to set the above system variables on your Windows server.

2.4.5.1 Set Variables on Linux Machine

Setting System Variables on a Linux Machine

The following steps will walk you through adding System Environment Variables to a machine running Linux.

1. Open the **terminal** (*shell*) on your server.
2. Enter the following command(s) to *define* and *export* your **JAVA_HOME** variable.

Set Variables Command
JAVA_HOME=/opt/java/jdk1.6.0 export JAVA_HOME

Warning

- The variable value shown above is an **example**. When adding the JAVA_HOME variable in your environment you need to enter the path for your Java JDK directory.
- It is extremely important the path is to the **JDK location** and not to the Java root directory.
- The same holds true when you add the JBOSS_HOME and ANT_HOME variables in the next steps. The JBOSS_HOME variable needs to have the path for your JBoss directory and the ANT_HOME variable should have the path for your Ant directory.

3. Enter the following command(s) to *define* and *export* your **JBOSS_HOME** variable.

Set Variables Command
JBOSS_HOME=/opt/jboss-as-7.1.1.Final export JBOSS_HOME

4. Enter the following command(s) to *define* and *export* your **ANT_HOME**

Set Variables Command
ANT_HOME=/opt/apache-ant-1.8.2 export ANT_HOME

5. Enter the following to *update* your PATH variable

Set Variables Command

```
PATH=$PATH:$ANT_HOME/bin:$JAVA_HOME/bin
```

Note

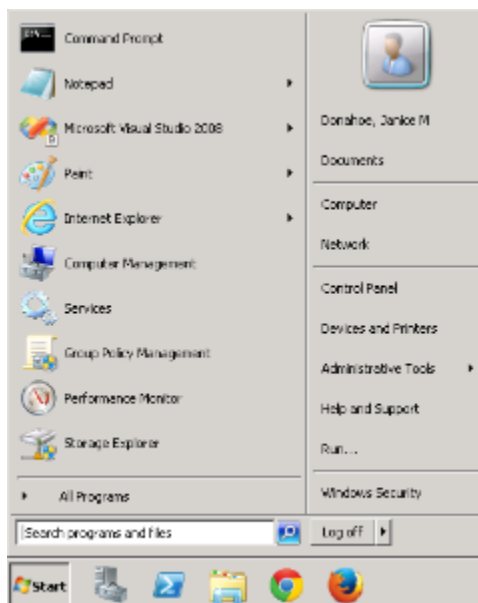
You do not need to export PATH because it has already been exported. If for some reason your PATH has never been exported then you will need to do it now. Simply adding variables to the PATH does not require you to export it again.

2.4.5.2 Set Variables on Windows Machine

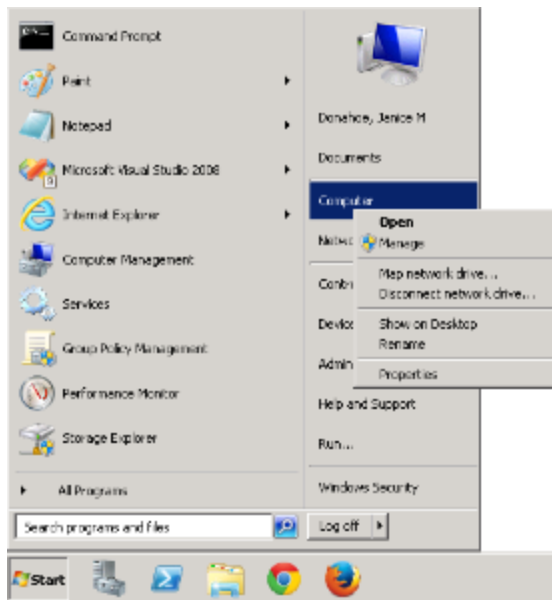
Setting System Variables on a Windows Machine

The following steps will walk you through adding System Environment Variables to a machine running Windows.

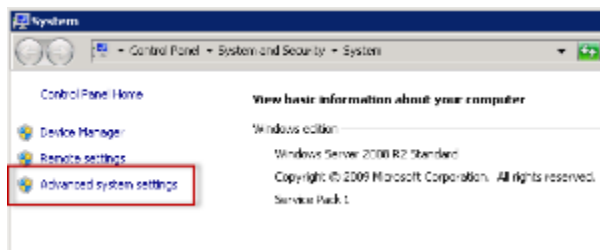
1. Click on **Start** button located on your windows taskbar. The **start menu** will open.



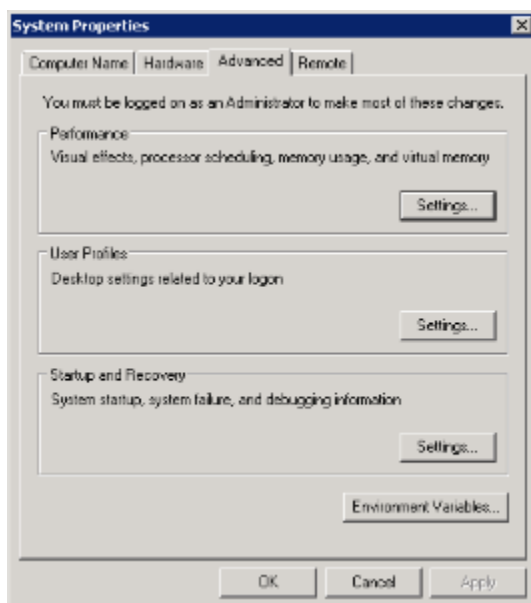
2. Right click on **My Computer** to display a popup menu.



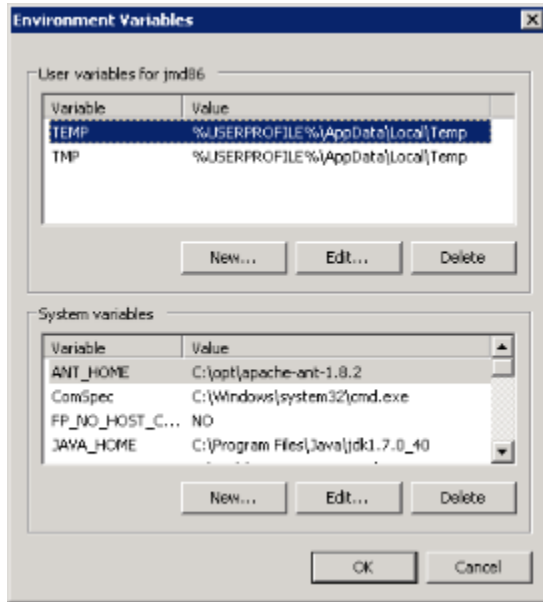
3. Select **Properties**. The Systems window will open displaying basic information about your computer.
4. Click on the **Advanced System Settings** link located on the left hand side of the window.



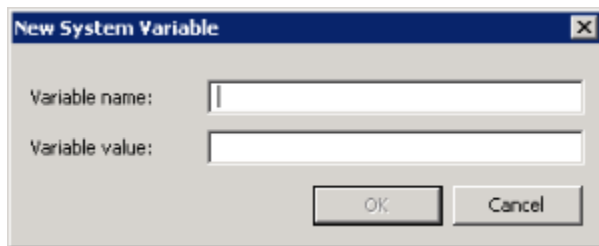
5. The Systems Properties window will open to the Advanced tab



6. Click on the **Environment Variables** button to open the Environment Variables window.



7. Click on the **New** button to open the New System Variable window.



8. Enter the following for your JAVA_HOME variable

Variable Name: JAVA_HOME
Variable value: C:\Program Files\Java\jdk1.7.0_40

Warning

- The variable value shown above is an **example**. When adding the JAVA_HOME variable in your environment you need to enter the path for your Java JDK directory.
- It is extremely important the path is to the **JDK location** and not to the Java root directory.
- The same holds true when you add the JBOSS_HOME and ANT_HOME variables in the next steps. The JBOSS_HOME variable needs to have the path for your JBoss directory and the ANT_HOME variable should have the path for your Ant directory.

9. Click on the **OK** button to save the new entry and return to the Environment Variables window.

10. Click on the **New** button to add your JBOSS_HOME variable.

Variable Name: JBOSS_HOME
Variable value: C:\opt\jboss-as-7.1.1.Final

11. Click on the **OK button** to save the new entry and return to the Environment Variables window.
12. Click on the **New button** to add your ANT_HOME variable.

Variable Name: ANT_HOME
Variable value: C:\opt\apache-ant-1.8.2

13. Click on the **OK button** to save the new entry and return to the Environment Variables window.
14. All of the variables you just entered should appear in the list of System Variables.
15. Close the Environment Variables window, the System Properties window, and the Systems window.

2.5 Web Server Requirements

The i2b2 Web Client can be hosted by any web server that supports HTML, JavaScript, CSS and GIF / JPG / PNG image files. The i2b2 requires the following components to be installed on the web server.

Servers Running Linux / MacOS Operating System

1. Client URL Request Library (cURL)
2. PHP: Hypertext Preprocessor (PHP)

Servers Running Windows Operating System

1. Internet Information Services (IIS)
2. PHP: Hypertext Preprocessor (PHP)

2.5.1 Client URL Request Library (cURL)

Client URL Request Library (cURL) is an open source project that produces two products; both of which have to be installed on your web server in order to host the i2b2 Administration Module and Web Client.

1. Command line tool for transferring data with URL syntax.
2. Client-side URL transfer library (libcurl).

For more **information** about cURL you can visit one of the following websites:

<http://curl.haxx.se/>
<http://en.wikipedia.org/wiki/CURL>

For **documentation** on installing cURL you can visit the following website:

<http://curl.haxx.se/docs/install.html>

To **download** cURL you can visit the following website:

<http://curl.haxx.se/download.html>

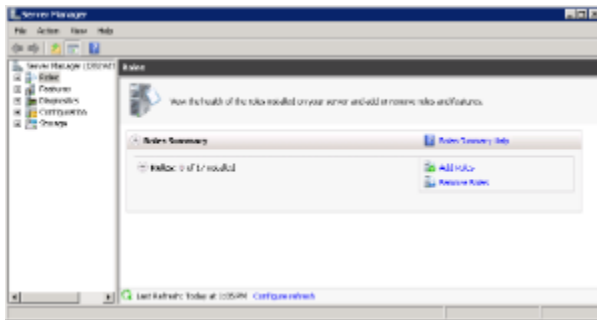
2.5.2 Internet Information Services (IIS)

Internet Information Services (IIS) is a Web Server role developed by Microsoft and included with all Microsoft's operating systems. By default the IIS is typically not turned on when the operating system is installed. In order to host the i2b2 Web Client the IIS needs to be turned on.

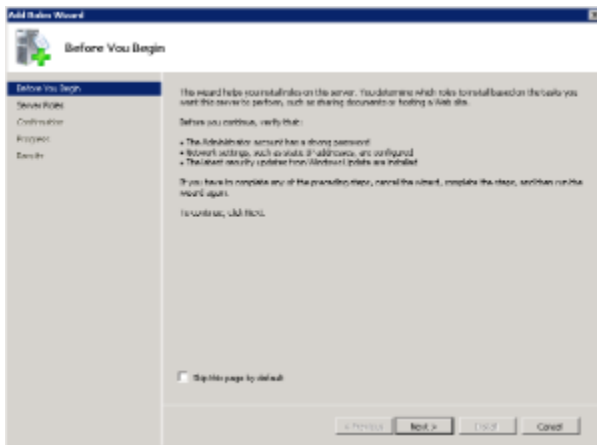
The following steps will outline the process of Installing IIS7.0 on Windows Server 2008. If you are using a different version of Windows Server or IIS it is recommended you follow the instructions defined by Microsoft. You can find out more information about IIS by visiting the following website: <http://www.iis.net/>

IIS 7.0 Installation Steps

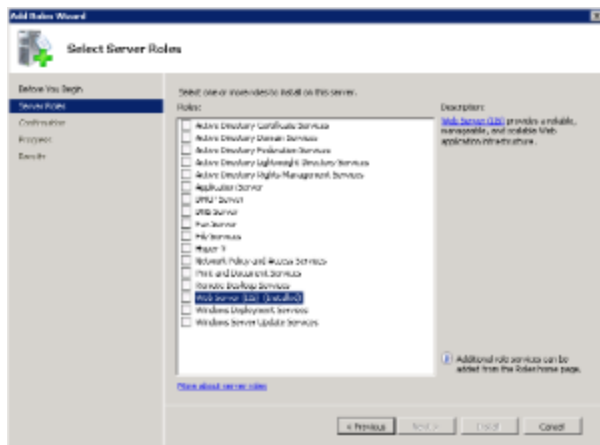
1. In Windows Server 2008, the roles are managed in the Server Manager application. This application can be accessed by going to your **Administrative Tools** menu and selecting **Server Manager**.
2. In the **Server Manager** window, select **Roles** from the panel on the left. The Roles Summary view will display on the right.



3. Click on **Add Roles** located on the right side of the Roles Summary view. The Add Roles Wizard will open.
4. Click **Next** to select which role to install.



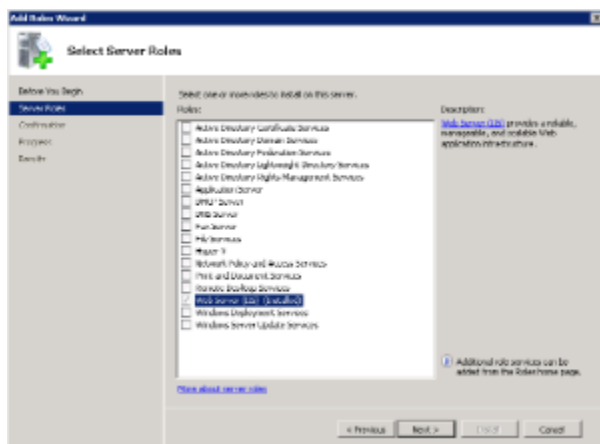
5. Select **Web Server (IIS)**.



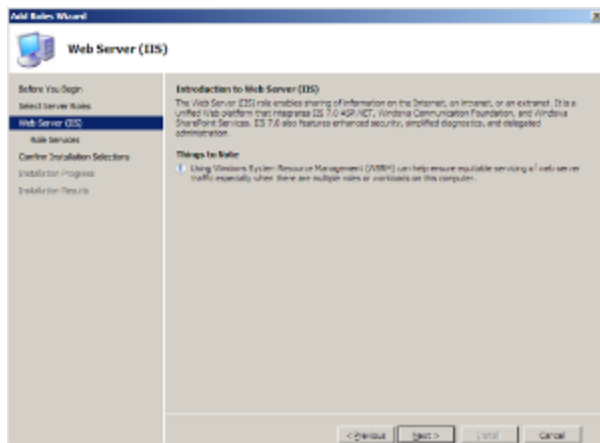
6. The Add Roles Wizard will notify you of any required dependencies. IIS depends on the Windows Process Activation Service (WAS) feature; therefore the following informational dialog box appears.



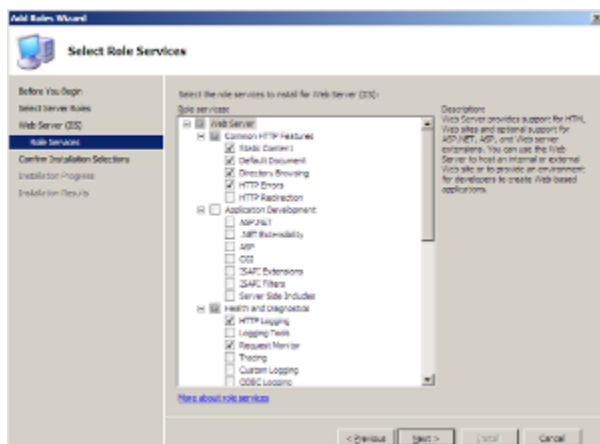
7. Click **Add Required Role Services** to continue.
8. The Web Server is now selected for install and the Select Server Roles dialog box will open. Click **Next** to continue.



9. An informational dialog will appear. Click **Next** to continue.

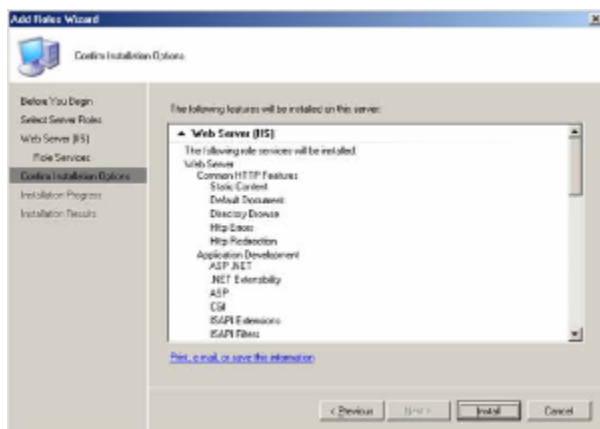


10. A list of all IIS 7.0 features available for installation will display. The features included in the default installation are already selected.



11. Click **Next** if there are no additional features you wish to install.

12. A summary of what will be installed will display.



13. Click **Install** to continue. The Installation Progress dialog will display.



2.5.3 PHP

PHP: Hypertext Preprocessor, known as PHP, is a server-side scripting language. In order for the i2b2 Web Client to function properly, PHP has to be installed on your web server.

- If your web server is running a Linux or MacOS operating system you can proceed to the section titled *PHP for Linux*.
- If your web server is running a Microsoft operating system you can proceed to the section titled *PHP for Windows*.

2.5.3.1 PHP for Linux

According to the PHP Website:

—*"We do not distribute binaries for UNIX/Linux binaries. Most Linux distributions come with PHP these days, so if you do not want to compile your own, go to your distribution's download site."*

They did provide a list of binaries available on external servers for many different versions of Linux and MacOS. To see a list of these external servers you can go to the following page on the php website:

<http://php.net/downloads.php>

For documentation on configuring PHP for cURL you can visit the following page on the php website:

<http://www.php.net/manual/en/book.curl.php>

2.5.3.2 PHP for Windows

Microsoft has developed a free tool called **Web Platform Installer** and is designed to make the installation of PHP for windows easier. The installation steps written below will walk you through installing PHP using the Web Platform Installer.

Note

For additional information about PHP for windows you can go to Microsoft's website at <http://windows.php.net/>

PHP Installation Steps

1. Go to Microsoft's PHP on Windows page at <http://www.microsoft.com/web/platform/phponwindows.aspx>

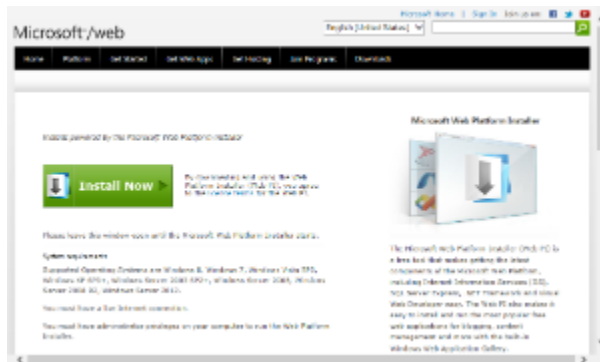


2. Click on the **Install PHP** button for the version of PHP you wish to install.

Note

i2b2 only requires that PHP be installed, it does not require a specific version. You can select the appropriate version for your environment.

3. The Web Platform Installer for PHP page will display. Click on **Install Now** to download the executable file.



4. Once the download has finished go to the location in which you downloaded the file.
5. Click on the file to start the Web Platform Installer.
6. The installer will walk you through the installation of PHP.

2.6 i2b2 Requirements

i2b2 Software Requirements

The "i2b2 Software" is made up of several components that can be downloaded from the i2b2 website. On the i2b2 website these components have been grouped into three main categories:

1. i2b2 Workbench
2. i2b2 VMWare
3. i2b2 Source

Within each of these grouping are the corresponding zip files that can be downloaded. The following tables outline what files need to be downloaded for this installation.

Category: i2b2 Workbench

The latest version of the i2b2 Workbench is available as an executable and can be downloaded from the i2b2 website. There are two versions available for download; you will need to select the one that is appropriate for you.

Filename	Description
i2b2Workbench-win-1700.zip	An executable version of i2b2 Workbench that runs on Windows (client only).
i2b2Workbench-mac-1700.zip	An executable version of i2b2 Workbench that runs on Mac (client only).
i2b2Workbench-documentation-1700.zip	Workbench documentation

Category: i2b2 VMWare

The i2b2 VMWare is a VM Image of a complete i2b2 Server installed on CentOS. If you do not want to install the i2b2 Server from scratch you can use this VM image to run your instance of i2b2.

Filename	Description
i2b2vmware-1700.zip	VMWare Image of Core i2b2 Server v1.7.00
vmware_Install_Guide_17.pdf	Install documentation for using the i2b2 VMWare image.

Category: i2b2 Source

The i2b2 source is a collection of the i2b2 source code for the i2b2 clients and server. The source code can be used to build the i2b2 Server from scratch.

Filename	Description
i2b2core-src-1700.zip	The core source code for the i2b2 server.
i2b2webclient-1700.zip	The source code for the i2b2 Web Client.
i2b2createdb-1700.zip	The i2b2 data installation scripts for Oracle, PostgreSQL and SQL Server
i2b2core-doc-1700.zip	All the technical documents for the i2b2 core cells and clients (Workbench & Web Client).

All of the above files are required for this installation and need to be downloaded before continuing with this installation.

2.6.2 Download i2b2 Software

The steps in this section outline the process of accessing and downloading the required i2b2 software files from the i2b2 web site. They are written for downloading the i2b2 Workbench but they apply to any of the files that you will be downloading.

Assumptions:

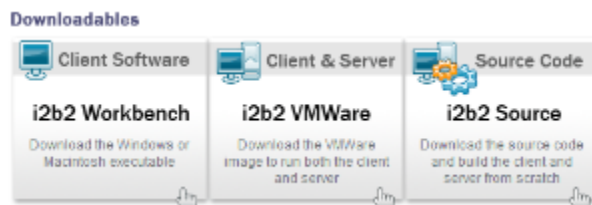
Depending on your browser and your version of windows or mac you may need to select a target directory to save your files. For this document, the assumption is made that the files will be downloaded to your *Download Folder*.

i2b2 Software Download Steps

1. Go to the i2b2 website (<http://www.i2b2.org>)
2. At the top of the page there is a navigation bar, click on **Software** to go to the *Software page*.



3. The software page will load. Scroll down to the section called **Downloadables**.



4. Click on the **Client Software** box.
5. Information about the latest version and a list of files available for download will appear.



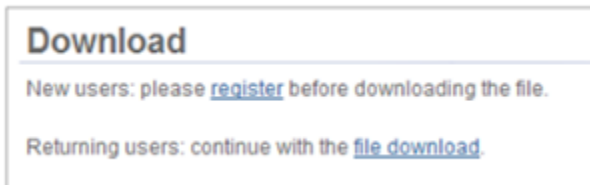
Note

The name of the file shown in the above image may vary slightly depending on the version of the i2b2 software you are downloading. The file name will always start with "i2b2Workbench-win" or "i2b2Workbench-mac" and the last part of the name is dependent on the version of the software in the zip file.

Example: "1700" means the zip file contains version 1.7.00 of the i2b2 Workbench.

6. Select the appropriate file to download.

7. The **Download** page will open. At this point, if you are not already a registered user you will need to do so. If you are a returning user you can click on the "**file download**" link.

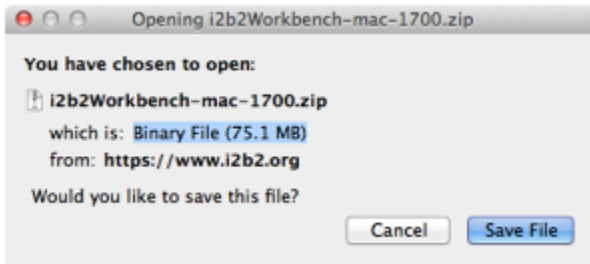


8. The next step is to review the i2b2 license and choose to either accept or decline.

- a. If you choose to **Decline** you will be brought back to the main i2b2 Software page.
- b. If you agree with the license click on **Accept** to continue with the download.

9. The **Save dialog box** will open.

Macintosh:



Windows:



10. Click on the **Save** or **Save File** button and the zip file will be saved to your *Download folder*.

11. Once the file has finished downloading open your *Download folder*.

12. Move the zip file into a target area of your choice.

Important

You need to repeat these steps to download the remaining i2b2 software listed under **Source Code** box. See *list of required i2b2 software in the i2b2 Requirements section*.

At this point you do not need to extract the files as this will be done during the installation

2.7 Next Steps

Steps completed in this chapter

The following steps were completed during this chapter on Requirements.



Requirements Chapter



Database Requirements



Installed one of the database management systems supported by i2b2 (*Oracle / PostgreSQL / SQLServer*)



Browser Requirements



Installed one of the browsers supported by i2b2 (*Firefox / Internet Explorer / Safari*)



i2b2 Server Requirements



Installed Java JDK 7.0 on your i2b2 Server.



Installed JBoss 7.1.1 Application Server on your i2b2 Server.



Installed Apache Ant 1.8.2 on your i2b2 Server.



Installed Apache Axis2 1.6.2 on your i2b2 Server.



Set your system environment variables on your i2b2 Server.



Web Server Requirements



Installed IIS on your web server *Windows machine only*.



Installed Curl on your web server *Linux machine only*.



Installed Php: Hypertext Preprocessor on your web server.



i2b2 Software Requirements



Downloaded the i2b2 data installation scripts.



Downloaded the i2b2 core source code.



Downloaded the i2b2 Web Client code.



Downloaded the i2b2 Workbench application for Windows or Macintosh.



Downloaded the VMWare image of the i2b2 Core Server. *Optional*

Next Steps

After installing all required software and downloading the i2b2 Software the next step in the installation process is to proceed with the **Data Installation**. The next chapter will guide you through the process of installing the i2b2 demo data.

Chapter 3. Data Installation

The data installation chapter outlines the process of installing the i2b2 data. This process involves creating tables, procedures and triggers as well as loading data into the tables.

Chapter 3. Table of Contents

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3.2 Data Installation Overview

- 3.2.1 Extract the i2b2 Data Package
- 3.2.2 Directory Structure and Schema Mapping

3.3 Create Database User Accounts

- 3.3.1 Create User Accounts in Oracle
- 3.3.2 Create User Accounts in PostgreSQL
- 3.3.3 Create User Accounts in SQL Server

3.4 Crcdata Tables

- 3.4.1 Working Directory
- 3.4.2 Set Database Properties
- 3.4.3 Create Crcdata Tables
- 3.4.4 Create Crcdata Stored Procedures
- 3.4.5 Load Crcdata Tables

3.5 Hivedata Tables

- 3.5.1 Working Directory
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3.6 IM Tables

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- 3.6.2 Set Database Properties
- 3.6.3 Create IM Tables
- 3.6.4 Load IM Tables

3.7 Metadata Tables

- 3.7.1 Working Directory
- 3.7.2 Set Database Properties
- 3.7.3 Create Metadata Tables
- 3.7.4 Load Metadata Tables

3.8 PM Tables

- 3.8.1 Working Directory
- 3.8.2 Set Database Properties
- 3.8.3 Create PM Tables
- 3.8.4 Create PM Triggers
- 3.10.5 Load PM Tables

3.9 Workdata Tables

- 3.9.1 Working Directory
- 3.9.2 Set Database Properties
- 3.9.3 Create Workdata Tables
- 3.9.4 Load Workdata Tables

3.10 Next Steps

3.1 Prerequisites

The following installations **must be completed** prior to beginning the process of installing the i2b2 data.



Requirements Chapter



Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)



Installed Java, JBoss, Apache Ant and Apache Axis2



Downloaded the i2b2 Software

3.2 Data Installation Overview

In this chapter we will be using the scripts provided in the data package to create tables and load them with sample data.

Assumptions

The data in this package provides data for a domain of **i2b2demo** and a project of **Demo**. The assumption is that the PM Service will be configured as such when installing the PM Cell.

Order of Installation

The basic steps that will be taken during this installation are as follows:

- Step 1:** Extract the i2b2 data package
- Step 2:** Create database user accounts
- Step 3:** Install the Crcdata Tables and Stored Procedures
- Step 4:** Install the Hivedata Tables
- Step 5:** Install the Imdata Tables (*only if installing the IM Cell which is optional*)
- Step 6:** Install the Metadata Tables
- Step 7:** Install the PM Tables and Triggers
- Step 8:** Install the Workdata Tables

Important

The details of what is to be done for each step are defined in the different sections within this chapter. It is important to follow steps in the order they are defined and not to skip any of them unless otherwise noted.

3.2.1 Extract the i2b2 Data Package

In the *Requirements Chapter* of this install document you downloaded a zip file that contained the i2b2 data package. This zip file contains all the data installation scripts needed to create the i2b2 tables and load the sample data provided.

Steps to extract the code

1. Set up a target source directory for the i2b2 data.
2. Locate the **i2b2create_db_1700.zip** file you downloaded in the *Requirements chapter*.
3. Extract the data package into the target source directory you just created.

Tip

You will want to make note of the location as it will be needed further along in the i2b2 installation. In the installation document whenever you see **YOUR_I2B2_DATA_DIR** it will need to be replaced with the location of your i2b2 Data files.

For your convenience an installation Worksheet to track the setup locations has been provided in the Appendices Chapter.

3.2.2 Directory Structure and Schema Mapping

Directory Structure for the i2b2 demo data package

Once you have extracted the files from the i2b2 data package you will notice the following directory structure in your i2b2 data directory:

Main Directory for New Data Installs: *YOUR_I2B2_DATA_DIR*edu.harvard.i2b2.data\Release_1-7\NewInstall

Directory	Description
Crcdata	Contains the data installation files for the Data Repository (CRC) Cell.
Hivedata	Contains the data installation files for the i2b2 Hive.
Imdata	Contains the data installation files for the Identity Management (IM) Cell.
Metadata	Contains the data installation files for the Ontology Management (ONT) Cell.
Pmdata	Contains the data installation files for the Project Management (PM) Cell.
Workdata	Contains the data installation files for the Workplace Framework (WORK) Cell.

In each of the above directories you will find the following:

Directory or File	Description
Scripts	This directory contains all the scripts used during the data installation (create and load)
db.properties	Properties file to define the database setup parameters (<i>type, username, driver, etc.</i>)

Schema Mapping

As stated previous the main directory for your data installation is *YOUR_I2B2_DATA_DIR*edu.harvard.i2b2.data\Release_1-7\NewInstall and within it are several folders contains the install scripts. These folder and the appropriate schema to which they are mapped are outlined in the following table.

Directory Folder	Schema	Project
Crcdata	i2b2demodata	Demo
Hivedata	i2b2hive	
Imdata	i2b2imdata	
Metadata	i2b2metadata	Demo
Pmdata	i2b2pm	
Workdata	i2b2workdata	Demo

3.3 Create Database User Accounts

In order for the i2b2 database scripts to work and enable the core cells to communicate with the database you need to create user accounts in

your i2b2 database. The following table shows what users will be created for each database / schema that is part of the i2b2 database.

User Name	Password	Database / Schema
i2b2demodata	demouser	i2b2demodata
i2b2hive	demouser	i2b2hive
i2b2imdata	demouser	i2b2imdata
i2b2metadata	demouser	i2b2metadata
i2b2pm	demouser	i2b2pm
i2b2workdata	demouser	i2b2workdata

The process of creating these users depends on which Database Management System you are using in your environment. Proceed to the section that correlates to your environment (Oracle, PostgreSQL or SQL Server).

3.3.1 Create User Accounts in Oracle

3.3.2 Create User Accounts in PostgreSQL

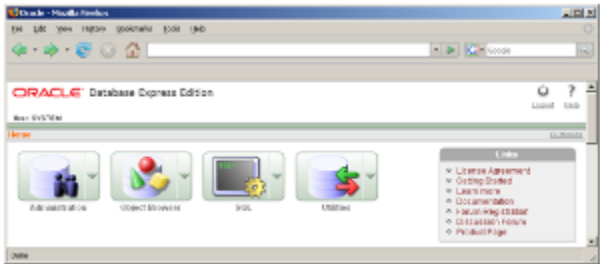
3.3.3 Create User Accounts in SQL Server

3.3.1 Create User Accounts in Oracle

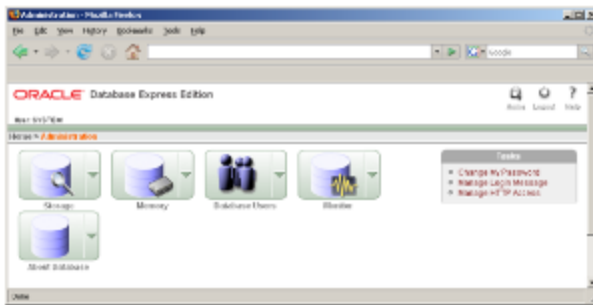
Steps to Create i2b2 Database Users

The following outlines the steps to take when creating the user accounts in your Oracle database.

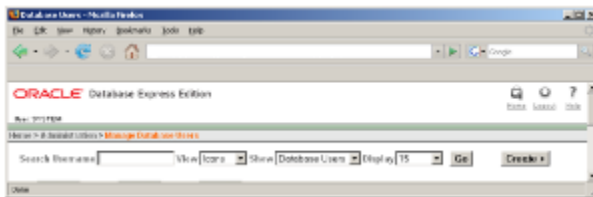
- 1. Open a browser and enter: `http://yourhost:yourPort/apex`
- 2. Log in as system user.
- 3. Click on **Administration** icon to open the *Administration page*.



- 4. Click on **Database Users** icon to open the *Manage Database Users page*.



5. Click on **Create** button to open the *Create Database User* page.



6. In the *Create Database User* section enter the following user name and password:

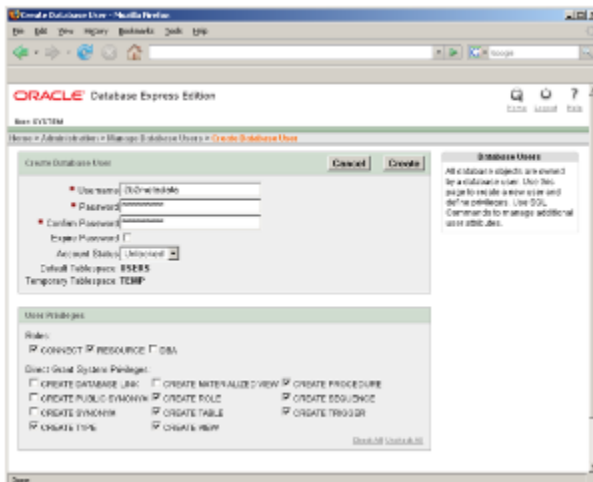
User Name: i2b2metadata
Password: demouser

Warning

When setting up the new users make sure **Expire Password** is **NOT** checked off.

7. In the *User Privileges* section check off the following options:

CREATE PROCEDURE	CREATE ROLE	CREATE SEQUENCE
CREATE TABLE	CREATE TRIGGER	CREATE TYPE
CREATE VIEW		



- Click on the **Create** button to save the user.
- Repeat steps 1-8 to create the following additional users:

User Name	Password	Project
i2b2demodata	demouser	Demo
i2b2hive	demouser	
i2b2imdata	demouser	Demo
i2b2pm	demouser	
i2b2workdata	demouser	Demo

3.3.2 Create User Accounts in PostgreSQL

Steps to Create i2b2 Database Users

The following outlines the steps to take when creating the user accounts in your PostgreSQL database.

- Log into PostgreSQL using psql.
- Create the following schemas:

Schema
i2b2demodata
i2b2hive
i2b2imdata
i2b2metadata
i2b2pm
i2b2workdata

Example Command to create a schema

Create Schema Command
Create schema i2b2demodata

- Create the following users:

User Name	Password	Schema
i2b2demodata	demouser	i2b2demodata
i2b2hive	demouser	i2b2hive
i2b2imdata	demouser	i2b2imdata
i2b2metadata	demouser	i2b2metadata
i2b2pm	demouser	i2b2pm
i2b2workdata	demouser	i2b2workdata

Important

Make sure you grant all privileges on all tables in the schema to the appropriate user.

Example: For the i2b2demodata schema you will grant all access to the i2b2demodata user.

3.3.3 Create User Accounts in SQL Server

Steps to Create i2b2 Database Users

The following outlines the steps to take when creating the user accounts in your SQL Server database.

1. Log into SQL Server Management Studio
2. Create the following databases

Database
i2b2demodata
i2b2hive
i2b2imdata
i2b2metadata
i2b2pm
i2b2workdata

3. Create the following users <i>(new logins)</i>.

User Name	Password	Database
i2b2demodata	demouser	i2b2demodata
i2b2hive	demouser	i2b2hive
i2b2imdata	demouser	i2b2imdata
i2b2metadata	demouser	i2b2metadata
i2b2pm	demouser	i2b2pm
i2b2workdata	demouser	i2b2workdata

Warning

When setting up the new logins make sure **Enforce password expiration** is **NOT** checked off.

3.4 Crcdata Tables

Overview of CRC Data Installation Process

The Crcdata tables are part of the **Data Repository (CRC) Cell**. The following outlines the steps that will be taken during the Crcdata installation.

- Step 1:** Change your working directory
- Step 2:** Configure the database properties for the Crcdata
- Step 3:** Create the Crcdata tables, indexes and sequences
- Step 4:** Create the stored procedures
- Step 5:** Load sample data into the tables

Note

The term "**crcdata**" and "**datamart**" mean the same thing. Your i2b2 demo data package has a folder called crcdata while the scripts that will have the term datamart in the name.

Example: crc_create_datamart_oracle.sql

3.4.1 Working Directory

Step 1: Change Working Directory

During the **CRC Data Installation** we will be working with the **Crcdata directory**. Within this directory are the files we will be editing to define the database properties, create the Crcdata tables and load the sample data provided with the data package.

To change your working directory to the Crcdata directory enter the following command:

Change Directory Command

```
CD YOUR_I2B2_DATA_DIRedu.harvard.i2b2.data\Release_1-7\NewInstall\Crcdata
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Windows Command: CD C:\opt\data\edu.harvard.i2b2.data\Release_1-7\NewInstall\Crcdata

Linux Command: CD /opt/data/edu.harvard.i2b2.data/Release_1-7/NewInstall/Crcdata

3.4.2 Set Database Properties

Step 2: Set Database Properties for Crcdata Tables

As stated earlier each i2b2 database schema has a corresponding directory that contains the data files for installing the data. Each of these directories has a file called **db.properties** and it needs to be updated with your environment variables.

Steps for setting database properties

Assumptions:

- You are logged into the command line application for your environment. (*Linux: Terminal or Shell and Windows: Command Prompt*)
- You have already changed your working directory to the one that is appropriate for this installation.

1. At the command prompt type the following:

Linux Command

```
open db.properties
```

Windows Command

```
db.properties
```

2. The **db.properties** file will open. Set the following properties for the DBMS at your site:

Important

When setting the database properties make sure you set the user to **i2b2demodata** and the project to **demo**.

Database Properties File

Oracle Database

```
db.type=oracle
db.username=i2b2demodata
db.password=demouser
db.server=LocationOfYourDatabase:1521:xe
db.driver=oracle.jdbc.driver.OracleDriver
db.url=jdbc:oracle:thin:@LocationOfYourDatabase:1521:xe
db.project=demo
```

PostgreSQL Database

```
db.type=postgresql
db.username=i2b2demodata
db.password=demouser
db.driver=org.postgresql.Driver
db.url=jdbc:postgresql://LocationOfYourDatabase/i2b2?searchpath=i2b2demodata
db.project=demo
```

SQL Server Database

```
db.type=sqlserver
db.username=i2b2demodata
db.password=demouser
db.driver=com.microsoft.sqlserver.jdbc.SQLServerDriver
db.url=jdbc:sqlserver://LocationOfYourDatabase:1433;database=demo
db.project=demo
```

3. Save the changes and close the file.

Tip

To save yourself steps, DO NOT close your Command Prompt window as you will be continuing to use it throughout the remainder of the installation.

3.4.3 Create Crcdata Tables

Step 3: Create Data Repository (CRC) Tables

The **third step** in the Crcdata installation process is to create the Crcdata tables, indexes and sequences by running the following command:

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml create_crcdata_tables_release_1-7
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml create_crcdata_tables_release_1-7
```

Note

If the command %ANT_HOME% does not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace %ANT_HOME% with the full path to your Ant directory.

3.4.4 Create Crcdata Stored Procedures

Step 4: Create Data Repository (CRC) Stored Procedures

The **fourth step** in the Crcdata installation process is to create the stored procedures for the demodata tables

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml create_procedures_release_1-7
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml create_procedures_release_1-7
```

Note

If the command %ANT_HOME% does not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace %ANT_HOME% with the full path to your Ant directory.

3.4.5 Load Crcdata Tables

Step 5: Load Data Repository (CRC) Tables

The **fifth** and **final step** in the Crcdata installation process is to load the data into the demodata tables by running the following command:

Important

- The demodata provided in the data package is a sampling of demonstration patients and observations that are by no means based on real patients. Also included is a sample of concepts, modifiers and providers that coincide with the Metadata that is loaded during the Metadata tables section.
- The data provided is intended to provide you a sample of how you may setup the Crcdata tables.
- If you have your own data and wish to load it instead of the i2b2 sample demodata you can do it at this point of the installation.

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml db_demodata_load_data
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml db_demodata_load_data
```

Note

The loading of the Crcdata may take an extended period of time (20 minutes) due to the amount of sample data provided.

3.5 Hivedata Tables

Overview of Hive Data Installation Process

The Hivedata tables are part of the **Project Management (PM) Cell**. The following outlines the steps that will be taken during the Hivedata installation.

- Step 1:** Change your working directory
- Step 2:** Configure the database properties for the Hivedata
- Step 3:** Create the Hivedata tables, indexes and sequences
- Step 4:** Load sample data into the tables

3.5.1 Working Directory

Step 1: Change Working Directory for Hivedata Installation

In this step of the installation process we will be working with the **Hivedata directory**. Within this directory are the files we will be editing to define the database properties, create the hive tables and load the sample data provided with the data package.

To change your working directory to the Hivedata directory enter the following command:

Change Directory Command

```
CD YOUR_I2B2_DATA_DIRedu.harvard.i2b2.data\Release_1-7\NewInstall\Hivedata
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Windows Command: CD C:\opt\data\edu.harvard.i2b2.data\Release_1-7\NewInstall\Hivedata

Linux Command: CD /opt/data/edu.harvard.i2b2.data/Release_1-7/NewInstall/Hivedata

3.5.2 Set Database Properties

Step 2: Set Database Properties for Hivedata Tables

As stated earlier each i2b2 database schema has a corresponding directory that contains the data files for installing the data. Each of these directories has a file called **db.properties** and it needs to be updated with your environment variables.

Steps for setting database properties

Assumptions:

- You are logged into the command line application for your environment. (*Linux: Terminal or Shell and Windows: Command Prompt*)
- You have already changed your working directory to the one that is appropriate for this installation.

1. At the command prompt type the following:

Linux Command

```
open db.properties
```

Windows Command

```
db.properties
```

2. The **db.properties** file will open. Set the following properties for the DBMS at your site:

Important

When setting the database properties make sure you set the user to **i2b2hive**. Projects are not assigned to Hivedata which is why the

db.project property is not in the hive's db.properties file.

Database Properties File

Oracle Database

```
db.type=oracle
db.username=i2b2hive
db.password=demouser
db.server=LocationOfYourDatabase:1521:xe
db.driver=oracle.jdbc.driver.OracleDriver
db.url=jdbc:oracle:thin:@LocationOfYourDatabase:1521:xe
```

PostgreSQL Database

```
db.type=postgresql
db.username=i2b2hive
db.password=demouser
db.driver=org.postgresql.Driver
db.url=jdbc:postgresql://LocationOfYourDatabase/i2b2?searchpath=i2b2hive
```

SQL Server Database

```
db.type=sqlserver
db.username=i2b2hive
db.password=demouser
db.driver=com.microsoft.sqlserver.jdbc.SQLServerDriver
db.url=jdbc:sqlserver://LocationOfYourDatabase:1433;database=demo
```

3. Save the changes and close the file.

Tip

To save yourself steps, DO NOT close your Command Prompt window as you will be continuing to use it throughout the remainder of the installation.

3.5.3 Create Hive Tables

Step 3: Create Hive Tables

The **third step** in the Hivedata installation process is to create the Hive tables, indexes and sequences by running the following command:

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml create_hivedata_tables_release_1-7
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml create_hivedata_tables_release_1-7
```

Note

If the command %ANT_HOME% does not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace %ANT_HOME% with the full path to your Ant directory.

3.5.4 Load Hive Data

Step 4: Load Data into Hive Tables

The **fourth** and **final step** in the Hivedata installation process is to load the data into the hive tables by running the following command:

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml db_hivedata_load_data
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml db_hivedata_load_data
```

Note

If the command %ANT_HOME% does not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace %ANT_HOME% with the full path to your Ant directory.

3.6 IM Tables

Overview of the IM Data Installation Process

The Imdata tables are part of the **Identity Management (IM) Cell**. The following outlines the steps that will be taken during the Imdata installation.

- Step 1:** Change your working directory
- Step 2:** Configure the database properties for the Imdata
- Step 3:** Create the Imdata tables, indexes and sequences
- Step 4:** Load sample data into the tables

3.6.1 Working Directory

Step 1: Change Working Directory for Imdata Installation

During the **IM Data Installation** we will be working with the **Imdata directory**. Within this directory are the files we will be editing to define the database properties, create the IM tables and load the sample data provided with the data package.

To change your working directory to the Imdata directory enter the following command:

Change Directory Command

```
CD YOUR_I2B2_DATA_DIRedu.harvard.i2b2.data\Release_1-7\NewInstall\Imdata
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Windows Command: CD C:\opt\data\edu.harvard.i2b2.data\Release_1-7\NewInstall\Imdata

Linux Command: CD /opt/data/edu.harvard.i2b2.data/Release_1-7/NewInstall/Imdata

3.6.2 Set Database Properties

Step 2: Set Database Properties for Imdata Tables

As stated earlier each i2b2 database schema has a corresponding directory that contains the data files for installing the data. Each of these directories has a file called **db.properties** and it needs to be updated with your environment variables.

Steps for setting database properties

Assumptions:

- You are logged into the command line application for your environment. (*Linux: Terminal or Shell and Windows: Command Prompt*)
- You have already changed your working directory to the one that is appropriate for this installation.

1. At the command prompt type the following:

Linux Command

```
open db.properties
```

Windows Command

```
db.properties
```

2. The **db.properties** file will open. Set the following properties for the DBMS at your site:

Important

When setting the database properties make sure you set the user to **i2b2imdata** and the project to **demo**.

Database Properties File**Oracle Database**

```
db.type=oracle
db.username=i2b2imdata
db.password=demouser
db.server=LocationOfYourDatabase:1521:xe
db.driver=oracle.jdbc.driver.OracleDriver
db.url=jdbc:oracle:thin:@LocationOfYourDatabase:1521:xe
db.project=demo
```

PostgreSQL Database

```
db.type=postgresql
db.username=i2b2imdata
db.password=demouser
db.driver=org.postgresql.Driver
db.url=jdbc:postgresql://LocationOfYourDatabase/i2b2?searchpath=i2b2imdata
db.project=demo
```

SQL Server Database

```
db.type=sqlserver
db.username=i2b2imdata
db.password=demouser
db.driver=com.microsoft.sqlserver.jdbc.SQLServerDriver
db.url=jdbc:sqlserver://LocationOfYourDatabase:1433;database=demo
db.project=demo
```

3. Save the changes and close the file.

Tip

To save yourself steps, DO NOT close your Command Prompt window as you will be continuing to use it throughout the remainder of the installation.

3.6.3 Create IM Tables

Step 3: Create Identity Management (IM) Tables

The **third step** in the Imdata installation process is to create the IM tables, indexes and sequences by running the following command:

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml create_imdata_tables_release_1-7
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml create_imdata_tables_release_1-7
```

Note

If the command %ANT_HOME% does not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace %ANT_HOME% with the full path to your Ant directory.

3.6.4 Load IM Tables

Step 4: Load Identity Management (IM) Tables

The **fourth** and **final step** in the Imdata installation process is to load the data into the IM tables by running the following command:

Important

- The Imdata provided in the data package is a sampling of demonstration patients and projects that are by no means based on real patients. Its intended use is to provide you a sample of how you may setup the IM tables.
- The data provided is intended to provide you a sample of how you may setup the IM tables.
- If you have your own data and wish to load it instead of the i2b2 sample Imdata you can do it at this point of the installation.

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml db_imdata_load_data
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml db_imdata_load_data
```

3.7 Metadata Tables

Overview of the Metadata Installation Process

The Metadata tables are part of the **Ontology Management (ONT) Cell**. The following outlines the steps that will be taken during the Metadata installation.

- Step 1:** Change your working directory
- Step 2:** Configure the database properties for the Metadata
- Step 3:** Create the Metadata tables, indexes and sequences
- Step 4:** Load sample data into the tables

3.7.1 Working Directory

Step1: Change Working Directory for Metadata Installation

During the **Metadata Installation** we will be working with the **Metadata directory**. Within this directory are the files we will be editing to define the database properties, create the IM tables and load the sample data provided with the data package.

To change your working directory to the Metadata directory enter the following command:

Change Directory Command
CD <i>YOUR_I2B2_DATA_DIR</i> edu.harvard.i2b2.data\Release_1-7\NewInstall\Metadata

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:
Windows Command: CD C:\opt\data\edu.harvard.i2b2.data\Release_1-7\NewInstall\Metadata
Linux Command: CD /opt/data/edu.harvard.i2b2.data/Release_1-7/NewInstall/Metadata

3.7.2 Set Database Properties

Step 2: Set Database Properties for Metadata Tables

As stated earlier each i2b2 database schema has a corresponding directory that contains the data files for installing the data. Each of these directories has a file called **db.properties** and it needs to be updated with your environment variables.

Steps for setting database properties

- Assumptions:**
- You are logged into the command line application for your environment. (*Linux: Terminal or Shell and Windows: Command Prompt*)
 - You have already changed your working directory to the one that is appropriate for this installation.

1. At the command prompt type the following:

Linux Command
open db.properties

Windows Command

db.properties

- The **db.properties** file will open. Set the following properties for the DBMS at your site:

Important

When setting the database properties make sure you set the user to **i2b2metadata** and the project to **demo**.

Database Properties File

Oracle Database

```
db.type=oracle
db.username=i2b2metadata
db.password=demouser
db.server=LocationOfYourDatabase:1521:xe
db.driver=oracle.jdbc.driver.OracleDriver
db.url=jdbc:oracle:thin:@LocationOfYourDatabase:1521:xe
db.project=demo
```

PostgreSQL Database

```
db.type=postgresql
db.username=i2b2metadata
db.password=demouser
db.driver=org.postgresql.Driver
db.url=jdbc:postgresql://LocationOfYourDatabase/i2b2?searchpath=i2b2metadata
db.project=demo
```

SQL Server Database

```
db.type=sqlserver
db.username=i2b2metadata
db.password=demouser
db.driver=com.microsoft.sqlserver.jdbc.SQLServerDriver
db.url=jdbc:sqlserver://LocationOfYourDatabase:1433;database=demo
db.project=demo
```

- Save the changes and close the file.

Tip

To save yourself steps, DO NOT close your Command Prompt window as you will be continuing to use it throughout the remainder of the installation.

3.7.3 Create Metadata Tables

Step 3: Create Metadata Tables

The **third step** in the Metadata installation process is to create the Metadata tables, indexes and sequences by running the following command:

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml create_metadata_tables_release_1-7
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml create_metadata_tables_release_1-7
```

Note

If the command %ANT_HOME% does not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace %ANT_HOME% with the full path to your Ant directory.

3.7.4 Load Metadata Tables

Step 4: Load Metadata Tables

The **fourth and final step** in the Metadata installation process is to load the data into the Metadata tables by running the following command:

Important

The Metadata provided in the data package is a sampling of terms from various standard coding systems. There data is rather large but it is by no means a complete set of ICD-9, SNOMED, LOINC, or CPT codes.

If you have your own Metadata and wish to load it instead of the i2b2 sample Metadata you can do it at this point of the installation.

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml db_metadata_load_data
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml db_metadata_load_data
```

Note

The loading of the Metadata may take an extended period of time (20 minutes) due to the amount of sample data provided.

3.8 PM Tables

Overview of PM Data Installation Process

The Pmdata tables are part of the **Project Management (PM) Cell**. The following outlines the steps that will be taken during the Pmdata installation.

- Step 1:** Change your working directory
- Step 2:** Configure the database properties for the Pmdata
- Step 3:** Create the Pmdata tables, indexes and sequences
- Step 4:** Create the triggers for the PM tables
- Step 5:** Load sample data into the tables

3.8.1 Working Directory

Step1: Change Working Directory for PM Data Installation

During the **PM Data Installation** we will be working with the **Pmdata directory**. Within this directory are the files we will be editing to define the database properties, create the PM tables and triggers as well as load the sample data provided with the data package.

To change your working directory to the Pmdata directory enter the following command:

Change Directory Command

```
CD YOUR_I2B2_DATA_DIRedu.harvard.i2b2.data\Release_1-7\NewInstall\Pmdata
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Windows Command: CD C:\opt\data\edu.harvard.i2b2.data\Release_1-7\NewInstall\Pmdata

Linux Command: CD /opt/data/edu.harvard.i2b2.data/Release_1-7/NewInstall/Pmdata

3.8.2 Set Database Properties

Step 2: Set Database Properties for PM Tables

As stated earlier each i2b2 database schema has a corresponding directory that contains the data files for installing the data. Each of these directories has a file called **db.properties** and it needs to be updated with your environment variables.

Steps for setting database properties

Assumptions:

- You are logged into the command line application for your environment. (*Linux: Terminal or Shell and Windows: Command Prompt*)
- You have already changed your working directory to the one that is appropriate for this installation.

1. At the command prompt type the following:

Linux Command

```
open db.properties
```

Windows Command

```
db.properties
```

2. The **db.properties** file will open. Set the following properties for the DBMS at your site:

Important

When setting the database properties make sure you set the user to **i2b2pm**. Projects are not assigned to Pmda which is why the db.project property is not in the PM's db.properties file

Database Properties File

Oracle Database

```
db.type=oracle
db.username=i2b2pm
db.password=demouser
db.server=LocationOfYourDatabase:1521:xe
db.driver=oracle.jdbc.driver.OracleDriver
db.url=jdbc:oracle:thin:@LocationOfYourDatabase:1521:xe
```

PostgreSQL Database

```
db.type=postgresql
db.username=i2b2pm
db.password=demouser
db.driver=org.postgresql.Driver
db.url=jdbc:postgresql://LocationOfYourDatabase/i2b2?searchpath=i2b2pm
```

SQL Server Database

```
db.type=sqlserver
db.username=i2b2pm
db.password=demouser
db.driver=com.microsoft.sqlserver.jdbc.SQLServerDriver
db.url=jdbc:sqlserver://LocationOfYourDatabase:1433;database=demo
```

3. Save the changes and close the file.

Tip

To save yourself steps, DO NOT close your Command Prompt window as you will be continuing to use it throughout the remainder of the installation.

3.8.3 Create PM Tables

Step 3: Create Project Management (PM) Tables

The **third step** in the Pmda installation process is to create the PM tables, indexes and sequences by running the following command:

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml create_pmda_tables_release_1-7
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml create_pmda_tables_release_1-7
```

Note

If the command %ANT_HOME% does not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace %ANT_HOME% with the full path to your Ant directory.

3.8.4 Create PM Triggers

Step 4: Create Project Management (PM) Stored Procedures

The **fourth step** in the Pmda installation process is to create the triggers for the PM tables

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml create_triggers_release_1-7
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml create_triggers_release_1-7
```

Note

If the command %ANT_HOME% does not work it may be because you did not set your environment variables as suggested in the

Requirements Chapter. If you do not wish to set this variable then you will need to replace %ANT_HOME% with the full path to your Ant directory.

3.10.5 Load PM Tables

Step 5: Load Data Repository (CRC) Tables

The **fifth** and **final step** in the Pmdata installation process is to load the data into the PM tables by running the following command:

Important

The PM scripts assume that the i2b2 cells are running on port 9090; if they are not you will need to modify the Cells URL in the admin tool or modify the PM_CELL_PARAMS records.

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml db_pmdata_load_data
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml db_pmdata_load_data
```

3.9 Workdata Tables

Overview of the Workdata Installation Process

The Workdata tables are part of the **Workplace Framework (WORK) Cell**. The following outlines the steps that will be taken during the Workdata installation.

- Step 1:** Change your working directory
- Step 2:** Configure the database properties for the Workdata
- Step 3:** Create the Workdata tables, indexes and sequences
- Step 4:** Load sample data into the tables

3.9.1 Working Directory

Step1: Change Working Directory for Workdata Installation

During the **Workdata Installation** we will be working with the **Workdata directory**. Within this directory are the files we will be editing to define the database properties, create the Workdata tables and load the sample data provided with the data package.

To change your working directory to the Workdata directory enter the following command:

Change Directory Command

```
CD YOUR_I2B2_DATA_DIRedu.harvard.i2b2.data\Release_1-7\NewInstall\Workdata
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path*: use a forward slash.
- *Windows Path*: use a backward slash.

EXAMPLES:

Windows Command: CD C:\opt\data\edu.harvard.i2b2.data\Release_1-7\NewInstall\Workdata

Linux Command: CD /opt/data/edu.harvard.i2b2.data/Release_1-7/NewInstall/Workdata

3.9.2 Set Database Properties

Step 2: Set Database Properties for Workdata Tables

As stated earlier each i2b2 database schema has a corresponding directory that contains the data files for installing the data. Each of these directories has a file called **db.properties** and it needs to be updated with your environment variables.

Steps for setting database properties

Assumptions:

- You are logged into the command line application for your environment. (*Linux: Terminal or Shell and Windows: Command Prompt*)
- You have already changed your working directory to the one that is appropriate for this installation.

1. At the command prompt type the following:

Linux Command

```
open db.properties
```

Windows Command

```
db.properties
```

2. The **db.properties** file will open. Set the following properties for the DBMS at your site:

Important

When setting the database properties make sure you set the user to **i2b2workdata** and the project to **demo**.

Database Properties File

Oracle Database

```
db.type=oracle
db.username=i2b2workdata
db.password=demouser
db.server=LocationOfYourDatabase:1521:xe
db.driver=oracle.jdbc.driver.OracleDriver
db.url=jdbc:oracle:thin:@LocationOfYourDatabase:1521:xe
db.project=demo
```

PostgreSQL Database

```
db.type=postgresql
db.username=i2b2workdata
db.password=demouser
db.driver=org.postgresql.Driver
db.url=jdbc:postgresql://LocationOfYourDatabase/i2b2?searchpath=i2b2workdata
db.project=demo
```

SQL Server Database

```
db.type=sqlserver
db.username=i2b2workdata
db.password=demouser
db.driver=com.microsoft.sqlserver.jdbc.SQLServerDriver
db.url=jdbc:sqlserver://LocationOfYourDatabase:1433;database=demo
db.project=demo
```

3. Save the changes and close the file.

Tip

To save yourself steps, DO NOT close your Command Prompt window as you will be continuing to use it throughout the remainder of the installation.

3.9.3 Create Workdata Tables

Step 3: Create Workplace Framework (WORK) Tables

The **third step** in the Workdata installation process is to create the Workdata tables, indexes and sequences by running the following command:

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml create_workdata_tables_release_1-7
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml create_workdata_tables_release_1-7
```

Note

If the command %ANT_HOME% does not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace %ANT_HOME% with the full path to your Ant directory.

3.9.4 Load Workdata Tables

Step 4: Load Workplace Framework (WORK) Tables

The **fourth** and **final step** in the Workdata installation process is to load the data into the Workdata tables by running the following command:

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f data_build.xml db_workdata_load_data
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f data_build.xml db_workdata_load_data
```

3.10 Next Steps

Steps Completed

The following steps were completed during this chapter on the data installation process.



Data Installation Chapter



Extracted the i2b2 data package



Created database user accounts for i2b2 schemas



Created the tables and loaded the data for the following:



Crcdata



Hivedata



Imdata



Metadata



Pmdata
☒
Workdata

Next Steps

After completing this chapter on Data Installation you are now ready to begin installing the i2b2 server. Before you can install any cells you need to first install the i2b2 Server-Common. The procedures for this step are outlined in the **i2b2 Server-Common Install chapter**.

Chapter 4. i2b2 Server-Common Install

As part of the i2b2 there are a group of common server files that are used by the i2b2 cells. These files are contained in the **edu.harvard.i2b2.server-core** project which has to be deployed before installing any of the i2b2 Core Cells.

Chapter 4. Table of Contents

4.1 Prerequisites

4.2 Server-common Installation Overview

- [4.2.1 Extract Source Code](#)
- [4.2.2 Directory Structure and Working Directory](#)

4.3 Stop Services

4.4 Configuration

- [4.4.1 Configure the Server-common Build Properties](#)

4.5 Deployment

4.6 Next Steps

4.1 Prerequisites

The following installations **must be completed** prior to beginning the process of installing the i2b2 server-common.



Requirements Chapter



Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)



Installed Java, JBoss, Apache Ant and Apache Axis2



Downloaded the i2b2 Software



Data Installation Chapter



Created database user accounts for i2b2 schemas



Created all the data tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



Created the stored procedures for the Crcdata tables and the triggers for the Pmdata tables



Loaded data into all the tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)

4.2 Server-common Installation Overview

Installation Overview

In this chapter we will extract the source code for all of the i2b2 cells. We will also be deploying the common i2b2 server code that is used by all the i2b2 core cells.

Important

The i2b2 server-common has to be deployed **before** any other i2b2 cells are deployed.

Order of Installation

The basic steps that will be taken during this installation are as follows:

- Step 1:** Extract i2b2 source code
- Step 2:** Stop services (JBoss)
- Step 3:** Edit i2b2 server-common configuration files
- Step 4:** Deploy the i2b2 server-common

Important

The details of what is to be done for each step are defined in the different sections within this chapter. It is important to follow steps in the order they are defined and not to skip any of them unless otherwise noted.

4.2.1 Extract Source Code

In the *Requirements Chapter* of this install document you downloaded a zip file that contained the i2b2 core source code. This zip file contains all the i2b2 code needed to install the i2b2 cells including the i2b2 Server-Common.

Steps to extract the code

1. Set up a target source directory for the i2b2 server code.
2. Locate the **i2b2core-src-1700.zip** file you downloaded in the *Requirements chapter*.
3. Extract the core server source code into the target directory you just created.

Tip

You will want to make note of the location as it will be needed further along in the i2b2 installation. In the installation document whenever you see **YOUR_I2B2_SRC_DIR** it will need to be replaced with the location of your i2b2 Core Source code.

For your convenience an installation Worksheet to track the setup locations has been provided in the Appendices Chapter.

4.2.2 Directory Structure and Working Directory

Once you have extracted the i2b2 core source code you will notice the main directory structure in your i2b2 source directory

Main Directory for New Data Installs: *YOUR_I2B2_SRC_DIR*

Directory	Description
admin	Contains the source code for the Admin module used by the PM Cell.
edu.harvard.i2b2.crc	Contains the source code for the Data Repository (CRC) cell.
edu.harvard.i2b2.fr	Contains the source code for the File Repository (FR) cell.
edu.harvard.i2b2.im	Contains the source code for the Identity Management (IM) cell.
edu.harvard.i2b2.ontology	Contains the source code for the Ontology (ONT) cell.
edu.harvard.i2b2.pm	Contains the source code for the Project Management (PM) cell.
edu.harvard.i2b2.server-common	Contains the source code for the common server code used by the i2b2 core cells.
edu.harvard.i2b2.workplace	Contains the source code for the Workplace Framework (WORK) cell.
edu.harvard.i2b2.xml	Contains the xsd files used by the i2b2 server and clients.

Working Directory

In this step of the installation process we will be working with the **edu.harvard.i2b2.server-common** directory. Within this directory is the **build.properties** file that will be edited with the necessary information to build and deploy the common server code.

4.3 Stop Services

Stop JBoss

In order to deploy the i2b2 server-common correctly on your i2b2 server it is important that JBoss is not running.

The process of stopping your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Stop JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Stop JBoss Windows Service**.

Stop JBoss Linux Service

The following steps will walk you through the process of stopping your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to stop JBoss.

Stop JBoss Command
<code>/etc/init.d/jboss stop</code>

```
/etc/init.d/jboss stop
```

3. The script to stop JBoss will run.
4. Provided there are no issues JBoss will no longer be running.

Stop JBoss Windows Service

The following steps will walk you through the process of stopping your JBoss server via a windows service.

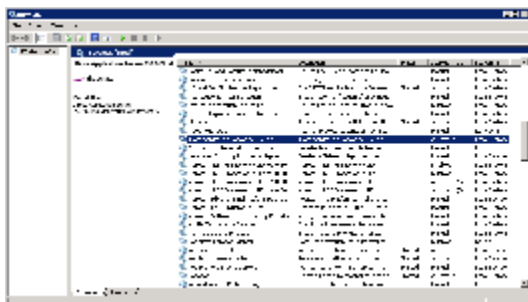
Note

These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss as a Windows Service* in the *Requirements Chapter*.

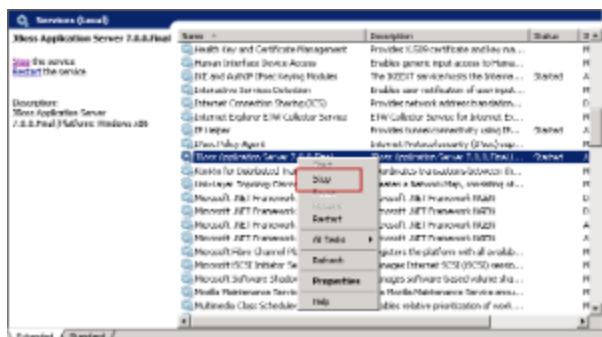
1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

Important

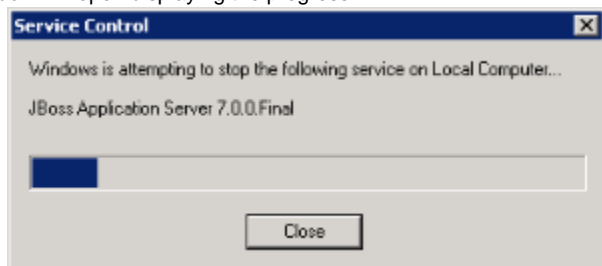
The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.



- Using the mouse, *right click* on the name of the service to display the pop-up menu.
- Select **Stop** to stop the service from running.



6. A window will open displaying the progress.



7. The progress window will close once the service has stopped running.

4.4 Configuration

As stated previously the working directory for server-common installation is **edu.harvard.i2b2.server-common folder**. The following outlines the steps that need to be taken during the configuration stage of the installation.

- Step 1:** Change your working directory
- Step 2:** Configure the build properties

Assumptions

The steps in this section are based on the following assumptions:

- Linux:** your user has the appropriate **administrative access** to the opt directory.
- Windows:** You are logged into the Windows Command Prompt as an **Administrator**.

If you do not have the appropriate access you will have problems running the scripts.

Step 1: Change working directory

The **first step** in the cell configuration process is to change your working directory to the location of your **edu.harvard.i2b2.pm folder**.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.server-common
```


Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: `CD /opt/i2b2/edu.harvard.i2b2.server-common`

Windows Command: `CD C:\opt\i2b2\edu.harvard.i2b2.server-common`

4.4.1 Configure the Server-common Build Properties

Step 2: Configure the build properties

The **second step** in the cell configuration process is to edit the **build.properties** file for edu.harvard.i2b2.server-common folder. During this step you need to set the *jboss.home* and *axis2.war.name* properties for your environment.

Steps to update build.properties

1. At the command prompt type the following:

Command
build.properties

2. The **build.properties** file will open. Set the following properties to reflect your environment:

Build Properties File
jboss.home= YOUR_JBOSS_HOME_DIR axis2.war.name= i2b2.war

3. Save the changes and close the file.

4.5 Deployment

The deployment process at this stage of the installation will install the **i2b2 server-common** on the *JBoss Web Server*.

Deploy edu.harvard.i2b2.server-common

The following steps will walk you through the deployment process. The commands on a Windows Server may differ slightly on a Unix Machine. This difference will be noted when appropriate.

Note

During the configuration process the working directory was already changed to the edu.harvard.i2b2.server-common folder. If you did not change it then you can skip step 1 and go directly to the second step of deployment. If you did change it then you will need to change it back by following the steps outlined below.

Step 1: Change working directory

The **first step** in the cell configuration process is to change your working directory to the location of your **edu.harvard.i2b2.pm** folder.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.server-common
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: CD /opt/i2b2/edu.harvard.i2b2.server-common

Windows Command: CD C:\opt\i2b2\edu.harvard.i2b2.server-common

Step 2: Deploy edu.harvard.i2b2.server-common

The **second** and **final step** in the deployment process is to run the Ant script to deploy edu.harvard.i2b2.server-common.

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant clean dist deploy jboss_pre_deployment_setup
```

Run Command

```
%ANT_HOME%\bin\ant.bat clean dist deploy jboss_pre_deployment_setup
```

Note

If the command %ANT_HOME% does not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace %ANT_HOME% with the full path to your Ant

directory.

Provided there were no problems running the script you will see **Build Successful** when the script finishes and the edu.harvard.i2b2.server-common has been deployed.

4.6 Next Steps

Steps Completed

The following steps were completed during this chapter on installing i2b2 server-common.



i2b2 Server-common Installation Chapter



Extracted the i2b2 source code to a directory of your choice (*YOUR_I2B2_SRC_DIR*)



Stopped JBoss Services



Deployed edu.harvard.i2b2.server-common

Note

Normally we restart JBoss services between installations so we can verify a cell was deployed correctly. In this chapter we intentionally omitted this step because we did not deploy a cell so there are no services to check.

If you are **not continuing** with the rest of the installation at this time you may want to restart your JBoss services if they are needed for other applications in your environment. Steps on how to do this can be found in any of the cell installation chapters in the section called *Start Services*

Next Steps

After completing this chapter on installing the i2b2 server-common you are now ready to begin installing the i2b2 core cells. Each cell installation has its own chapter that will walk you through the installation process.

For the most part the order in which the cells are installed does not matter. There are a couple of exceptions:

1. The PM Cell has to be installed before any other cells.
2. The i2b2 Administration Module has to be installed after the PM Cell before any other cells.

At this point in the installation process your **next step** is to proceed to the **Install Project Management (PM) Cell chapter** where the steps for installing the PM Cell are defined.

Chapter 5. Project Management (PM) Cell Install

Information in the **Project Management cell** is related to the setup and maintenance of the hive, projects, users and security. The PM Cell needs to be installed prior to the other i2b2 Core cells.

Chapter 5. Table of Contents

5.1 Prerequisites

5.2 PM Installation Overview

- 5.2.1 Source Code and Directory Structure

5.3 Stop Services

5.4 Configuration

- 5.4.1 Configure the PM Build Properties
- 5.4.2 Data Source Configuration

5.5 Deployment

5.6 Start Services

5.7 Verify PM Installation

5.8 Next Steps

5.1 Prerequisites

The following installations **must be completed** prior to beginning the process of installing the Project Management (PM) Cell.



Requirements Chapter



Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)



Installed Java, JBoss, Apache Ant and Apache Axis2



Downloaded the i2b2 Software



Data Installation Chapter



Created database user accounts for i2b2 schemas



Created all the data tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



Created the stored procedures for the Crcdata tables and the triggers for the Pmdata tables



Loaded data into all the tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



i2b2 Server-common Install Chapter



Extracted all the i2b2 source code to a directory a directory of your choice (*YOUR_I2B2_SRC_DIR*)



Configured Server-common properties



Deployed edu.harvard.i2b2.server-common

5.2 PM Installation Overview

Installation Overview

In this chapter we will be installing the Project Management (PM) Cell.

Important

The PM Cell has to be deployed **before** any other i2b2 cells are deployed.

Order of Installation

The basic steps that will be taken during this installation are as follows:

- Step 1:** Stop services (JBoss)
- Step 2:** Edit PM configuration files
- Step 3:** Deploy the PM Cell
- Step 4:** Start services (JBoss)
- Step 5:** Verify installation

Important

The details of what is to be done for each step are defined in the different sections within this chapter. It is important to follow steps in the order they are defined and not to skip any of them unless otherwise noted.

5.2.1 Source Code and Directory Structure

Source Code for Project Management (PM) Cell

In the chapter titled *Install i2b2 Server-Common*, you extracted the files from the i2b2 Core Source Code zip file into a directory of your choosing (*YOUR_I2B2_SRC_DIR*). One of the files extracted was a folder called **edu.harvard.i2b2.pm** and it is in this folder where the files for the PM installation reside.

Project Management Directory Structure

In this step of the installation process we will be working with the **edu.harvard.i2b2.pm** directory. Within this directory are the files we will be editing in order to build and deploy the PM Cell on your i2b2 Server. The files and their location within your working directory are as follows:

Main PM Directory: *YOUR_I2B2_SRC_DIR*edu.harvard.i2b2.pm\

File Name	Description
build.properties	Contains properties needed during the building of the PM Cell.

Directory for Data Source Configuration: `YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.pm\etc\jboss\`

File Name	Description
pm-ds.xml	Configure the JBoss Data source for the PM cell.

5.3 Stop Services

Note

In the previous chapter (*i2b2 Server-Common Install*) we intentionally did not restart JBoss.

- If you did restart JBoss then you need to proceed with this step.
- If you did not restart JBoss then you can skip this step.
- If you are not sure if JBoss is running then we suggest you proceed with this step in the event that it may be running.

Stop JBoss

In order to deploy the PM cell correctly on your i2b2 server it is important that JBoss is not running.

The process of stopping your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Stop JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Stop JBoss Windows Service**.

Stop JBoss Linux Service

The following steps will walk you through the process of stopping your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to stop JBoss.

Stop JBoss Command

```
/etc/init.d/jboss stop
```

3. The script to stop JBoss will run.
4. Provided there are no issues JBoss will no longer be running.

Stop JBoss Windows Service

The following steps will walk you through the process of stopping your JBoss server via a windows service.

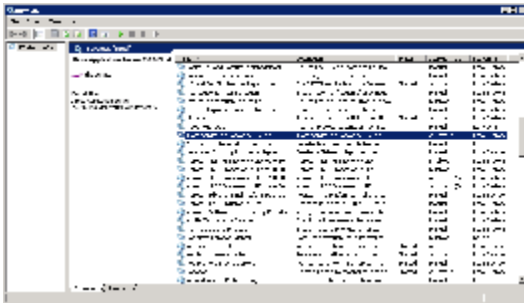
Note

These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss as a Windows Service* in the *Requirements Chapter*.

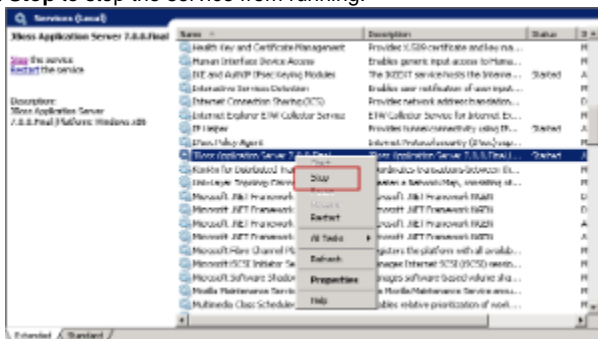
1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

Important

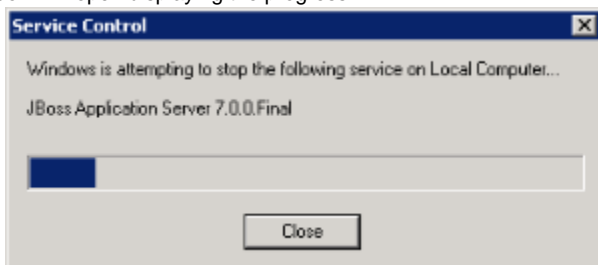
The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.



4. Using the mouse, *right click* on the name of the service to display the pop-up menu.
5. Select **Stop** to stop the service from running.



6. A window will open displaying the progress.



7. The progress window will close once the service has stopped running.

5.4 Configuration

Configure PM Cell for Installation

As stated in the previous section, there are a couple of files in the **edu.harvard.i2b2.pm** directory that will need to be edited to reflect the appropriate configuration at your site. There are several steps that will need to be taken.

- Step 1:** Change your working directory
- Step 2:** Configure the build properties
- Step 3:** Configure the data sources

Note

The configuration files you will be editing are delivered with examples. In some instances these files may contain multiple examples for the three different database management systems supported by the i2b2.

Assumptions

The steps in this section are based on the following assumptions:

Linux: your user has the appropriate **administrative access** to the opt directory.

Windows: You are logged into the Windows Command Prompt as an **Administrator**.

If you do not have the appropriate access you will have problems running the scripts.

Step 1: Change working directory

The **first step** in the cell configuration process is to change your working directory to the location of your **edu.harvard.i2b2.pm** folder.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.pm
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: CD /opt/i2b2/edu.harvard.i2b2.pm

Windows Command: CD C:\opt\i2b2\edu.harvard.i2b2.pm

5.4.1 Configure the PM Build Properties

Step 2: Configure the build properties

The **second step** in the cell configuration process is to edit the **build.properties** file for edu.harvard.i2b2.pm. During this step you need to set the *jboss.home* and *axis2.war.name* properties.

Steps to update build.properties

1. At the command prompt type the following:

Linux Command
open build.properties

Windows Command
build.properties

2. The **build.properties** file will open. Set the following properties to reflect your environment:

Build Properties File
jboss.home= <i>YOUR_JBOSS_HOME_DIR</i> axis2.war.name= <i>i2b2.war</i>

3. Save the changes and close the file.

5.4.2 Data Source Configuration

Step 3: Configure the data source for the PM Cell

The PM cell needs to communicate with your **i2b2 database** and in order to do this it needs to know where the tables for the **pmdata** reside. Therefore the **third** and **final step** in the cell configuration process is to configure the data sources for the PM Cell. This information is configured in the **pm-ds.xml** file.

Things to keep in mind when configuring your datasources:

When configuring your data sources you want to make sure you edit the following:

- The **pmdata** tables were created during the chapter on Data Installation.
- The **PMBootstrapDS** points to the data source for your pm tables.
 - The **<user-name>** and **<password>** need to match the database user you set up for your pmdata. In the i2b2 demo database

this is *i2b2pm* and *demouser*.

- The **<connection_url>** needs to have the following:
 - The correct JDBC information for your type of database.
 - The correct location of the database containing your pmdata tables.
- Both the **<driver-class>** and **<driver>** need to accurately reflect the type of database you are connecting to.

Steps to configure data sources

The following steps define how to configure your data sources for the PM Cell.

1. The **pm-ds.xml** file is located in the following directory:
YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.pm\etc\jboss
2. Open the pm-ds.xml file to configure your data sources.

Oracle Database

```
<datasource jta="false" jndi-name="java:/PMBootStrapDS"
  pool-name="PMBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:xe</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2pm</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>>false</validate-on-match>
    <background-validation>>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>>false</share-prepared-statements>
  </statement>
</datasource>
```

PostgreSQL Database

```

<datasource jta="false" jndi-name="java:/PMBootStrapDS"
  pool-name="PMBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:postgresql://localhost:5432/i2b2</connection-url>
  <driver-class>org.postgresql.Driver</driver-class>
  <driver>postgresql-9.2-1002.jdbc4.jar</driver>
  <security>
    <user-name>i2b2pm</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```

SQL Server Database

```

<datasource jta="false" jndi-name="java:/PMBootStrapDS"
  pool-name="PMBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:sqlserver://localhost:1433</connection-url>
  <driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>
  <driver>sqljdbc4.jar</driver>
  <security>
    <user-name>i2b2pm</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <valid-connection-checker
class-name="org.jboss.jca.adapters.jdbc.extensions.mssql.MSSQLValidConnectionChecker">
  </valid-connection-checker>
    <validate-on-match>false</validate-on-match>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```

3. Save the changes and close the file.

5.5 Deployment

The deployment process at this stage of the installation will install the **i2b2 Project Management (PM) Cell** on the *JBoss Web Server*.

Deploy edu.harvard.i2b2.pm

The following steps will walk you through the deployment process. The commands on a Windows Server may differ slightly on a Linux Machine. This difference will be noted when appropriate.

Step 1: Change working directory

The **first step** in the deployment process is to change your working directory to the location of your **edu.harvard.i2b2.pm**.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.pm
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: CD /opt/i2b2/edu.harvard.i2b2.pm

Windows Command: CD C:\opt\i2b2\edu.harvard.i2b2.pm

Step 2: Deploy edu.harvard.i2b2.pm

The **second** and **final step** in the deployment process is to run the Ant script to deploy edu.harvard.i2b2.server.pm.

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f master_build.xml clean build-all deploy
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f master_build.xml clean build-all deploy
```

Note

If the commands **ant** or **%ANT_HOME%** do not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace **%ANT_HOME%** with the full path to your Ant directory.

Provided there were no problems running the script you will see **Build Successful** when the script finishes and the edu.harvard.i2b2.pm has been deployed.

5.6 Start Services

Start JBoss

Once the cell has been deployed the JBoss Server has to be **running** in order to use the i2b2. The process of starting your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Start JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Start JBoss Windows Service**.

Start JBoss Linux Service

The following steps will walk you through the process of starting your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to start JBoss.

Stop JBoss Command

```
/etc/init.d/jboss start
```

3. The script to start JBoss will run.

Start JBoss Windows Service

The following steps will walk you through the process of starting your JBoss server via a windows service.

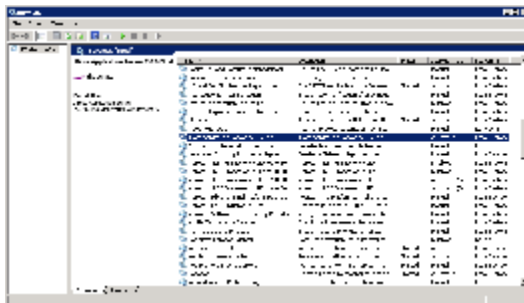
Note

These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss Web Server as a Windows Service* in the *Requirements Chapter*.

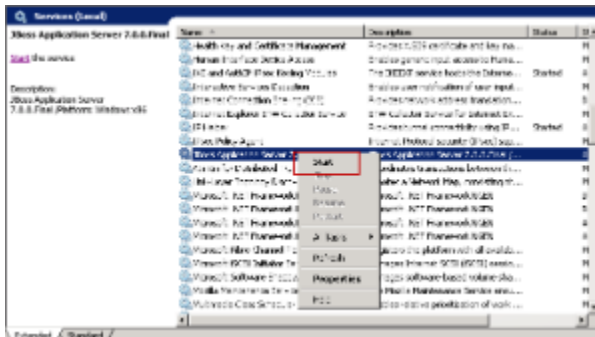
1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

Important

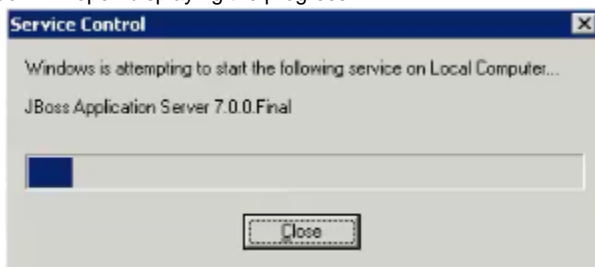
The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.



4. Using the mouse, *right click* on the name of the service to display the pop-up menu.
5. Select **Start** to start the service.



6. A window will open displaying the progress.



7. The progress window will close once the service has started running.

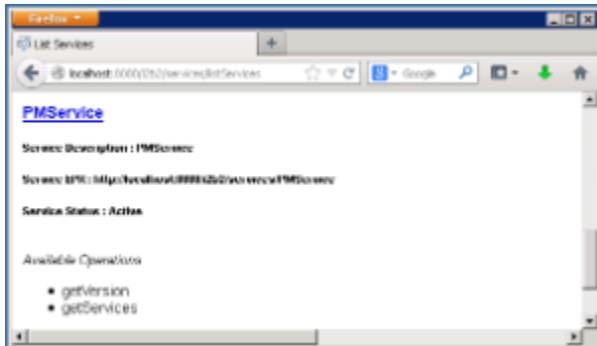
5.7 Verify PM Installation

Verify Web Services

Although this step of the installation is optional it is highly recommended that you do a "Sanity Check" to make sure the Web Service for the PM Cell is running.

Steps to verify web services

1. Open your web browser and enter the following URL:
`http://yourHost:9090/i2b2/services/listServices`
2. Verify the **PMService** is listed as active.



5.8 Next Steps

Steps Completed

The following steps were completed during this chapter on installing the PM Cell.



Project Management (PM) Installation Chapter



Stopped JBoss services



Configured the build properties



Configured the data sources



Deployed edu.harvard.i2b2.pm



Started JBoss services



Verified installation



PM Web Services are running

Next Steps

Before continuing with the installation of the other i2b2 Core Cells you need to install the i2b2 Administration (Admin) Module. In order to manage your cells and configure your project related data you need to be able to log into the Admin.

Although not required we also recommend that you install the i2b2 Web Client and Workbench so that you can do a quick sanity check after each cell is installed. This sanity check will verify the cell was properly installed and is working correctly.

At this point in the installation process your **next step** is to proceed to the **i2b2 Administration Module Install Chapter** where the steps for installing the Admin are defined.

Chapter 6. i2b2 Administration Module Install

The i2b2 Administration Module (Admin) is a web based application that is designed to assist with the workflow and overall ease of setting up your i2b2 environment. Users with administration privileges can manage their cells, projects and user. The Admin has to be setup after you install the PM Cell and before you install any other i2b2 cells.

Chapter 6. Table of Contents
6.1 Prerequisites
6.2 Admin Installation Overview <ul style="list-style-type: none">6.2.1 Source Code and Working Directories
6.3 Install Admin on Web Server
6.4 Configuration
6.5 Verify Admin Installation
6.6 Next Steps

6.1 Prerequisites

The following installations **must be completed** prior to beginning the process of installing the i2b2 Administration Module.



Requirements Chapter

- ☒ Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)
- ☒ Installed Java, JBoss, Apache Ant and Apache Axis2
- ☒ Downloaded the i2b2 Software



Data Installation Chapter

- ☒ Created database user accounts for i2b2 schemas
- ☒ Created all the data tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)
- ☒ Created the stored procedures for the Crcdata tables and the triggers for the Pmdata tables
- ☒ Loaded data into all the tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



i2b2 Server-common Install Chapter



Extracted all the i2b2 source code to a directory a directory of your choice (*YOUR_I2B2_SRC_DIR*)



Configured Server-common properties



Deployed edu.harvard.i2b2.server-common



Project Management (PM) Cell Install Chapter



Configured PM cell properties



Deployed edu.harvard.i2b2.pm

6.2 Admin Installation Overview

Installation Overview

In this chapter we will be installing the i2b2 Administration Module.

Important

The Admin has to be installed **after the PM Cell** has been deployed and **before any other i2b2 cells** are installed.

Order of Installation

The basic steps that will be taken during this installation are as follows:

Step 1: Copy the Admin directory to your web server directory

Step 2: Configure the Admin for your domain

Step 3: Deploy the PM Cell

Step 4: Verify installation

Important

The details of what is to be done for each step are defined in the different sections within this chapter. It is important to follow steps in the order they are defined and not to skip any of them unless otherwise noted.

6.2.1 Source Code and Working Directories

Source Code for the i2b2 Administration Module

In the chapter titled *Install i2b2 Server-Common*, you extracted the files from the i2b2 Core Source Code zip file into a directory of your choosing (*YOUR_I2B2_SRC_DIR*). One of the files extracted was a folder called **admin** and it is in this folder where the files for the Admin installation reside.

Working Directories for Admin Installation

Unlike the cell installations we will be copying the Admin directory to your web server directory and then working with the Admin files within the web server directory and not the i2b2 directory.

Important

It is very important you make sure you are editing the files in your web server directory and not the ones that reside in *YOUR_I2B2_SRC_DIR*.

i2b2 Admin Directory:

The i2b2 Admin directory is located within *YOUR_I2B2_SRC_DIR*.

Examples:

Linux: /opt/i2b2/admin

Windows: C:\opt\i2b2\admin

Web Server Directory:

Depending on your operating system and machine configuration the location of your web server (httpd) directory may reside in a different location than the examples provided. These examples are based on the most common default paths for a Windows Server and a Linux Machine.

Examples:

Linux: /var/www/html

Windows: C:\inetpub\wwwroot

6.3 Install Admin on Web Server

Copy Admin Files to your Web Server Directory

At this point in the installation we need to copy the i2b2 admin directory from *YOUR_I2B2_SRC_DIR* to your web server directory.

Steps to copy files

1. Go to the location of *YOUR_I2B2_SRC_DIR*.
2. Locate the folder called **admin**.
3. Copy the entire **admin folder** to your **web server directory**.

Linux Machine

On a Linux machine you want to copy it to your httpd directory.

Example: /var/www/html

Windows Server

On windows server you want to copy it to your wwwroot directory which is in your inetpub folder.

Example: C:\inetpub\wwwroot

6.4 Configuration

The admin is pre-configured for a **local host** domain of **i2b2demo**. The steps in this section will walk you through how to configure the Admin to a

different domain or host.

Steps to update domain and host

WARNING

Make sure you are editing the files in your **web server directory** and *not* the ones that reside in `YOUR_I2B2_SRC_DIR`.

1. Go to the **admin folder** in your **web server directory**.

Examples:

Linux: `/var/www/html`

Windows: `C:\inetpub\wwwroot`

2. Open the **i2b2_config_data.js** file.
3. Edit or add additional domains for your environment.

Important

- If you are installing the i2b2 demo environment do not edit the domain "i2b2demo" except to update the `urlCellPM` with your host and port for the location of the PM Cell.
- If you are setting up your own i2b2 environment with test or production data then you can copy the domain section and edit it to reflect your environment.

i2b2_config_data.js

```
{
  urlProxy: "index.php",
  urlFramework: "js-i2b2/",
  //-----
  // THESE ARE ALL THE DOMAINS A USER CAN LOGIN TO
  lstDomains: [
    { domain: "i2b2demo",
      name: "i2b2demo",
      urlCellPM: "http://localhost:9090/i2b2/services/PMService/",
      allowAnalysis: true,
      adminOnly: true,
      debug: false
    }
  ]
  //-----
}
```

4. Save the changes and close the file.

6.5 Verify Admin Installation

The next step is to verify the Admin installed correctly by making sure you can log into it. The steps shown below outline the process of logging into the Admin for the i2b2demo domain.

Logging into i2b2 Admin (i2b2demo domain)

1. Open a web browser and enter the following location:
<http://localhost/admin>

2. The **i2b2 Login** page will open.



3. Login with a user you know has administrative privileges.

Note

For the i2b2demo domain the user login information is:

Username: i2b2

Password: demouser

4. Once logged on you will be presented with the **i2b2 Administration Welcome** page.



At this point you should not receive any errors logging into the i2b2 Admin. If you are not able to log in please see the *Troubleshooting chapter*. If there are no errors logging in then you have confirmed the Admin was installed correctly.

6.6 Next Steps

Steps Completed

The following steps were completed during this chapter on installing the i2b2 Admin.



Install i2b2 Administration Module Chapter



Copied Admin files to web server directory



Configured Admin for the your domain (*i2b2demo*)



Verified the installation

Next Steps

At this point in the installation process you have two options on how you would like to proceed.

Path 1: Install the i2b2 Web Client and Workbench before you proceed with installing the remaining i2b2 core cells.

This path will allow you to do a sanity check after you install each cell. The sanity check involves logging into the clients and making sure there are no errors being reported.

Path 2: Install the remaining i2b2 core cells and then install the i2b2 Web Client and Workbench.

This path will allow you to install all the cells. After you install each cell you will be able to verify the service is running but you will not be able to do a full sanity check until the end when you install the clients.

The **next step** for **Path 1** is to proceed to the i2b2 Web Client Install chapter.

The **next step** for **Path 2** is to proceed to the Ontology Cell Install chapter.

Tip

The path you choose is strictly up to you. For those of you that are new to i2b2 we recommend you follow the first path and install the clients before installing the remaining cells. Doing a sanity check after each cell installation will help troubleshoot and narrow down any issues that you may encounter.

Chapter 7. i2b2 Web Client Install

Currently there are two i2b2 clients available to users.

1. i2b2 Web Client
2. i2b2 Workbench

This chapter will guide you through the installation of the i2b2 Web Client, which is a web-based interface to the i2b2 hive. The web client reproduces much of the functionality of the desktop client and one of the primary advantages is the software does not have to be installed on a

user's computer. All an i2b2 user needs to run the web client is a web browser. This aids greatly in enterprise-wide roll out of the i2b2 across an institution. However, because of the current limitations of web browsers, certain advanced functionality will continue to require a subset of "power users" to download the desktop client.

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7.1 Prerequisites
7.2 Web Client Installation Overview
• 7.2.1 Extract Source Code
• 7.2.2 Directory Structure and Working Directories
7.3 Install Web Client on Web Server
7.4 Configuration
• 7.4.1 Proxy Configuration
• 7.4.1.1 Security Configuration in PHP Proxy
• 7.4.1.2 Configure Web Client to Connect to Proxy
• 7.4.2 Domain Configuration
7.5 Verify Web Client Installation
7.6 Next Steps

7.1 Prerequisites

The following installations **must be completed** prior to beginning the process of installing the i2b2 Web Client.



Requirements Chapter



Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)



Installed Java, JBoss, Apache Ant and Apache Axis2



Downloaded the i2b2 Software



Data Installation Chapter



Created database user accounts for i2b2 schemas



Created all the data tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



Created the stored procedures for the Crcdata tables and the triggers for the Pmdata tables



Loaded data into all the tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



i2b2 Server-common Install Chapter



Extracted all the i2b2 source code to a directory a directory of your choice (*YOUR_I2B2_SRC_DIR*)



Configured Server-common properties



Deployed edu.harvard.i2b2.server-common



Project Management (PM) Cell Install Chapter



Configured PM cell properties



Deployed edu.harvard.i2b2.pm



i2b2 Administration Module Install Chapter



Copied Admin files to your web server directory



Updated i2b2_config_data.js file with domain information and the location of the PM Cell.



Verified admin installation

7.2 Web Client Installation Overview

In this chapter we will be installing the i2b2 Web Client.

Order of Installation

The basic steps that will be taken during this installation are as follows:

Step 1: Extract the Web Client source code.

Step 2: Copy the Web Client directory to your web server directory.

Step 3: Configure the Web Client for your domain.

Step 4: Verify Web Client installed correctly.

Important

The details of what is to be done for each step are defined in the different sections within this chapter. It is important to follow steps in the order they are defined and not to skip any of them unless otherwise noted.

7.2.1 Extract Source Code

In the *Requirements Chapter* of this install document you downloaded a zip file that contained the i2b2 Web Client code. This zip file contains all the i2b2 code needed to install the i2b2 Web Client on your web server.

Steps to extract the code

1. Set up a target source directory for the contents of the web client zip file .
2. Locate the **i2b2webclient-1700.zip** file you downloaded in the *Requirements chapter*.
3. Extract the web client code into the target source directory you just created.

Tip

You will want to make note of the location as it will be needed further along in the i2b2 installation. In the installation document whenever you see **YOUR_I2B2_WC_DIR** it will need to be replaced with the location of your i2b2 Web Client code.

For your convenience an installation Worksheet to track the setup locations has been provided in the Appendices Chapter.

7.2.2 Directory Structure and Working Directories

i2b2 Web Client Directory Structure

Once you have extracted the i2b2 Web Client code you will notice the following directory structure in your i2b2 Web Client directory:

Main Directory: *YOUR_I2B2_WC_DIR*\webclient\

Directory / Files	Description
assets	Directory containing the CSS files and images for the i2b2 Web Client.
help	Directory containing the "on-line help" files.
js-ext	Directory containing the JavaScript code for external software like YUI
js-i2b2	Directory containing all the JavaScript code related to the i2b2 Web Client framework.
i2b2_config_data.js	JavaScript file containing the i2b2 Web Client domains.

Web Client "Framework" Directory: *YOUR_I2B2_WC_DIR*\webclient\js-i2b2

Directory	Description
cells	Directory containing the implementation code for each cell.
hive	Directory containing the generalized web client framework.

Cells Directory: *YOUR_I2B2_WC_DIR*\webclient\js-i2b2\cells

Directory	Description
CRC	Root directory for the Data Repository (CRC) Cell; contains controllers and Ajax code for the views.
ONT	Root directory for the Ontology Management (ONT) Cell; contains controllers and Ajax code for the views.
PLUGINMGR	Root directory for the plug-in manager in the web client; contains controllers and Ajax code for the view.
plugins	Contains the plug-ins created for the web client.
PM	Root directory for the Project Management (PM) Cell; contains controllers and Ajax code for the views.
WORK	Root directory for the Workplace Framework (WORK) Cell; contains controllers and Ajax code for the views.

Note

Within each of the above cell directories is an **assets** folder that contains the images, HTML templates and other non-code files that are needed by the cell.

Working Directories for i2b2 Web Client Installation

Similar to the i2b2 Administration installation we will be copying the Web Client directory to your web server directory. We will be working with the Web Client files within the web server directory and not *YOUR_I2B2_WC_DIR*.

i2b2 Web Client Directory:

The i2b2 Web Client directory is the location in which you extracted the web client files into during the previous section on extracting the source code. In this document the i2b2 Web Client directory is referred to as ***YOUR_I2B2_WC_DIR***.

Examples:

Linux: /opt/webclient

Windows: C:\opt\webclient

Web Server Directory:

Depending on your operating system and machine configuration the location of your web server (httpd) directory may reside in a different location than the examples provided. These examples are based on the most common default paths for a Windows Server and a Linux Machine.

Examples:

Linux: /var/www/html

Windows: C:\inetpub\wwwroot

7.3 Install Web Client on Web Server

Copy Web Client Files to your Web Server Directory

At this point in the installation we need to copy the i2b2 Web Client directory from *YOUR_I2B2_WC_DIR* to your web server directory.

Steps to copy files

1. Go to the location of ***YOUR_I2B2_WC_DIR***.
2. Locate the folder called **webclient**.
3. Copy the entire **webclient** folder to your **web server directory**.

Linux: On a Linux server you want to copy it to your *httpd* directory.

Example: /var/www/html

Windows: On windows server you want to copy it to your *wwwroot* directory which is in your inetpub folder.

Example: C:\inetpub\wwwroot

7.4 Configuration

The Web Client is pre-configured for a local host domain of **i2b2demo** and includes a PHP proxy in the distributed software. The information within these configuration sections was written to assist you in setting up the i2b2 Web Client to work with other domains in your environment. The changes to the PHP configuration are optional and we do recommend you review them to make sure it is appropriate for your environment.

There are basically two steps in configuring the i2b2 Web Client to work in your environment.

Step 1: Configure the Proxy (*Optional*)

Step 2: Configure the Domain

Note

The registration and configuration of custom plug-ins and cells is not covered in this document. The [Web Client Space](#) in this community wiki contains additional documentation on custom plug-ins and cell.

The majority of the configuration settings are maintained in a *connection configuration file* called **i2b2_config_data.js**. The one exception is the PHP security configuration is maintained in a PHP file called **index.php**. The i2b2_config_data.js file contains the following attributes for defining the Proxy, Framework and Domains:

Name	Null	Type	Description
urlProxy	N	String	The full path URL for the i2b2 web services proxy server.
urlFramework	N	String	The full path URL to the root js-i2b2-directory.
lstDomains	N	Array	An array containing one or more domain definition objects. <i>The domain attributes are defined in the section on configuring the domain.</i>

EXAMPLE: default settings in i2b2_config_data.js

i2b2_config_data.js

```
{
  urlProxy: "index.php",
  urlFramework: "js-i2b2/",
  //-----
  -----
  // THESE ARE ALL THE DOMAINS A USER CAN LOGIN TO
  lstDomains: [
    { domain: "i2b2demo",
      name: "HarvardDemo",
      urlCellPM: "http://services.i2b2.org/i2b2/services/PMService/",
      allowAnalysis: true,
      debug: false
    }
  ]
  //-----
  -----
}
```

Important

Before you proceed with configuring the i2b2 Web Client we **highly recommend** you do a quick check to make sure the Web Client copied to your web server correctly. This can be done by opening your browser and entering the following address:

http://localhost/webclient/

The i2b2 Web Client page will display and you should be able to log into the i2b2 Host of *HarvardDemo*.

7.4.1 Proxy Configuration

Proxy Information

The i2b2 Web Client communicates with server-side web services using Asynchronous JavaScript and XML (AJAX).

All modern web browsers follow a universal security standard which does not allow JavaScript code to directly communicate with any server that is not the exact same base URL that was used to load the web page. This behavior is critically important in preventing a hacker's code from offloading your personal information to a random IP overseas; it also prevents web-based applications from directly engaging an enterprise's SOA web services.

The solution to this problem is to use a web proxy that forwards the request to the correct service and then returns the response back to the browser. This extremely simple cell enables the browser based web client to participate fully with the i2b2 Hive.

Although the Web Client is platform independent, a server side proxy has to be written for the type of server that is hosting it. Included in the i2b2 Web Client software is a proxy written in PHP.

7.4.1.1 Security Configuration in PHP Proxy

Configure Security in PHP Proxy

Included in the code distribution is **index.php** which can act as a simply proxy for use in a PHP-enabled Apache web server. This proxy file requires PHP to be compiled with XML support (default setting in most Linux distributions). Within the PHP file are 2 arrays that are used to restrict all requests from connected web clients to only the IP addresses that the cells are located at.

Array	Description
\$WHITELIST	List of <i>acceptable</i> URL prefixes.
\$BLACKLIST	List of <i>invalid</i> URL prefixes.

Examples:

index.php

```
$WHITELIST = array(
    "http://",
    "http://127.0.0.1:9090/axis2/rest/",
    "http://localhost:9090/axis2/rest/",
    "http://127.0.0.1:7070/i2b2/rest/",
    "http://localhost:7070/i2b2/rest/",
    "http://services.i2b2.org",
    "https://services.i2b2.org"
);

$BLACKLIST = array(
    "http://127.0.0.1:9090/test",
    "http://localhost:9090/test",
    "http://127.0.0.1:7070/test",
    "http://localhost:7070/test"
);
```

Steps to update the index.php file

WARNING

Make sure you are editing the files in your **web server directory** and not the ones that reside in *YOUR_I2B2_WC_DIR*.

1. Go to the **web client folder** in your **web server directory**.

Linux Example: /var/www/html

Windows Example: C:\inetpub\wwwroot

2. Open the **index.php** file to edit the existing arrays with information that is relevant to your security policies .
3. Save the changes and close the file.

7.4.1.2 Configure Web Client to Connect to Proxy

The i2b2 Web Client is pre-configured to use the PHP proxy that is delivered with the i2b2 Web Client Software. The steps in this section will walk you through how to access the `_connection configuration_file` and change the proxy attributes.

Steps to update the Proxy information in i2b2_config_data.js

WARNING

Make sure you are editing the files in your **web server directory** and not the ones that reside in *YOUR_I2B2_WC_DIR*.

1. Go to the **web client folder** in your **web server directory**.

Linux Example: /var/www/html

Windows Example: C:\inetpub\wwwroot

2. Open the **i2b2_config_data.js** file to edit the proxy information.

i2b2_config_data.js

```
urlProxy: "index.php",
```

Important

- The urlProxy must be changed for every deployment.
- It should be set to point to **your web proxy cell**. In all cases it must be the same base URL (hostname and port) as the website that is used to load the initial **default.htm** file into the browser.

3. Save the changes.

7.4.2 Domain Configuration

As stated earlier, the configuration attribute called **IstDomains** is an array containing one or more domain definition objects. The *domain definition data object* contains the following attributes for each data object.

Name	Null	Type	Description
domain	N	String	A short code used by the proxy server for the domain / group ID.
name	N	String	A human-readable string containing the domain's name. This is visible to users when logging into the i2b2 Web Client.
urlCellPM	N	String	The full path URL for the Project Management Cell.
allowAnalysis	Y	Boolean	Defines whether or not the plug-in viewer is available to users. The plugin viewer is used to access the optional plug-ins (Analysis Tools). This setting will affect all users . <ul style="list-style-type: none">• Y = Analysis Tools will appear as an option on the menu bar. Users can access the optional plugins via the <i>Plugin Viewer</i>.• N = Analysis Tools will not appear as an option on the menu bar. Users will not be able to access the optional plug-ins.
debug	Y	Boolean	Defines whether or not debugging messages are logged. (uses additional memory).

Steps to update domain

WARNING

Make sure you are editing the files in your **web server directory** and not the ones that reside in *YOUR_I2B2_WC_DIR*.

1. Go to the **web client folder** in your **web server directory**.

Linux Example: /var/www/html

Windows Example: C:\inetpub\wwwroot

2. Open the **i2b2_config_data.js** file to edit the domain information.

3. Edit or add additional domains for your environment.

Important

- If you are installing the i2b2 demo environment you want to add the "i2b2demo" domain and update the *urlCellPM* with the host and port with the location of your PM Cell.
- If you are setting up your own i2b2 environment with test or production data then you can copy the domain section and edit it to reflect your environment.
- You can comment out or remove the HarvardDemo domain. However, we highly recommend you leave it during the installation process so you can use it for troubleshooting whether an issue is with your local setup. You can remove it after everything is installed and is working.

i2b2_config_data.js

```
//-----  
-----  
// THESE ARE ALL THE DOMAINS A USER CAN LOGIN TO  
lstDomains: [  
  { domain: "i2b2demo",  
    name: "HarvardDemo",  
    urlCellPM: "http://services.i2b2.org/i2b2/services/PMService/",  
    allowAnalysis: true,  
    debug: false  
  }  
]  
//-----  
-----
```

4. If you have multiple domains (demo / test / production) you can copy the **{domain} section** and edit it to reflect the other domains in your environment.

i2b2_config_data.js

```
//-----  
-----  
// THESE ARE ALL THE DOMAINS A USER CAN LOGIN TO  
lstDomains: [  
  { domain: "i2b2demo",  
    name: "HarvardDemo",  
    urlCellPM: "http://services.i2b2.org/i2b2/services/PMService/",  
    allowAnalysis: true,  
    debug: false  
  },  
  { domain: "i2b2demo",  
    name: "i2b2demo (1.7)",  
    urlCellPM: "http://localhost:9090/i2b2/services/PMService/",  
    allowAnalysis: true,  
    debug: true  
  }  
]  
//-----  
-----
```

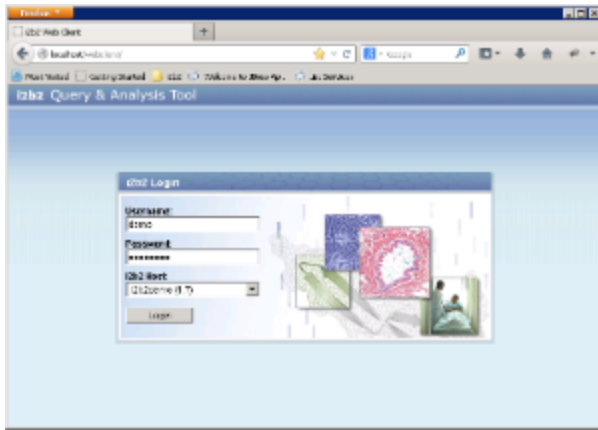
5. Save the changes and close the file.

7.5 Verify Web Client Installation

The next step is to verify the Web Client installed correctly by making sure you can log into it. The steps shown below outline the process of logging into the Web Client for the i2b2demo domain.

Logging into i2b2 Web Client (i2b2demo domain)

1. Open a web browser and enter the following location:
<http://localhost/webclient/>
2. The **i2b2 Login** page will open.



3. Login into the Web Client.

Note

For the i2b2demo domain the user login information is:

Username: demo

Password: demouser

4. The i2b2 Web Client will open to the main page displaying all the different views (Navigate Terms, Query Tool, etc.)

Things to keep in mind:

Assuming you have been installing the cells in the order in which they appear in this installation guide the only cell you have installed is the PM Cell. This means when you log into the Web Client you will see **valid errors** in all the views. (*Navigate and Find Terms, Query Tool, Previous Queries and Workplace*).

At this point you should not receive any errors regarding the PM Cell. If you are not able to log into the Web Client please see the *Troubleshooting chapter*. If there are no errors logging in then you have confirmed the Web Client was installed correctly.

7.6 Next Steps

Steps Completed

The following steps were completed during this chapter on installing the i2b2 Web Client.



Install i2b2 Web Client Chapter



Copied Web Client files to web server directory



Configured Web Client for your domain



Verified installation



Able to log into the i2b2 Web Client

Next Steps

At this point in the installation process you have two options on how you would like to proceed.

Path 1: Install the i2b2 Workbench and then proceed with installing the remaining i2b2 cells.

Note

The communication with the PM and other cells does differ slightly when logging into the two clients, which is why we recommend you install both the Web Client and the Workbench.

Path 2: Proceed with installing the remaining i2b2 cells and then install the i2b2 Workbench at the end.

The **next step** for **Path 1** is to proceed to the Install i2b2 Workbench chapter.

The **next step** for **Path 2** is to proceed to the Install Ontology Cell chapter.

Tip

The path you choose is strictly up to you. For those of you that are new to i2b2 we recommend you follow the first path and also install the workbench before installing the remaining cells. Doing a sanity check after each cell installation will help troubleshoot and narrow down any issues that you may encounter.

Chapter 8. i2b2 Workbench Install

As stated in the previous chapter (*Install i2b2 Web Client*) there are two i2b2 clients available to users. This chapter will guide you through the installation of the i2b2 Workbench on both Windows and Macintosh operating systems.

Chapter 8. Table of Contents

8.1 Prerequisites

8.2 Workbench Installation Overview

- 8.2.1 Extract Workbench Executables

8.3 Configuration

- 8.3.1 Define Hive Location
 - 8.3.1.1 Access Properties file on a Macintosh
 - 8.3.1.2 Access Properties file on Windows
- 8.3.2 Define Physical Memory

8.4 Verify Workbench Installation

8.5 Next Steps

8.1 Prerequisites

The following installations **must be completed** prior to beginning the process of installing the i2b2 Workbench.



Requirements Chapter



Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)



Installed Java, JBoss, Apache Ant and Apache Axis2



Downloaded the i2b2 Software



Data Installation Chapter



Created database user accounts for i2b2 schemas



Created all the data tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



Created the stored procedures for the Crcdata tables and the triggers for the Pmdata tables



Loaded data into all the tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



i2b2 Server-common Install Chapter



Extracted all the i2b2 source code to a directory a directory of your choice (*YOUR_I2B2_SRC_DIR*)



Configured Server-common properties



Deployed edu.harvard.i2b2.server-common



Project Management (PM) Cell Install Chapter



Configured PM cell properties



Deployed edu.harvard.i2b2.pm



i2b2 Administration Module Install Chapter



Copied Admin files to your web server directory



Updated i2b2_config_data.js file with domain information and the location of the PM Cell.



Verified admin installation

The following installations are **not required** to occur before installing the i2b2 Workbench but **are recommended**.



i2b2 Web Client Install Chapter



i2b2 Web Client installed



Able to log into the i2b Web Client

8.2 Workbench Installation Overview

In this chapter we will be installing the i2b2 Workbench.

Order of Installation

The basic steps that will be taken during this installation are as follows:

- Step 1:** Extract the workbench executables
- Step 2:** Configuration: Define the hive location
- Step 3:** Configuration: Define physical memory
- Step 4:** Verify installation

Important

The details of what is to be done for each step are defined in the different sections within this chapter. It is important to follow steps in the order they are defined and not to skip any of them unless otherwise noted.

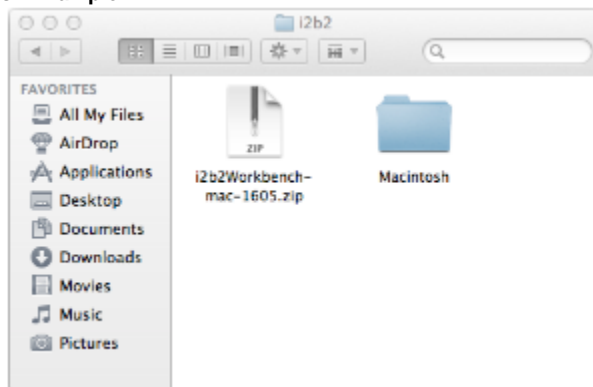
8.2.1 Extract Workbench Executables

In the *Requirements Chapter* of this install document you downloaded a zip file that contained the i2b2 Workbench code. Unlike the source code for the cells, the zip file for the i2b2 Workbench contains an executable file that will run the workbench. Also included are the files needed by the workbench to run. The source code for the i2b2 Workbench is not included in the zip files we will be extracting in this chapter.

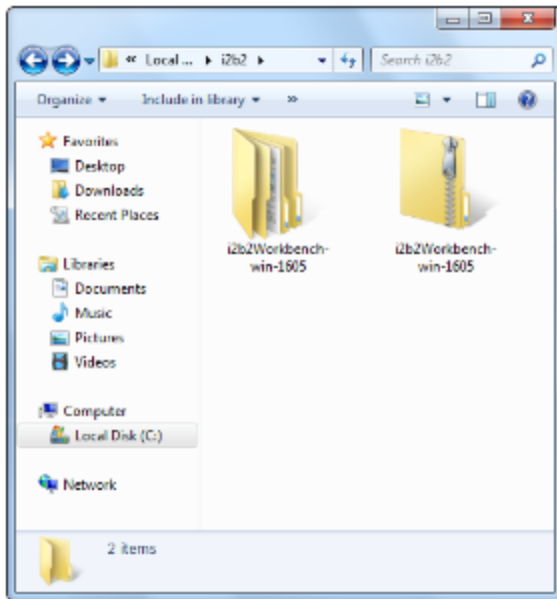
Steps to extract the code

1. Set up a target source directory for the contents of the workbench zip file.
2. Locate the file you downloaded in the *Requirements chapter*.
 - a. Zip file for Macintosh is called **i2b2workbench-mac-1700.zip**
 - b. Zip file for Windows is called **i2b2workbench-win-1700.zip**
3. Extract the files into the target source directory you just created.

Macintosh Example



Windows Example

**Tip**

You will want to make note of the location as it will be needed further along in the i2b2 installation. In the installation document whenever you see **YOUR_I2B2_WB_DIR** it will need to be replaced with the location of your i2b2 Web Client code.

For your convenience an installation Worksheet to track the setup locations has been provided in the Appendices Chapter.

8.3 Configuration

The files you extracted in the previous chapter contain an executable application file for the i2b2 Workbench. Since the application is already built and ready to be used there is not much that needs to be done in the way of configuration. There are two exceptions:

1. Define the location of the hive in your environment.
2. Define the physical memory for the workbench (Windows only).

8.3.1 Define Hive Location

In your i2b2 Workbench folder there is a file called **i2b2workbench.properties**. When a user starts the logon process by clicking on the executable the i2b2 Workbench looks to this properties file to find out where the i2b2 hive is located.

Important

The i2b2workbench.properties file that is delivered with the i2b2 software contains the properties for connecting to the i2b2 demo domain that is made available to the general public on the i2b2 web site (www.i2b2.org). Currently we are setting up a local version of the i2b2 demo hive. The same steps outlined here can also be taken to setup the workbench to work with any other domains you have in your environment (example a test and / or production domain).

Additional Note Regarding Accessing the i2b2workbench.properties File

The process of accessing the properties file is slightly different between Apple's Macintosh and Microsoft's Windows operating systems. If you do not know how to access these files in your environment then you can proceed to one of the following sections:

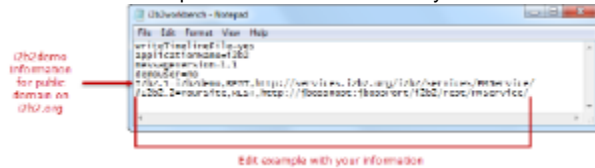
- *Access Properties File on a Macintosh*
- *Access Properties File on Windows*

Once you have opened the property file you can return to this section to see how to configure it to work in your environment.

Editing the i2b2workbench.properties file

The last two lines of the i2b2workbench.properties file contain information about the location of the i2b2 hive.

- The second to last line is **i2b2demo** information for the "public" domain on the i2b2 website.
- The last line is an example that can be edited with your information.



Warning

When you open the i2b2workbench.properties file you may receive a warning message stating the file is locked. Click on the **Unlock** button to be make the file editable.

Steps to edit the Workbench properties

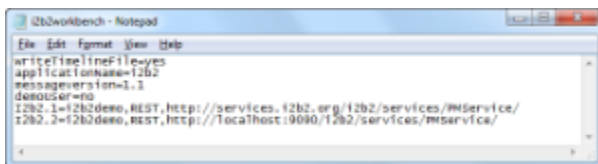
Edit the following information in the **i2b2workbench.properties** file.

1. Remove the **pound sign** (#) at the beginning of the line as this denotes a comment.
 - If it is not removed the i2b2 Workbench will ignore the string and the user will not be able to log onto that domain.
2. Update **YourSite** with the name of the domain you are setting up. In the instance of your local i2b2 demo install the domain is *i2b2demo*.

Important

The domain property is case sensitive; so i2b2*D*emo is not the same as i2b2*d*emo.

3. Update **jbossHost:jbossPort** with the name of your jboss host and its port.



Steps to update Workbench properties for multiple domains

If you have more than one environment you can include all of them in this one properties file by doing the following.

1. Copy the string you just edited to a new line.
2. Update the domain and jboss information with the correct information for the additional hive.
3. Make sure you advance the number at the beginning of the string ("i2b2.2").

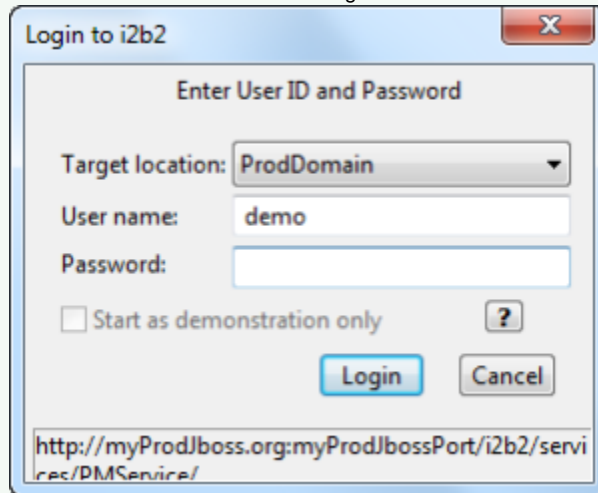
Example:

i2b2workbench.properties	
I2b2.1=	i2b2demo,REST,http://services.i2b2.org/i2b2/services/PMService/
I2b2.2=	i2b2demo,REST,http://localhost:9090/i2b2/services/PMService/
I2b2.3=	TestDomain,REST,http://myTestJboss.org:myTestJbossPort/i2b2/services/PMService/
I2b2.4=	ProdDomain,REST,http://myProdJboss.org:myProdJbossPort/i2b2/services/PMService/

Tip

If you do not want users to see the i2b2demo domain that was delivered with the i2b2 Workbench you can either remove it or comment it out by placing a pound sign (#) in front of the string.

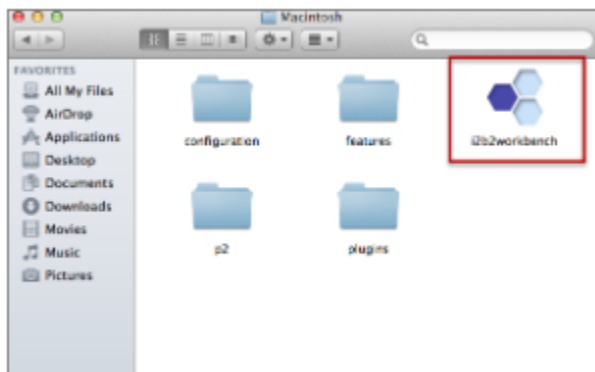
Also, the last domain listed in the properties file will be the one that defaults at the **Target location** when logging into the i2b2 Workbench. We recommend the domain users log into the most be the last one listed in your properties file.



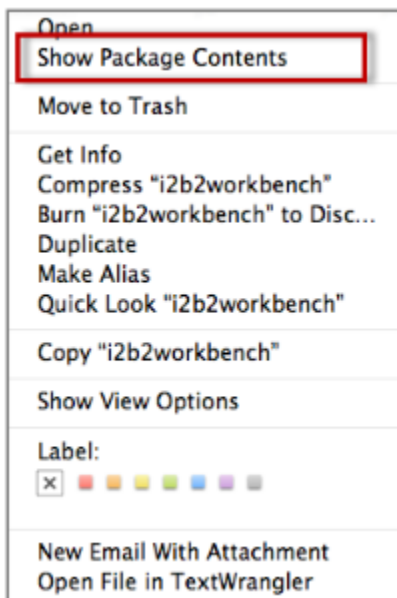
8.3.1.1 Access Properties file on a Macintosh

Steps to access i2b2Workbench.properties file on a Macintosh

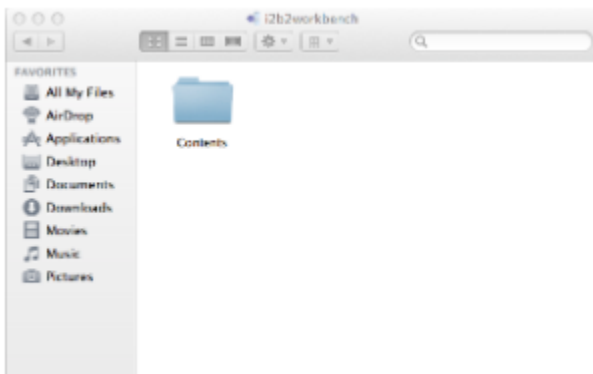
1. Go to *YOUR_I2B2_WB_DIR* and open the folder called **Macintosh**.
2. *Right click* on the i2b2workbench application.



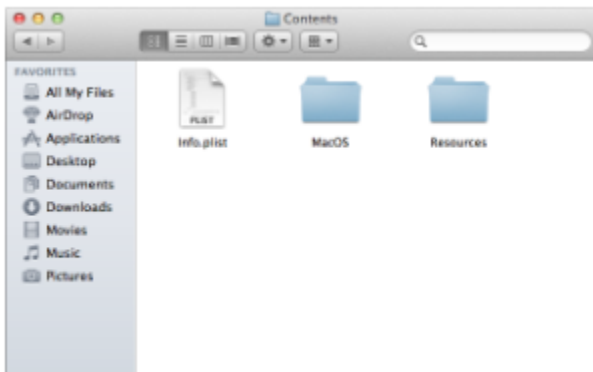
3. A pop-up menu will display. Select **Show Package Contents**.



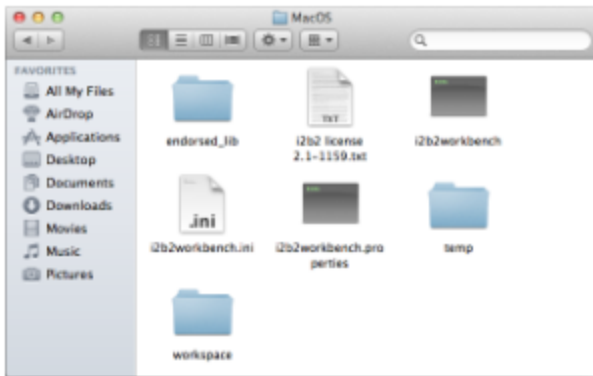
4. The **i2b2 Workbench** folder will open.



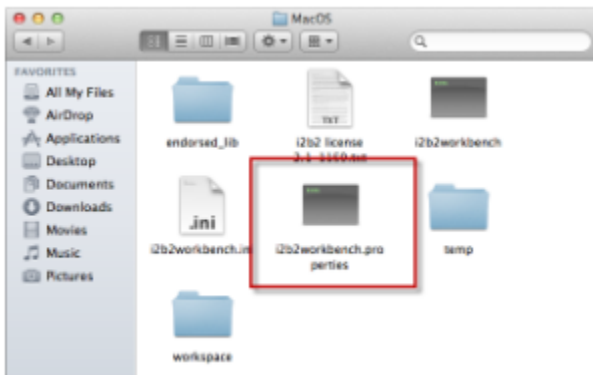
5. Open the **Contents** folder by double clicking on it.



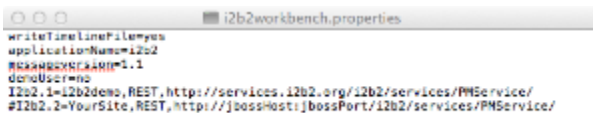
6. Open the **MacOS** folder by double clicking on it.



7. Double click on the **i2b2workbench.properties** file.



8. The properties file will open.



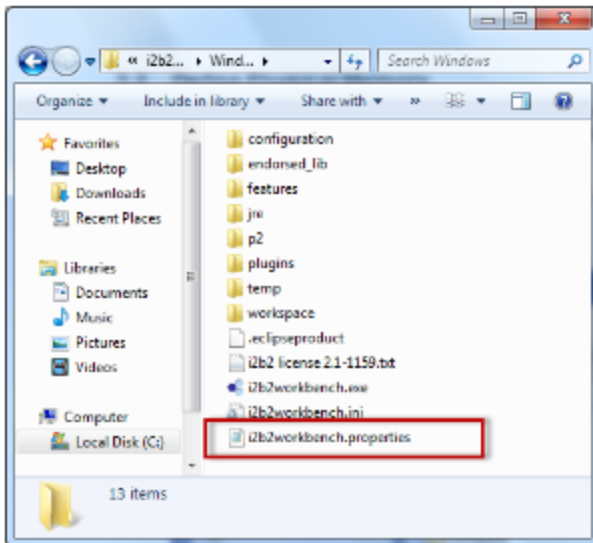
Note

Once the file opens you can return to the **Define Hive Location** section to walk through the steps of editing the file.

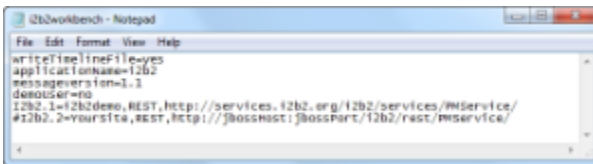
8.3.1.2 Access Properties file on Windows

Steps to access i2b2Workbench.properties file on Windows

1. Go to *YOUR_I2B2_WB_DIR* and open the folder called **Windows**.
2. Double click on the **i2b2workbench.properties** file.



3. The properties file will open.



Note

Once the file opens you can return to the **Define Hive Location** section to walk through the steps of editing the file.

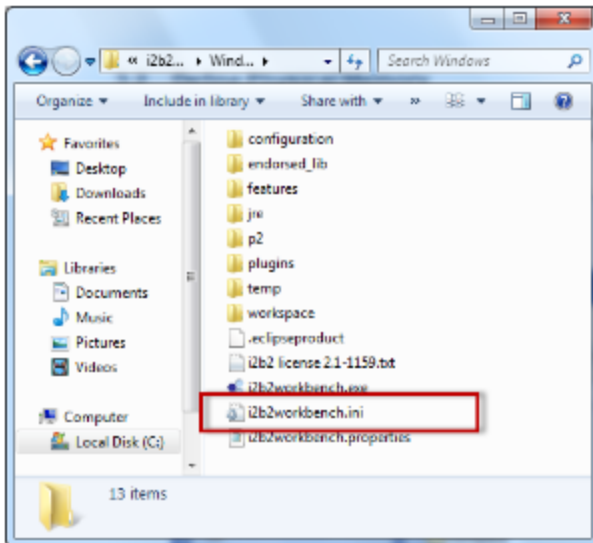
8.3.2 Define Physical Memory

In your i2b2 Workbench directory there is a file called **i2b2workbench.ini** and it is in this file that the physical memory for the i2b2 Workbench is defined.

Important

This section only applies to Microsoft Windows and it is **optional**. You do not need to edit this information to run the workbench only if you wish to change the default settings.

1. Go to *YOUR_I2B2_WB_DIR* and open the folder called **Windows**.
2. Double click on the **i2b2workbench.ini** file.



2. Edit the value of **Xmx** to be equal to the amount of physical memory on your computer. The default setting is *480m*.

Example: Scenario: your computer is running with 1GB of Ram
 Default Setting: -Xmx 480m
 New Setting: -Xms 1024m

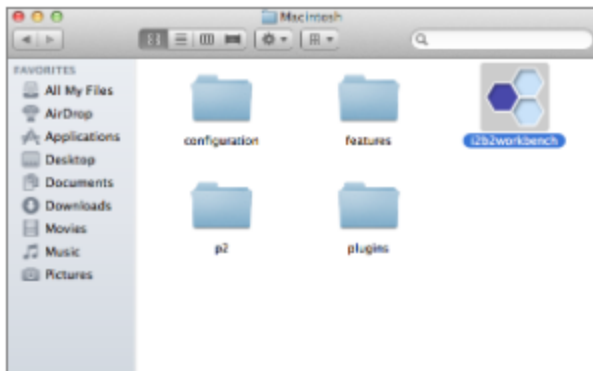
8.4 Verify Workbench Installation

The next step is to verify the i2b2 Workbench installed correctly by making sure you can log into it. The steps shown below outline the process of logging into the Workbench for the i2b2demo domain.

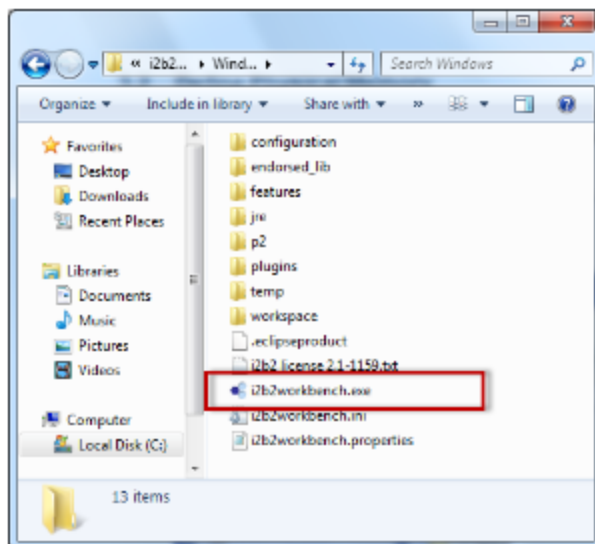
Logging into i2b2 Workbench (i2b2demo domain)

1. Go to *YOUR_I2B2_WB_DIR* and open the folder called **Windows**.
2. Double click on the **i2b2Workbench** application / executable.

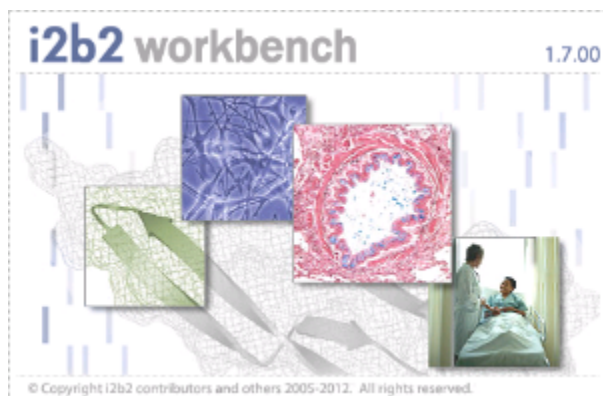
Macintosh:



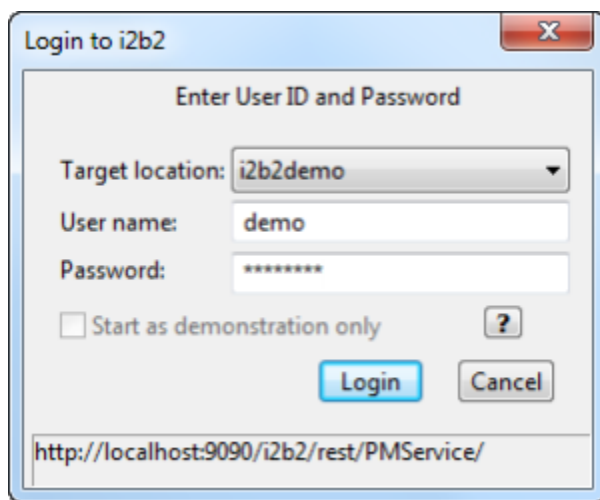
Windows:



3. The i2b2 Workbench splash screen will appear.



4. The i2b2 Login dialog window will open.



5. Select your **Target location**.

Tip

The URL at the bottom of the Login window should be the address of your PM Cell. If it isn't then you need to update the *i2b2Workbench.properties* file to point to the correct location. The section titled *Define Hive Location* explains how to edit this file.

6. Enter the user information for the domain you are logging into.

Note

For the **Target location** of i2b2demo the user login information is:

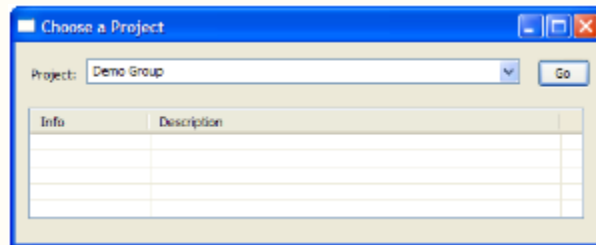
Username: demo

Password: demouser

7. Click on the **Login** button.

Important

If your user has access to multiple **projects** you will be presented with the **Choose a Project** dialog window and you will need to select a project before you can proceed with logging into the workbench.

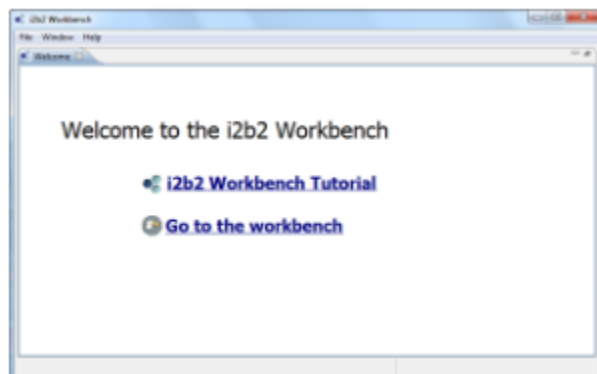


If you only have access to one project you will be logged directly into the workbench.

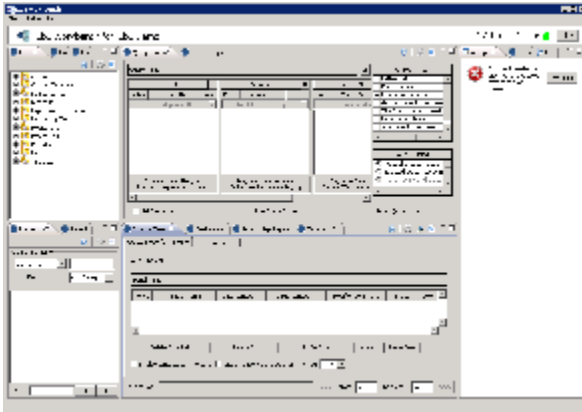
8. The i2b2 Workbench will open to the **Welcome** page.

Note

The welcome page will open the first time you login. All subsequent logins will bring you directory to the i2b2 desktop. You can access the welcome page anytime by selecting it from the *Help menu* on the toolbar.



9. Click on **Go to the workbench**. The desktop of the i2b2 Workbench will open.



Things to keep in mind:

Assuming you have been installing the cells in the order in which they appear in this installation guide the only cell you have installed is the PM cell. This means you will see valid errors in all the views (*Navigate and Find Terms*, *Query Tool*, *Previous Queries* and *Workplace*).

You should not receive any errors regarding the PM Cell. If you are not able to log into the Workbench please see the *Troubleshooting chapter*. If there are no errors logging in then you have confirmed the Workbench was installed correctly.

8.5 Next Steps

Steps Completed

The following steps were completed during this chapter on installing the i2b2 Workbench.



Install i2b2 Workbench Chapter



Extracted the i2b2 Workbench files



Configured the Workbench properties



Updated the Workbench properties file with the hive location



Updated physical memory (*Windows only and optional step*)



Verified installation



Able to log into the i2b2 Workbench

Next Steps

Provided there are no issues with the installation of the Workbench, your **next step** is to proceed with installing the remaining cells. The next chapter will guide you through the installation of the Ontology Management (ONT) Cell.

Chapter 9. Ontology Management (ONT) Cell Install

The Ontology Management (ONT) Cell manages the i2b2 vocabulary definitions, concepts and other terminology. It is accessed by other cells to give semantic meaning to data.

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9.1 Prerequisites
9.2 Ontology Installation Overview
• 9.2.1 Source Code and Directory Structure
9.3 Stop Services
9.4 Configuration
• 9.4.1 Configure Ontology Build Properties
• 9.4.2 Configure Ontology Application Directory Properties
• 9.4.3 Configure the Ontology Properties
• 9.4.3.1 Set Metadata Schema Name
• 9.4.3.2 Project Management Cell Properties
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• 9.4.3.5 Ontology Service Account Properties
• 9.4.3.6 Metadata Delimiter Property
• 9.4.4 Data Source Configuration
9.5 Deployment
9.6 Start Services
9.7 Update ONT Cell Data in i2b2 Admin
9.8 Verify Ontology Installation
9.9 Next Steps

9.1 Prerequisites

The following installations **must be completed** prior to beginning the process of installing the Ontology Management (ONT) Cell.



Requirements Chapter



Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)



Installed Java, JBoss, Apache Ant and Apache Axis2



Downloaded the i2b2 Software



Data Installation Chapter



Created database user accounts for i2b2 schemas



Created all the data tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



Created the stored procedures for the Crcdata tables and the triggers for the Pmdata tables



Loaded data into all the tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



i2b2 Server-common Install Chapter



Extracted all the i2b2 source code to a directory a directory of your choice (*YOUR_I2B2_SRC_DIR*)



Configured Server-common properties



Deployed edu.harvard.i2b2.server-common



Project Management (PM) Cell Install Chapter



Configured PM cell properties



Deployed edu.harvard.i2b2.pm



i2b2 Administration Module Install Chapter



Copied Admin files to your web server directory



Updated i2b2_config_data.js file with domain information and the location of the PM Cell.



Verified admin installation

The following installations are **not required** to occur before installing the Ontology Management (ONT) Cell but **are recommended**.



i2b2 Web Client Install Chapter



i2b2 Web Client installed



Able to log into the i2b Web Client



i2b2 Workbench Install Chapter



i2b2 Workbench installed



Able to log into the i2b Workbench

9.2 Ontology Installation Overview

In this chapter we will be installing the Ontology Management (ONT) Cell.

Order of Installation

The basic steps that will be taken during this installation are as follows:

- Step 1:** Stop services (JBoss)
- Step 2:** Edit Ontology configuration files
- Step 3:** Deploy the Ontology Cell
- Step 4:** Start services (JBoss)
- Step 5:** Update ONT Data in i2b2 Admin
- Step 6:** Verify installation

Important

The details of what is to be done for each step are defined in the different sections within this chapter. It is important to follow steps in the order they are defined and not to skip any of them unless otherwise noted.

9.2.1 Source Code and Directory Structure

Source Code for Ontology Management (ONT) Cell

In the chapter titled *Install i2b2 Server-Common*, you extracted the files from the i2b2 Core Source Code zip file into a directory of your choosing (*YOUR_I2B2_SRC_DIR*). One of the files extracted was a folder called **edu.harvard.i2b2.ontology** and it is in this folder where the files for the Ontology installation reside.

Working Directory for Ontology Cell Installation

In this step of the installation process we will be working with the **edu.harvard.i2b2.ontology** directory. Within this directory are the files we will be editing in order to build and deploy the Ontology Cell on your i2b2 Server. The files and their location within your working directory are as follows:

Main Ontology Directory: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.ontology\

File Name	Description
build.properties	Contains properties needed during the building of the Ontology Cell.

Directory for Ontology Property Files: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.ontology\etc\spring\

File Name	Description
ontology_application_directory.properties	Define the location for your application properties directory.
ontology.properties	Define the properties for other core cells, CRC service account and metadata delimiter.

Directory for Data Source Configuration: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.ontology\etc\jboss\

File Name	Description
ont-ds.xml	Configure the JBoss Data source for the Ontology cell.

9.3 Stop Services

Stop JBoss

In order to configure and deploy the Workplace cell correctly on your i2b2 server it is important that JBoss is not running.

The process of stopping your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Stop JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Stop JBoss Windows Service**.

Stop JBoss Linux Service

The following steps will walk you through the process of stopping your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to stop JBoss.

Stop JBoss Command

```
/etc/init.d/jboss stop
```

3. The script to stop JBoss will run.
4. Provided there are no issues JBoss will no longer be running.

Stop JBoss Windows Service

The following steps will walk you through the process of stopping your JBoss server via a windows service.

Note

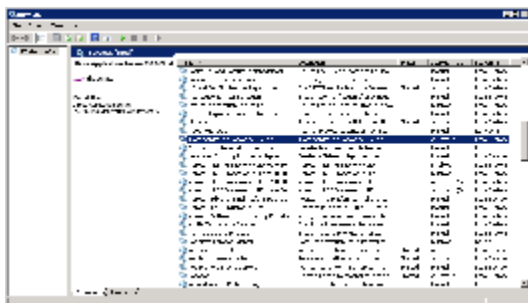
These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss as a Windows Service* in the *Requirements Chapter*.

1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**

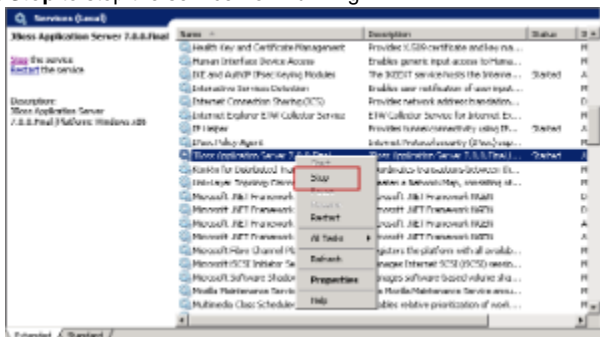
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

Important

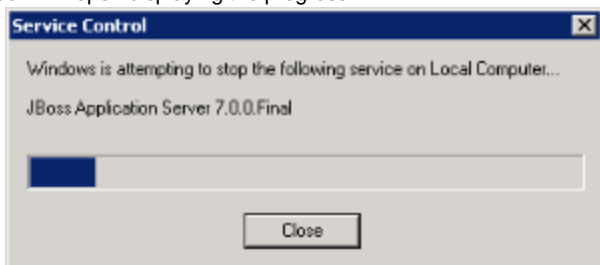
The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.



4. Using the mouse, *right click* on the name of the service to display the pop-up menu.
5. Select **Stop** to stop the service from running.



6. A window will open displaying the progress.



7. The progress window will close once the service has stopped running.

9.4 Configuration

Configure Ontology Cell for Installation

As stated in the previous section, there are a couple of files in the **edu.harvard.i2b2.ontology** directory that will need to be edited to reflect the appropriate configuration at your site. There are several steps that will need to be taken in order to configure the ontology cell for deployment.

- Step 1:** Change your working directory
- Step 2:** Configure the build properties

- Step 3:** Configure the Ontology Application Directory properties
- Step 4:** Ontology properties: Set Metadata schema name for the hivedata tables
- Step 5:** Ontology properties: Configure PM Cell Properties
- Step 6:** Ontology properties: Configure FR Cell Properties
- Step 7:** Ontology properties: Configure CRC Cell Properties
- Step 8:** Ontology properties: Configure the Ontology service account properties
- Step 9:** Ontology properties: Set the metadata delimiter property
- Step 10:** Configure the data sources

Note

The configuration files you will be editing are delivered with examples. In some instances these files may contain multiple examples for the three different database management systems supported by the i2b2.

Assumptions

The steps in this section are based on the following assumptions:

Linux: your user has the appropriate **administrative access** to the opt directory.

Windows: You are logged into the Windows Command Prompt as an **Administrator**.

If you do not have the appropriate access you will have problems running the scripts.

Step 1: Change working directory

The **first step** in the cell configuration process is to change your working directory to the location of your **edu.harvard.i2b2.ontology** folder.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.ontology
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: CD /opt/i2b2/edu.harvard.i2b2.ontology

Windows Command: CD C:\opt\i2b2\edu.harvard.i2b2.ontology

9.4.1 Configure Ontology Build Properties

Step 2: Configure the build properties

The **second step** in the cell configuration process is to edit the **build.properties** file for edu.harvard.i2b2.ontology. During this step you need to set the *jboss.home* and *axis2.war.name* properties.

Error rendering macro 'excerpt-include' : No link could be created for '5.4.1 Configure the PM Build Properties '.

9.4.2 Configure Ontology Application Directory Properties

Step 3: Configure the Application Directory properties

The **second step** in the cell configuration process is to edit the **ontology_application_directory.properties** file for edu.harvard.i2b2.ontology. During this step you need to specify a location for the application properties directory. This location can be anything you desire but it must be a directory path that the Windows or Linux user has been granted permission to access.

Steps to update ontology_application_directory.properties

1. At the command prompt type the following:

Linux Command

```
open YOUR_I2B2_SRC_DIR/edu.harvard.i2b2.ontology/etc/spring/ontology_application_directory.properties
```

Windows Command

```
YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.ontology\etc\spring\ontology_application_directory.properties
```

EXAMPLES:

Linux Command: open /opt/i2b2/edu.harvard.i2b2.ontology/etc/spring/ontology_application_directory.properties

Windows Command: C:\opt\i2b2\edu.harvard.i2b2.ontology\etc\spring\ontology_application_directory.properties

2. The **ontology_application_directory.properties** file will open. Set the following properties to reflect your environment:

Application properties for ONT Cell

```
edu.harvard.i2b2.ontology.applicationdir=/YOUR\_JBOSS\_HOME\_DIR/standalone/configuration/ontologyapp
```

3. Save the changes and close the file.

9.4.3 Configure the Ontology Properties

Ontology Properties Configuration

The **ontology.properties** file contains a number of properties that need to be modified with the variables that are specific to your environment. The Ontology cell needs these properties to deploy correctly and to set required parameters.

The properties within the ontology.properties file have been grouped together based on their function. For instance, the group of PM Cell Properties addresses the communication between the Ontology and PM Cell. The following list shows the groups we will be editing during this step of the installation.

- Group 1:** Metadata schema name (*Location of hivedata*)
- Group 2:** Project Management Cell Properties
- Group 3:** File Repository Cell Properties
- Group 4:** Data Repository Cell Properties
- Group 5:** Ontology Service Account Properties
- Group 6:** Metadata Delimiter Property

Open ontology.properties File

The following steps outline how to open the ontology.properties file. This file will remain open as you move through the next few sections editing all the required properties.

- At the command prompt type the following:

Linux Command
open <i>YOUR_I2B2_SRC_DIR</i> /edu.harvard.i2b2.ontology/etc/spring/ontology.properties

Windows Command
<i>YOUR_I2B2_SRC_DIR</i> \i2b2\edu.harvard.i2b2.ontology\etc\spring\ontology.properties

EXAMPLES:

Linux Command: open /opt/i2b2/edu.harvard.i2b2.ontology/etc/spring/ontology.properties

Windows Command: C:\opt\i2b2\edu.harvard.i2b2.ontology\etc\spring\ontology.properties

- The **ontology.properties** file will open.
- Once the file opens proceed to the next section titled *Set Metadata Schema Name*

9.4.3.1 Set Metadata Schema Name

Step 4: Set Metadata schema name for the hivedata tables

During the hivedata installation one of the tables created was the ONT_DB_LOOKUP table. The Ontology needs to communicate with this table and in order to do this we need to tell it where to find the Hivedata tables. During this step we will set the database schema name for the hivedata.

Prerequisite

You need to know the location of your Hivedata tables. These are owned by the PM cell.

Steps to set the location of the ONT_DB_LOOKUP table

These steps include example configurations for Oracle, PostgreSQL and SQL Server.

- In the **ontology.properties** file scroll to the section called **Bootstrap METADATA schema name**.
- Set the metadataschema to the name of the database / schema where your hivedata tables are located.

Bootstrap METADATA schema name
Oracle Configuration ontology.bootstrapdb.metadataschema=i2b2hive
PostgreSQL Configuration ontology.bootstrapdb.metadataschema=i2b2hive
SQL Server Configuration ontology.bootstrapdb.metadataschema=i2b2hive.dbo

3. Save your changes and close the file.

9.4.3.2 Project Management Cell Properties

Step 5: Configure PM Cell properties

In order for the Ontology cell to communication with the PM cell the following properties need to be modified to reflect you environment.

1. In the **ontology.properties** file scroll to the section called **Project Management Cell Integration**.
2. Set the Project Management Properties for your PM Cell.

Important

When you edit the **ontology.ws.pm.url** property with the location of your PM Cell it is **extremely important** that you only edit the **host name** (*localhost*) and the **port** (*9090*). The remainder of the URL is required as it is written and should not be changed.

Project Management Cell Integration
ontology.ws.pm.url=http://localhost:9090/i2b2/services/PMService/getServices ontology.ws.pm.webServiceMethod=REST # Set this flag to bypass project management cell ontology.ws.pm.bypass=false ontology.ws.pm.bypass.project=demo ontology.ws.pm.bypass.role=MANAGER

3. Save your changes but do not close the file. You will be continuing to edit the file in the next few sections.

9.4.3.3 File Repository Cell Properties

Step 6: Configure FR Cell properties

In order for the Ontology cell to communication with the File Repository cell the following properties need to be modified to reflect you environment.

1. In the **ontology.properties** file scroll to the section called **File Repository Cell**.
2. Edit the edu.harvard.i2b2.ontology.ws.fr.url property to reflect the location of the File Repository cell in your environment.

Important

When you edit the **edu.harvard.i2b2.ontology.ws.fr.url** property it is **extremely important** that you only edit the **hostname** (*localhost*) and the **port** (9090). The remainder of the URL is required and should not be changed.

File Management Cell

```
edu.harvard.i2b2.ontology.ws.fr.url=http://localhost:9090/i2b2/services/FRService
edu.harvard.i2b2.ontology.ws.fr.tempSpace=/tmp
edu.harvard.i2b2.ontology.ws.fr.timeout=10000
edu.harvard.i2b2.ontology.ws.fr.fileThreshold=4000
edu.harvard.i2b2.ontology.ws.fr.attachmentName=cid
edu.harvard.i2b2.ontology.ws.fr.operation=urn:recvfileRequest
```

3. Save your changes but do not close the file. You will be continuing to edit the file in the next few sections.

9.4.3.4 Data Repository Cell Properties

Step 7: Configure CRC Cell properties

In order for the Ontology cell to communicate with the File Repository cell the following properties need to be modified to reflect your environment.

1. In the **ontology.properties** file scroll to the section called **CRC Cell**.
2. Edit the **edu.harvard.i2b2.ontology.ws.crc.url** property to reflect the location of the Data Repository cell in your environment.

Important

When you edit the **edu.harvard.i2b2.ontology.ws.crc.url** property it is **extremely important** that you only edit the **hostname** (*localhost*) and the **port** (9090). The remainder of the URL is required and should not be changed.

CRC Cell

```
edu.harvard.i2b2.ontology.ws.crc.url=http://localhost:9090/i2b2/services/QueryToolService
```

3. Save your changes but do not close the file. You will be continuing to edit the file in the next few sections.

9.4.3.5 Ontology Service Account Properties

Step 8: Configure the Ontology service account properties

In order for the Ontology Cell to perform various services behind the scenes it requires a single service account be setup and defined in the properties file. This service account is the same one that is used by the CRC. Later in this document you will be setting up the service account in the PM as a user. In this stage of the Ontology installation you need to define the properties for this account.

1. In the **ontology.properties** file scroll to the section called **Ontology service account properties**.
2. Update the service account user and password for your environment.

Ontology service account properties

```
edu.harvard.i2b2.ontology.pm.serviceaccount.user=AGG_SERVICE_ACCOUNT
edu.harvard.i2b2.ontology.pm.serviceaccount.password=demouser
```

3. Save your changes but do not close the file. You will be continuing to edit the file in the next few sections.

9.4.3.6 Metadata Delimiter Property

Step 9: Set the metadata delimiter property

In order for synchronization between the Ontology metadata tables and the CRC dimension tables to work correctly a backslash may need to be added to your metadata. Whether or not a backslash is added automatically is defined in the **Metadata delimiter (backslash)** section.

1. In the **ontology.properties** file scroll to the section called **Metadata delimiter (backslash)**.
2. Update the delimiter value for your environment.

METADATA delimiter (backslash)

```
Ontology_terminal.delimiter=true
```

Value	Description
true	A backslash will be added automatically to the metadata fullpath name if it does not already exist.
false	This setting will not add a backslash to the fullpath name and will provide true backward compatibility with release 1.3

3. Save your changes and close the file.

9.4.4 Data Source Configuration

Step 10: Configure the data source for the Ontology Cell

The Ontology cell needs to communicate with your **i2b2 database** and in order to do this it needs to know where the tables for the **metadata** and **hivedata** reside. Therefore the **tenth** and **final step** in the cell configuration process is to configure the data sources for the Ontology Cell. This information is configured in the **ont-ds.xml** file.

Things to keep in mind when configuring your datasources:

- The **metadata** and **hivedata** tables were created during the chapter on Data Installation.
- The **OntologyDemoDS** points to the data source for your metadata tables.
 - The **<user-name>** and **<password>** need to match the database user you set up for your metadata. In the i2b2 demo database this is *i2b2metadata* and *demouser*.

- The **OntologyBootstrapDS** points to the data source for your `ONT_DB_LOOKUP` table which is a hivedata table.
 - The **<user-name>** and **<password>** need to match the database user you set up for your hivedata. In the i2b2 demo database this is *i2b2hive* and *demouser*.
- The **<connection_url>** needs to have the following:
 - The correct JDBC information for your type of database.
 - The correct location of the database containing your metadata or hivedata tables. *(These may or may not reside in the same location)*
- Both the **<driver-class>** and **<driver>** need to accurately reflect the type of database you are connecting to.

Steps to configure data sources

The following steps define how to configure your data sources for the Ontology Cell. These steps include example configurations for Oracle, PostgreSQL and SQL Server.

1. The **ont-ds.xml** file is located in the following directory:
`YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.ontology\etc\jboss`
2. Open the `ont-ds.xml` file to configure your data sources. *(see examples shown below)*

Oracle Database Configuration

```

<datasource jta="false" jndi-name="java:/OntologyDemoDS"
  pool-name="OntologyDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:xe</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2metadata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/OntologyBootStrapDS"
  pool-name="OntologyBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:xe</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```

PostgreSQL Database Configuration

```

<datasource jta="false" jndi-name="java:/OntologyDemoDS"
  pool-name="OntologyDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:postgresql://localhost:5432/i2b2</connection-url>
  <driver-class>org.postgresql.Driver</driver-class>
  <driver>postgresql-9.2-1002.jdbc4.jar</driver>
  <security>
    <user-name>i2b2metadata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/OntologyBootStrapDS"
  pool-name="OntologyBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:postgresql://localhost:5432/i2b2</connection-url>
  <driver-class>org.postgresql.Driver</driver-class>
  <driver>postgresql-9.2-1002.jdbc4.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```

SQL Server Database Configuration

```

<datasource jta="false" jndi-name="java:/OntologyDemoDS"
  pool-name="OntologyDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc: sqlserver://localhost:1433</connection-url>
  <driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>
  <driver>sqljdbc4.jar</driver>
  <security>
    <user-name>i2b2metadata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <valid-connection-checker
class-name="org.jboss.jca.adapters.jdbc.extensions.mssql.MSSQLValidConnectionChecker">
  </valid-connection-checker>
    <validate-on-match>false</validate-on-match>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/OntologyBootStrapDS"
  pool-name="OntologyBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc: sqlserver://localhost:1433</connection-url>
  <driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>
  <driver>sqljdbc4.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <valid-connection-checker
class-name="org.jboss.jca.adapters.jdbc.extensions.mssql.MSSQLValidConnectionChecker">
  </valid-connection-checker>
    <validate-on-match>false</validate-on-match>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```

3. If your environment has multiple projects pointing to different data sources then copy the **<datasource>** section for each project data source.
4. Update the **jndi-name** and **pool-name** to reflect the name of the second project .
Example: A second project called Demo2 would have the following entry:

Second Data Source Configuration

```
<datasource jta="false" jndi-name="java:/OntologyDemo2DS"
  pool-name="OntologyDemo2DS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:xe</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2metadata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
```

Note

The above example is for an Oracle database. If your database is SQL Server or PostgreSQL then you will need to copy the <datasource> section for your type database connection. Do not use this one as it will not work.

5. Save the changes and close the file.

9.5 Deployment

The deployment process at this stage of the installation will install the **i2b2 Ontology Management (ONT) Cell** on the *JBoss Web Server*.

Deploy edu.harvard.i2b2.ontology

The following steps will walk you through the deployment process. The commands on a Windows Server may differ slightly on a Linux Machine. This difference will be noted when appropriate.

Step 1: Change working directory

The **first step** in the deployment process is to change your working directory to the location of your **edu.harvard.i2b2.ontology**.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.ontology
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: `CD /opt/i2b2/edu.harvard.i2b2.ontology`

Windows Command: `CD C:\opt\i2b2\edu.harvard.i2b2.ontology`

Step 2: Deploy edu.harvard.i2b2.ontology

The **second** and **final step** in the deployment process is to run the Ant script to deploy edu.harvard.i2b2.server.ontology.

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f master_build.xml clean build-all deploy
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f master_build.xml clean build-all deploy
```

Note

If the commands **ant** or **%ANT_HOME%** do not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace **%ANT_HOME%** with the full path to your Ant directory.

Provided there were no problems running the script you will see **Build Successful** when the script finishes and the edu.harvard.i2b2.ontology has been deployed.

9.6 Start Services

Start JBoss

Once the cell has been deployed the JBoss Server has to be **running** in order to use the i2b2. The process of starting your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Start JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Start JBoss Windows Service**.

Start JBoss Linux Service

The following steps will walk you through the process of starting your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to start JBoss.

Stop JBoss Command

```
/etc/init.d/jboss start
```

3. The script to start JBoss will run.

Start JBoss Windows Service

The following steps will walk you through the process of starting your JBoss server via a windows service.

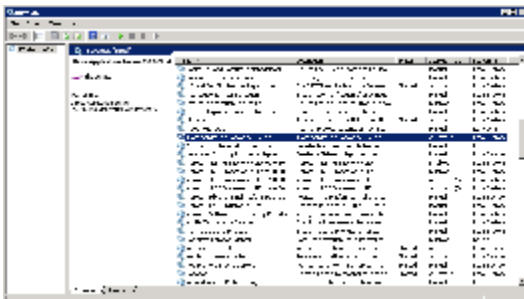
Note

These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss Web Server as a Windows Service* in the *Requirements Chapter*.

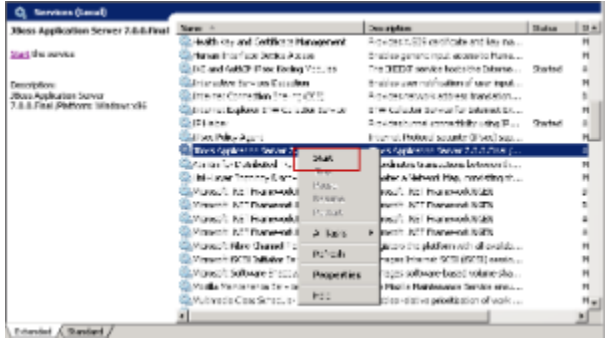
1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

Important

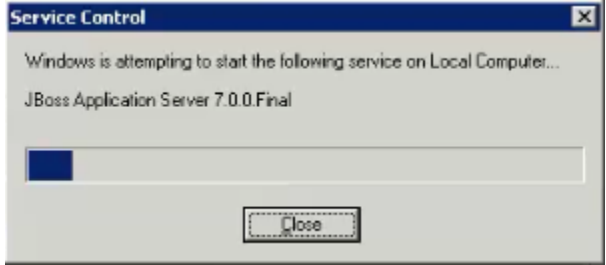
The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.



- Using the mouse, *right click* on the name of the service to display the pop-up menu.
- Select **Start** to start the service.



- A window will open displaying the progress.



- The progress window will close once the service has started running.

9.7 Update ONT Cell Data in i2b2 Admin

Now that you have installed the Ontology cell the next step is to update the cell data in the i2b2 Administration Module. The following steps will guide you through the process of editing existing cell data.

Important

In the *Data Installation* chapter, the cell data for the required i2b2 core cells was loaded into the cell data table when installing the Pmdata.

By default the cells are configured to work with the i2b2 demo database. This means *localhost* and port *9090* are part of the cell's address.

- You will need to edit the cells data if you changed any of default settings.
- You can skip this step if you did not change the default settings.

To be safe you may want to review the default settings at least once to determine if anything is different in your environment.

Edit Existing Cell Data

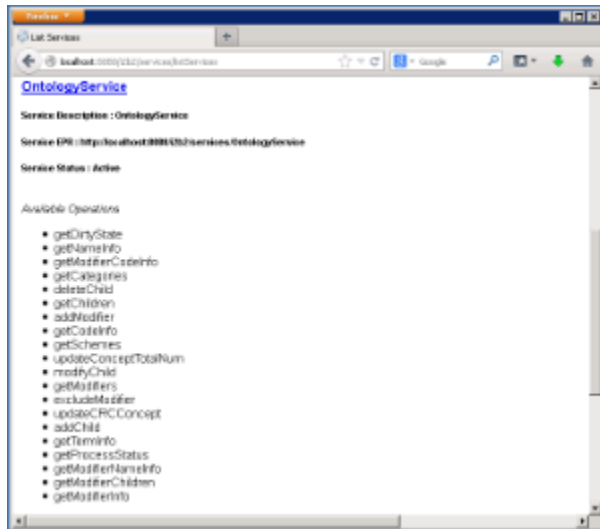
- Log into the i2b2 Administration Module.
`http://localhost/admin`
- Click on **Manage Cells** located in the navigation panel on the left.
- The *Manage Cells* page will display in the panel on the right.

Verify Web Services

At this point in the installation process you want to do a quick check to make sure the Web Service for the Ontology Cell is running.

Steps to verify web services

1. Open your web browser and enter the following URL:
[_http://yourHost:9090/i2b2/services/listServices_](http://yourHost:9090/i2b2/services/listServices_)
2. Verify the **OntologyService** is listed as active.



Log into the Web Client and Workbench

The best "sanity check" you can do is to log into the i2b2 Web Client and Workbench. If there is a problem with the Ontology cell you will see an error in the Navigate Terms and Find Terms views.

Note

The communication with the PM and other cells does differ slightly when logging into the two clients, which is why we recommend you log into both the Web Client and the Workbench.

Things to check:

- Verify no error messages appear in the Navigate, Find and Edit Terms views
- Expand and collapse folders in Navigate and Edit Terms view.

Things to keep in mind:

Assuming you have been installing the cells in the order in which they appear in this installation guide you most likely have not installed the CRC or Workplace cells yet. This means you will see valid errors in the Query Tool, Previous Queries and Workplace views when you log into either one of the clients. Also, you will receive an error when doing a search in Find Terms view as long as the CRC is not installed yet.

References for logging in and troubleshooting

- For steps on how to log into the Web Client please see the *Install i2b2 Web Client chapter*.
- For steps on how to log into the Workbench please see the *Install i2b2 Workbench chapter*.
- If you are getting errors when logging into either client please see the *Troubleshooting chapter*.

9.9 Next Steps

Steps completed in this chapter

The following steps were completed during this chapter on installing the Ontology Cell.



Install Ontology Management (ONT) Cell Chapter



Stopped JBoss services



Configured the build properties



Configured the application directory properties



Configured the Ontology properties



Set the Metadata Schema Name (*location of hivedata tables*)



Set the PM cell properties



Set the FR cell properties



Set the CRC cell properties



Set the metadata delimiter property



Deployed edu.harvard.i2b2.ontology



Started JBoss services



Verified installation



Verified Ontology Web Services are running



Able to log into the i2b2 Web Client and Workbench

Next Steps

Provided there are no issues with the installation of the Ontology cell, your **next step** is to proceed with installing the remaining cells. The remaining cells do not need to be installed in any particular order. The next chapter will guide you through the installation of the Data Repository (CRC) Cell.

Chapter 10. Data Repository (CRC) Cell Install

The Data Repository (CRC) Cell manages the storage and querying of the clinical data stored in the demodata tables.

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 - 10.4.4.2.1 PDO Paging Properties
 - 10.4.4.2.2 Analysis Plug-in - Queue Properties
 - 10.4.4.2.3 Setfinder Query - Timeout Properties
 - 10.4.4.2.4 Setfinder Query - Lockout Properties
 - 10.4.4.2.5 Setfinder Query - Temp Table Properties
- 10.4.5 Data Source Configuration

10.5 Deployment

10.6 Start Services

10.7 Update CRC Cell Data in i2b2 Admin

10.8 Update Path in CRC Tables

10.9 Verify CRC Installation

10.10 Next Steps

10.1 Prerequisites

The following installations **must be completed** prior to beginning the process of installing the Data Repository (CRC) Cell.



Requirements Chapter



Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)



Installed Java, JBoss, Apache Ant and Apache Axis2



Downloaded the i2b2 Software



Data Installation Chapter



Created database user accounts for i2b2 schemas



Created all the data tables (*Crcdata*, *Hivedata*, *Imdata*, *Metadata*, *Pmdata* and *Workdata*)



Created the stored procedures for the *Crcdata* tables and the triggers for the *Pmdata* tables



Loaded data into all the tables (*Crcdata*, *Hivedata*, *Imdata*, *Metadata*, *Pmdata* and *Workdata*)



i2b2 Server-common Install Chapter



Extracted all the i2b2 source code to a directory a directory of your choice (*YOUR_I2B2_SRC_DIR*)



Configured Server-common properties



Deployed edu.harvard.i2b2.server-common



Project Management (PM) Cell Install Chapter



Configured PM cell properties



Deployed edu.harvard.i2b2.pm



i2b2 Administration Module Install Chapter



Copied Admin files to your web server directory



Updated *i2b2_config_data.js* file with domain information and the location of the PM Cell.



Verified admin installation

The following installations are **not required** to occur before installing the Data Repository (CRC) Cell but **are recommended**.



i2b2 Web Client Install Chapter



i2b2 Web Client installed



Able to log into the i2b Web Client



i2b2 Workbench Install Chapter



i2b2 Workbench installed



Able to log into the i2b Workbench



Ontology Management (ONT) Cell Install Chapter



Configured Ontology cell properties



Deployed edu.harvard.i2b2.ontology



Updated Ontology cell data in Admin



Verified ontology installation

10.2 CRC Installation Overview

In this chapter we will be installing the Data Repository (CRC) Cell.

Order of Installation

The basic steps that will be taken during this installation are as follows:

- Step 1:** Stop services (JBoss)
- Step 2:** Edit CRC Loader configuration files
- Step 3:** Edit CRC configuration files
- Step 4:** Deploy the CRC Cell
- Step 5:** Start services (JBoss)
- Step 6:** Update CRC Data in i2b2 Admin
- Step 7:** Update path in CRC table
- Step 8:** Verify installation

Important

The details of what is to be done for each step are defined in the different sections within this chapter. It is important to follow steps in the order they are defined and not to skip any of them unless otherwise noted.

10.2.1 Source Code and Directory Structure

Source Code for Data Repository (CRC) Cell

In the chapter titled *Install i2b2 Server-Common*, you extracted the files from the i2b2 Core Source Code zip file into a directory of your choosing (*YOUR_I2B2_SRC_DIR*). One of the files extracted was a folder called **edu.harvard.i2b2.crc** and it is in this folder where the files for the CRC installation reside.

CRC Directory Structure

The main directory for the CRC Cell is **edu.harvard.i2b2.crc** and as stated earlier this directory resides in *YOUR_I2B2_SRC_DIR*. During this installation of the CRC cell we will be editing a number of files that reside within the CRC directory. These files and their location are outlined below:

Main CRC Directory: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.crc\

File Name	Description
-----------	-------------

build.properties	Contains properties needed during the building of the CRC Cell.
------------------	-----------------------------------------------------------------

Directory for CRC and CRCLoader Properties: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.crc\etc\spring\

File Name	Description
crc_application_directory.properties	Define the location for your application properties.
edu.harvard.i2b2.crc.loader.properties	Define the properties for the PM and FR cells for the CRCLoader.
CRCLoaderApplicationContext.xml	Define several properties for database sources and lookup table for the CRCLoader.
crc.properties	Define the properties for the CRC cell, CRC service account, and various parameters that are used by the CRC when running queries on the server.

Directory for Data Source Configuration: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.crc\etc\jboss\

File Name	Description
crc-ds.xml	Configure the JBoss Data source for the CRC cell.

10.3 Stop Services

Stop JBoss

In order to configure and deploy the CRC cell correctly on your i2b2 server it is important that JBoss is not running.

The process of stopping your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Stop JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Stop JBoss Windows Service**.

Stop JBoss Linux Service

The following steps will walk you through the process of stopping your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to stop JBoss.

Stop JBoss Command

```
/etc/init.d/jboss stop
```

3. The script to stop JBoss will run.
4. Provided there are no issues JBoss will no longer be running.

Stop JBoss Windows Service

The following steps will walk you through the process of stopping your JBoss server via a windows service.

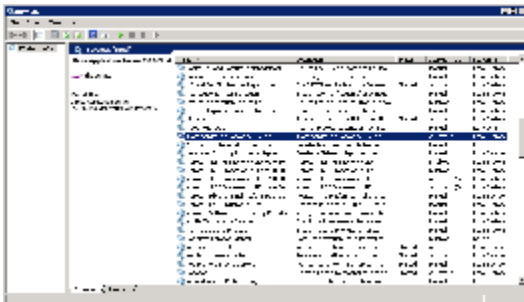
Note

These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss as a Windows Service* in the *Requirements Chapter*.

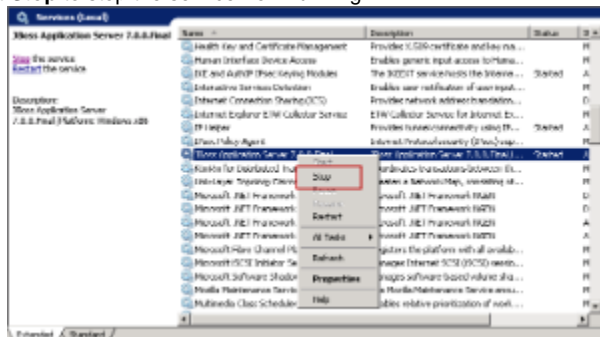
1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

Important

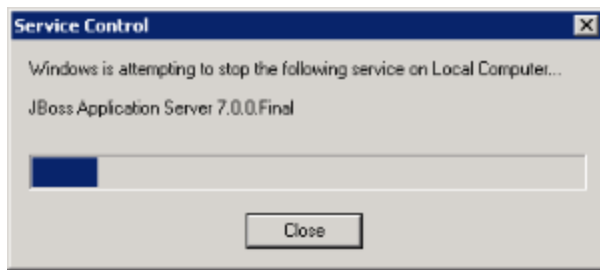
The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.



4. Using the mouse, *right click* on the name of the service to display the pop-up menu.
5. Select **Stop** to stop the service from running.



6. A window will open displaying the progress.



7. The progress window will close once the service has stopped running.

10.4 Configuration

Configure the CRC Cell for Installation

As stated in the previous section, there are a number of files in the **edu.harvard.i2b2.crc** directory that will need to be edited to reflect the appropriate configuration at your site. The following outlines the steps that need to be taken during the configuration stage of the installation.

There are several steps that will need to be taken.

- Step 1:** Change working directory
- Step 2:** Configure the build properties
- Step 3:** Configure the CRC application directory properties
- Step 4:** CRC Loader properties: Configure FR cell properties
- Step 5:** CRC Loader properties: Configure PM cell properties
- Step 6:** CRC Loader properties: Configure data source
- Step 7:** CRC properties: Configure PM cell properties
- Step 8:** CRC properties: Configure data source lookup
- Step 9:** CRC properties: Configure ONT cell properties
- Step 10:** CRC properties: Configure CRC service account properties
- Step 11:** CRC properties: Configure the optional "performance" properties
 - PDO Paging properties
 - Analysis Plug-in - Queue Properties
 - Setfinder Query - Timeout Properties
 - Setfinder Query - Lockout Properties
 - Setfinder Query - Temp Table Properties

Step 12: CRC properties: Configure the data sources

Note

The configuration files you will be editing are delivered with examples. In some instances these files may contain multiple examples for the three different database management systems supported by the i2b2.

Assumptions

The steps in this section are based on the following assumptions

Linux: your user has the appropriate **administrative access** to the opt directory.

Windows: You are logged into the Windows Command Prompt as an **Administrator**.

If you do not have the appropriate access you will have problems running the scripts.

Step 1: Change working directory

The **first step** in the cell configuration process is to change your working directory to the location of your **edu.harvard.i2b2.crc** folder.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.crc
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: CD /opt/i2b2/edu.harvard.i2b2.crc

Windows Command: CD C:\opt\i2b2\edu.harvard.i2b2.crc

10.4.1 Configure CRC Build Properties

Step 2: Configure the build properties for the CRC Cell.

The **second step** in the cell configuration process is to edit the **build.properties** file for edu.harvard.i2b2.crc. During this step you need to set the *jboss.home* and *axis2.war.name* properties for your environment.

Error rendering macro 'excerpt-include' : No link could be created for '5.4.1 Configure the PM Build Properties '.

10.4.2 Configure CRC Application Directory Properties

Step 3: Configure the Application Directory properties

The **third step** in the cell configuration process is to edit the **crc_application_directory.properties** file for edu.harvard.i2b2.crc. During this step you need to specify a location for the application properties directory. This location can be anything you desire but it must be a directory path that the Windows or Linux user has been granted permission to access.

Steps to update *crc_application_directory.properties*

1. At the command prompt type the following:

Linux Command

```
open YOUR_I2B2_SRC_DIR/edu.harvard.i2b2.crc/etc/spring/crc_application_directory.properties
```

Windows Command

```
YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.crc\etc\spring\crc_application_directory.properties
```

EXAMPLES:

Linux Command: open /opt/i2b2/edu.harvard.i2b2.crc/etc/spring/crc_application_directory.properties

Windows Command: C:\opt\i2b2\edu.harvard.i2b2.crc\etc\spring\crc_application_directory.properties

2. The **crc_application_directory.properties** file will open. Set the following properties to reflect your environment:

Application properties for CRC Cell
edu.harvard.i2b2.crc.applicationdir= /YOUR_JBOSS_HOME_DIR/standalone/configuration/crcapp

3. Save the changes and close the file.

10.4.3 Configure CRC Loader Properties

The CRC Loader is one of the components of the CRC Cell and has its own configuration files. In this section you will be defining the properties for the CRC loader to communicate with the Project Management (PM) and File Repository (FR) Cells as well as setting up the database connections.

10.4.3.1 File Repository Cell Properties for CRC Loader

Step 4: CRC Loader properties: Configure FR cell properties

In order for the **CRC loader** to communicate with the *File Repository (FR) Cell* the following properties need to be modified to reflect your environment.

Important

If you have been installing the cells in the order they are written in the guide then you most likely have not installed the File Repository (FR) cell yet. Even though you have not installed it you can proceed with setting up the properties for it.

Typically the location of the FR cell is going to be the same as your other cells (ONT, CRC, WORK). If you do not know the location and would prefer to set these properties after you install the FR cell then you will need to remember to come back to this step.

1. At the command prompt type the following:

Linux Command
open YOUR_I2B2_SRC_DIR /edu.harvard.i2b2.crc/etc/spring/edu.harvard.i2b2.crc.loader.properties

Windows Command
YOUR_I2B2_SRC_DIR \i2b2\edu.harvard.i2b2.crc\etc\spring\edu.harvard.i2b2.crc.loader.p

EXAMPLES:

Linux Command: open /opt/i2b2/edu.harvard.i2b2.crc/etc/spring/edu.harvard.i2b2.crc.loader.properties

Windows Command: C:\opt\i2b2\edu.harvard.i2b2.crc\etc\spring\edu.harvard.i2b2.crc.loader.properties

2. The **edu.harvard.i2b2.crc.loader.properties** file will open.
3. Scroll to the section called **File Management Cell**.
4. Edit the **edu.harvard.i2b2.crc.loader.fr.pm.url** property to reflect the location of the FR cell in your environment.

Important

When you edit the **edu.harvard.i2b2.crc.loader.ws.fr.url** property with the location of your FR Cell it is **extremely important** that you only edit the **hostname** (*localhost*) and the **port** (*9090*). The remainder of the URL is required as it is written and should not be changed.

File Management Cell

```
edu.harvard.i2b2.crc.loader.ws.fr.url=http://localhost:9090/i2b2/services/FRService
edu.harvard.i2b2.crc.loader.ws.fr.tempSpace=/tmp
edu.harvard.i2b2.crc.loader.ws.fr.timeout=10000
edu.harvard.i2b2.crc.loader.ws.fr.fileThreshold=4000
edu.harvard.i2b2.crc.loader.ws.fr.attachmentNameCID
edu.harvard.i2b2.crc.loader.ws.fr.operationurn:recvfileRequest
```

5. Save the changes but do not close the file. You will editing the file again during this installation.

10.4.3.2 Project Management Cell Properties for CRC Loader

Step 5: CRC Loader properties: Configure PM cell properties

In order for the **CRC loader** to communicate with the *Project Management (PM) Cell* the following properties need to be modified to reflect your environment.

1. In the **edu.harvard.i2b2.crc.loader.properties** file scroll to the section called **File Management Cell**.
2. Edit the **edu.harvard.i2b2.crc.loader.pm.fr.url** property to reflect the location of the PM cell in your environment.

Important

When you edit the **edu.harvard.i2b2.crc.loader.ws.pm.url** property with the location of your PM Cell it is **extremely important** that you only edit the **hostname** (*localhost*) and the **port** (*9090*). The remainder of the URL is required as it is written and should not be changed.

Project Management Cell

```
edu.harvard.i2b2.crc.loader.ws.pm.url=http://localhost:9090/i2b2/services/PMService/getServices
# Flag to bypass project management cell
edu.harvard.i2b2.crc.loader.ws.pm.bypass=false
edu.harvard.i2b2.crc.loader.ws.pm.bypass.roleADMIN
edu.harvard.i2b2.crc.loader.ws.pm.bypass.project=Demo
```

3. Save your changes but do not close the file. You will be continuing to edit the file in the next few sections.

10.4.3.3 Data Source Properties for the CRC Loader

Step 6: CRC Loader properties: Configure data source lookup

During the hivedata installation one of the tables created was the CRC_DB_LOOKUP table. The CRC Loader needs to communicate with this table and in order to do this we need to tell it where to find the Hivedata tables. During this step we will define the properties for JDBC connection and the data source lookup in the following CRC Loader configuration files.

- CRCLoaderApplicationContext.xml
- edu.harvard.i2b2.crc.loader.properties (should still be open from previous section)

Prerequisite

You need to know the location of your Hivedata tables. These are owned by the PM cell.

Things to keep in mind when configuring the data sources in CRCLoaderApplicationContext.xml:

The following properties need to be updated or verified that they are set correctly for your environment:

"driverClassName"

- make sure the jdbc driver is correct for the type of database you are connecting to

"url"

- verify the jdbc is correct for your type of database
- The correct location the database that has your hivedata tables

"username" and "password"

- needs to match the database user you setup for your hivedata. In the i2b2 demo database this is *i2b2hive* and *demouser*.

Steps to update data sources in CRCLoaderApplicationContext.xml

These steps include example configurations for Oracle, PostgreSQL and SQL Server.

1. The **CRCLoaderApplicationContext.xml** file is located in the following directory:

`YOUR_I2B2_SRC_DIR\i2b2\edu.harvard.i2b2.crc\etc\spring\`

Important

The location shown above is written for Windows. If you are on a Linux machine the slashes in the path name need to be changed.

- *Linux Path*: use a forward slash.
- *Windows Path*: use a backward slash.

EXAMPLES:

Linux Path: `/opt/edu.harvard.i2b2.crc/etc/spring/`

Windows Path: `C:\opt\data\edu.harvard.i2b2.crc\etc\spring\`

2. Open the CRCLoaderApplicationContext.xml file to configure the data source for the CRC Loader

Oracle Database

```
<bean id="CRCBootstrapDS" class="org.apache.commons.dbcp.BasicDataSource"
destroy-method="close">
  <property name="driverClassName" value="oracle.jdbc.driver.OracleDriver" />
  <property name="url" value="jdbc:oracle:thin:@localhost:1521:XE" />
  <property name="username" value="i2b2hive" />
  <property name="password" value="demouser" />
</bean>
```

PostgreSQL Database

```
<bean id="CRCBootstrapDS" class="org.apache.commons.dbcp.BasicDataSource"
destroy-method="close">
  <property name="driverClassName" value=" org.postgresql.Driver " />
  <property name="url" value="jdbc:postgresql://localhost:5432/i2b2" />
  <property name="username" value="i2b2hive" />
  <property name="password" value="demouser" />
</bean>
```

SQL Server Database

```
<bean id="CRCBootstrapDS" class="org.apache.commons.dbcp.BasicDataSource"
  destroy-method="close">
  <property name="driverClassName" value="com.microsoft.sqlserver.jdbc.SQLServerDriver"
/>
  <property name="url" value="jdbc:sqlserver://localhost:1433" />
  <property name="username" value="i2b2hive" />
  <property name="password" value="demouser" />
</bean>
```

3. Save the changes and close the file.

Steps to update data sources in edu.harvard.i2b2.crc.loader.properties

These steps include example configurations for Oracle, PostgreSQL and SQL Server.

1. Go to the **edu.harvard.i2b2.crc.loader.properties** file you still have opened from earlier.
2. Scroll to the section called **Datasource Lookup info**.
3. Set the Datasource Lookup information to reflect the information you entered previously in the CRCLoaderApplicationContext.xml file.

Datasource Lookup info
Oracle Configuration edu.harvard.i2b2.crc.loader.ds.lookup.datasource= CRCBootstrapDS edu.harvard.i2b2.crc.loader.ds.lookup.servertype= ORACLE edu.harvard.i2b2.crc.loader.ds.lookup.schemaname= i2b2hive
PostgreSQL Configuration edu.harvard.i2b2.crc.loader.ds.lookup.datasource= CRCBootstrapDS edu.harvard.i2b2.crc.loader.ds.lookup.servertype= PostgreSQL edu.harvard.i2b2.crc.loader.ds.lookup.schemaname= i2b2hive
SQL Server Configuration edu.harvard.i2b2.crc.loader.ds.lookup.datasource= CRCBootstrapDS edu.harvard.i2b2.crc.loader.ds.lookup.servertype= SQLServer edu.harvard.i2b2.crc.loader.ds.lookup.schemaname= i2b2demodata.dbo

4. Save the changes and close the file.

10.4.4 Configure the CRC Properties

CRC Properties Configuration

The **crc.properties** file contains a number of properties that need to be modified to reflect your environment. Some of these properties are used during the installation of the CRC cell while others define how the CRC will function once it is installed. For the purpose of this document we have grouped them into two categories; (1) Required Environment Properties and (2) Optional Performance Properties.

- The **Required Environment Properties** are those whose variables have to be modified with information that is specific to your environment. The editing of these properties is defined in the Required Environment Properties section.
- The **Optional Performance Properties** are those properties that will change how the CRC performs. You can choose to edit them to your needs or to use the default settings.

Open crc.properties file

The following steps outline how to open the crc.properties file. This file will remain open as you move through the next few sections editing all the required properties.

1. At the command prompt type the following:

Linux Command

```
open YOUR_I2B2_SRC_DIR/edu.harvard.i2b2.crc/etc/spring/crc.properties
```

Windows Command

```
YOUR_I2B2_SRC_DIR\i2b2\edu.harvard.i2b2.crc\etc\spring\crc.properties
```

EXAMPLES:

Linux Command: open /opt/i2b2/edu.harvard.i2b2.crc/etc/spring/crc.properties

Windows Command: C:\opt\i2b2\edu.harvard.i2b2.crc\etc\spring\crc.properties

2. The **crc.properties** file will open.
3. Once the file opens proceed to the next section titled *Required Environment Properties / Project Management Cell Properties*.

10.4.4.1 Required Environment Properties

The following properties have to be modified in order for the CRC Cell to work correctly in your environment.

- Project Management Cell Properties
- Datasource lookup Properties (location of the CRC_DB_LOOKUP table)
- Ontology Cell Properties
- CRC service account properties

10.4.4.1.1 Project Management Cell Properties

Step 7: CRC properties: Configure PM cell properties

In order for the CRC to communication with the PM cell the following properties need to be modified to reflect you environment.

1. In the **crc.properties** file scroll to the section called **Project Management Cell**.
2. Edit the queryprocessor.ws.pm.url property to reflect the location of the PM cell in your environment.

Important

When you edit the **queryprocessor.ws.pm.url** property with the location of your PM Cell it is **extremely important** that you only edit the **hostname** (*localhost*) and the **port** (*9090*). The remainder of the URL is required as it is written and should not be changed.

Project Management Cell

```
queryprocessor.ws.pm.url=http://localhost:9090/services/PMService/getServices
# Flag to bypass project management cell
queryprocessor.ws.pm.bypass=false
queryprocessor.ws.pm.bypass.role=ADMIN
queryprocessor.ws.pm.bypass.project=Demo
```

3. Save your changes but do not close the file. You will be continuing to edit the file in the next few sections.

10.4.4.1.2 Data Source Lookup Properties

Step 8: CRC properties: Configure data source lookup properties

During the hivedata installation one of the tables created was the CRC_DB_LOOKUP table. The CRC needs to communicate with this table and in order to do this we need to tell it where to find the Hivedata tables. During this step we will set the schema / database name for the hivedata.

Prerequisite

You need to know the location of your Hivedata tables. These are owned by the PM cell.

Steps to set the Data source lookup properties

These steps include example configurations for Oracle, PostgreSQL and SQL Server.

1. In the **crc.properties** file scroll to the section called **Datasource Lookup properties**.
2. Set the **servertype** to the type of database you are connecting to and set the **schemaname** to the name of the database / schema where your hivedata tables are located.

Datasource Lookup info

Oracle Configuration

```
queryprocessor.ds.lookup.datasource=CRCDatasourceLookup  
queryprocessor.ds.lookup.servertype=ORACLE  
queryprocessor.ds.lookup.schemaname=i2b2hive
```

PostgreSQL Configuration

```
queryprocessor.ds.lookup.datasource=CRCDatasourceLookup  
queryprocessor.ds.lookup.servertype=PostgreSQL  
queryprocessor.ds.lookup.schemaname=i2b2hive
```

SQL Server Configuration

```
queryprocessor.ds.lookup.datasource=CRCDatasourceLookup  
queryprocessor.ds.lookup.servertype=SQLServer  
queryprocessor.ds.lookup.schemaname=i2b2hive.dbo
```

3. Save your changes but do not close the file. You will be continuing to edit the file in the next few sections.

10.4.4.1.3 Ontology Cell Properties

Step 9: CRC properties: Configure ONT cell properties

In order for the CRC to communication with the Ontology cell the following properties need to be modified to reflect you environment.

1. In the **crc.properties** file scroll to the section called **Ontology Cell**.
2. Edit the **queryprocessor.ws.ontology.url** and **edu.harvard.i2b2.crc.delegate.ontology.url** properties to reflect the location of the Ontology cell in your environment.

Important

When you edit the **queryprocessor.ws.ontology.url** and **edu.harvard.i2b2.crc.delegate.ontology.url** properties with the location of your Ontology Cell it is **extremely important** that you only edit the **hostname** (*localhost*) and the **port** (*9090*). The remainder of the URL is required as it is written and should not be changed.

Ontology Cell

```
queryprocessor.ws.ontology.url=http://localhost:9090/i2b2/services/OntologyService/getTermInfo  
edu.harvard.i2b2.crc.delegate.ontology.url=http://localhost:9090/i2b2/services/OntologyService  
edu.harvard.i2b2.crc.delegate.ontology.operation.getterminfo=/getTermInfo  
edu.harvard.i2b2.crc.delegate.ontology.operation.getchildren=/getChildren  
edu.harvard.i2b2.crc.delegate.ontology.operation.getmodifierinfo=/getModifierInfo
```

3. Save your changes but do not close the file. You will be continuing to edit the file in the next few sections.

10.4.4.1.4 CRC Service Account Properties

Step 10: CRC properties: Configure CRC service account properties

In order for the CRC Cell to perform various services behind the scenes it requires a single service account be setup and defined in the properties file. This service account is the same one that is used by the Ontology Cell. Later in this document you will be setting up the service account in the PM as a user. In this stage of the CRC installation you need to define the properties for this account.

1. In the **crc.properties** file scroll to the section called **service account properties**.
2. Update the service account user and password for your environment.

Ontology service account properties

```
edu.harvard.i2b2.crc.pm.serviceaccount.user=AGG_SERVICE_ACCOUNT
edu.harvard.i2b2.crc.pm.serviceaccount.password=demouser
```

3. Save your changes. You can close the file if you do not want to edit any of the optional properties defined in the next section.

10.4.4.2 Optional Performance Properties

Step 11: CRC properties: Configure the optional "performance" properties

The following properties are delivered with a default setting and the can be modified to meet the needs of your environment.

- PDO Paging properties
- Analysis Plug-in - Queue Properties
- Setfinder Query - Timeout Properties
- Setfinder Query - Lockout Properties
- Setfinder Query - Temp Table Properties

10.4.4.2.1 PDO Paging Properties

The Patient Data Object (PDO) is paged when the CRC returns it to the clients. There are several properties that can be edited to reflect the needs of your environment. For instance the paging observation size can be adjusted based on your runtime jvm settings.

1. In the **crc.properties** file scroll to the section called **PDO Paging properties**.
2. Update the PDO Paging properties to what will meet your needs.

PDO Paging properties

```
edu.harvard.i2b2.crc.pdo.paging.observation.size=7500
edu.harvard.i2b2.crc.pdo.paging.iteration=100
edu.harvard.i2b2.crc.pdo.paging.inputlist.minpercent=20
edu.harvard.i2b2.crc.pdo.paging.inputlist.minsize=1
# Paging method can be SUBDIVIDE_INPUT_METHOD / AVERAGE_OBSERVATION_METHOD
edu.harvard.i2b2.crc.pdo.paging.method=SUBDIVIDE_INPUT_METHOD
```

3. Save your changes. You can close the file if you do not want to edit any more of the optional properties defined in the next few sections.

10.4.4.2.2 Analysis Plug-in - Queue Properties

The CRC has an optional plug-in called Analysis plug-ins. This plug-in has its own set of properties defined in the `crc.properties` file. These properties define how long a job will run in each queue (medium or large) before it times out and moves onto the next queue.

1. In the **crc.properties** file scroll to the section called **Analysis Queue properties**.
2. Edit the length of time a process should run before timing out.

Analysis Queue properties
edu.harvard.i2b2.crc.analysis.queue.medium.timeoutmills=3000 edu.harvard.i2b2.crc.analysis.queue.medium.maxjobcount=4 edu.harvard.i2b2.crc.analysis.queue.large.timeoutmills=43200000 edu.harvard.i2b2.crc.analysis.queue.large.maxjobcount=1 edu.harvard.i2b2.crc.analysis.queue.medium.jobcheck.timemills=60000 edu.harvard.i2b2.crc.analysis.queue.large.jobcheck.timemills=60000

3. Save your changes and close the file.

10.4.4.2.3 Setfinder Query - Timeout Properties

When a setfinder query is run, the CRC needs to know how long the query should remain in the small, medium or large queue before it will timeout and move on to the next queue. This length of time is defined in the **Setfinder JMS Queue transaction timeout properties** section of the **crc.properties** file.

1. In the **crc.properties** file scroll to the section called **Setfinder JMS Queue transaction timeout properties**.
2. Edit the length of time for each queue.

Setfinder JMS Queue transaction timeout properties
edu.harvard.i2b2.crc.jms.small.timeoutsec=180 edu.harvard.i2b2.crc.jms.medium.timeoutsec=14400 edu.harvard.i2b2.crc.jms.large.timeoutsec=43200

3. Save your changes. You can close the file if you do not want to edit any more of the optional properties defined in the next few sections.

10.4.4.2.4 Setfinder Query - Lockout Properties

In i2b2 a user who is able to run queries and is only allowed to see aggregated results is known as an obfuscated user. An example of an aggregated result is *Number of patients*; this analysis type will only return the a patient set size - no patient data is returned. The obfuscated user is limited to the number of times he / she can run the same query in a project within a specified time period. If the user exceeds the maximum number of times then their account will be locked and only an administrator can unlock it.

The setfinder query - lockout properties enable you to customize this feature to what will work best for you and your users. These properties are defined in the **CRC setfinder query lockout parameter** section of the **crc.properties** file.

Explanation of lockout properties

The following table provides a brief explanation of the different lockout property values and what they mean.

Property Name	Values
edu.harvard.i2b2.crc.lockout.setfinderquery.count	<ul style="list-style-type: none">The default value of 7 allows for 7 attempts before the user is locked out.If you do not want to lockout your obfuscated users then set the count to -1. This will turn the feature off.
edu.harvard.i2b2.crc.lockout.setfinderquery.day	<ul style="list-style-type: none">This is the specified time period a user can run the same query before they are locked out.The default value of 30 means an obfuscated user will be locked out if they run the same query within a 30 day time span.
edu.harvard.i2b2.crc.lockout.setfinderquery.zero.count	<ul style="list-style-type: none">If this property is set to > 0 then the set size of 0 will be counted when determining if a user is locked out.The default value of -1 means a set size of 0 will not be counted.
edu.harvard.i2b2.crc.setfinderquery.obfuscation.count.sigma	<ul style="list-style-type: none">Defines the obfuscation standard deviation for the set size count (number of patients).The range is -2 to 2.
edu.harvard.i2b2.crc.setfinderquery.obfuscation.breakdowncount.sigma	<ul style="list-style-type: none">Defines the obfuscation standard deviation for the breakdown counts (gender, race, age, etc).The range is -4 to 4.
edu.harvard.i2b2.crc.setfinderquery.obfuscation.minimum.value	<ul style="list-style-type: none">If the count is within the minimum value then the obfuscated value returned will be 0.The default value of 3 means if the real set size is 3 or less then a count of zero will be returned to the user.

Note

In the i2b2 Web Client, obfuscated results will appear in *Query Status* with a +/- 3 next to the count. This +/- 3 is defined in the Web Client code; The client never looks to the CRC properties to determine what to display. Therefore, changes made to the **edu.harvard.i2b2.crc.setfinderquery.obfuscation.minimum.value** property will have no effect on the +/- value that displays in the Web Client. This property is simply used by the CRC during the obfuscation process to determine the set size that will be returned to the clients as the obfuscated result.

Steps to set the CRC setfinder query lockout properties

1. In the **crc.properties** file scroll to the section called **CRC setfinder query lockout parameter**.
2. Edit the properties to reflect how you would like the lockout feature to work in your environment.

CRC setfinder query lockout parameter

```
edu.harvard.i2b2.crc.lockout.setfinderquery.count=7
edu.harvard.i2b2.crc.lockout.setfinderquery.day=30
edu.harvard.i2b2.crc.lockout.setfinderquery.zero.count=-1
edu.harvard.i2b2.crc.setfinderquery.obfuscation.count.sigma=1.323
edu.harvard.i2b2.crc.setfinderquery.obfuscation.breakdowncount.sigma=1.6
edu.harvard.i2b2.crc.setfinderquery.obfuscation.minimum.value=3
```

3. Save your changes. You can close the file if you do not want to edit any more of the optional properties defined in the next few sections.

10.4.4.2.5 Setfinder Query - Temp Table Properties

A simple setfinder query is one that does not use a temp table during the querying process. The ability to not use a temp table will speed up the process of running a query against your database. The maximum number of items that can be in a query without using a temp table is defined in the **CRC setfinder query without using temp table** section of the **crc.properties** file.

1. In the **crc.properties** file scroll to the section called **CRC setfinder query without using temp table**.
2. Edit the default value to reflect the maximum number of items that can be in a query before using the temp table.

CRC setfinder query without using temp table
edu.harvard.i2b2.crc.setfinderquery.skiptemptable.maxconcept=40

3. Save your changes. You can close the file if you do not want to edit any more of the optional properties defined in the next few sections.

10.4.5 Data Source Configuration

Step 12: Configure the data sources

The CRC cell needs to communicate with your **i2b2 database** and in order to do this it needs to know where the tables for the **demodata** and **hiv edata** reside. Therefore the **twelfth** and **final step** in the cell configuration process is to configure the data sources for the CRC Cell. This information is configured in the **crc-ds.xml** file.

Things to keep in mind when configuring your datasources:

- The **demodata** and **hiv edata** tables were created during the chapter on Data Installation.
- The **CRCBootStrapDS** points to the data source for your CRC_DB_LOOKUP table which is a hiv edata table.
 - The **<user-name>** and **<password>** need to match the database user you set up for your hiv edata. In the i2b2 demo database this is *i2b2hive* and *demouser*.
- The **QueryToolDemoDS** points to the data source for your demodata tables.
 - The **<user-name>** and **<password>** need to match the database user you set up for your demodata. In the i2b2 demo database this is *i2b2demodata* and *demouser*.
- The **<connection_url>** needs to have the following:
 - The correct JDBC information for your type of database.
 - The correct location of the database containing your crcdata or hiv edata tables. (*These may or may not reside in the same location*)
- Both the **<driver-class>** and **<driver>** need to accurately reflect the type of database you are connecting to.

Steps to configure data sources

The following steps define how to configure your data sources for the CRC Cell. These steps include example configurations for Oracle, PostgreSQL and SQL Server.

1. The **crc-ds.xml** file is located in the following directory:
YOUR_I2B2_SRC_DIRedu.harvard.i2b2.crc\etc\jboss

2. Open the crc-ds.xml file to configure your data sources. (see examples shown below)

Oracle Database

```
<datasource jta="false" jndi-name="java:/CRCBootStrapDS"
pool-name="CRCBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:xe</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/QueryToolDemoDS"
pool-name="QueryToolDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:XE</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2demodata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
```

PostgreSQL Database

```

<datasource jta="false" jndi-name="java:/CRCBootStrapDS"
  pool-name="CRCBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:postgresql://localhost:5432/i2b2</connection-url>
  <driver-class>org.postgresql.Driver</driver-class>
  <driver>postgresql-9.2-1002.jdbc4.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/QueryToolDemoDS"
  pool-name="QueryToolDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:postgresql://localhost:5432/i2b2</connection-url>
  <driver-class>org.postgresql.Driver</driver-class>
  <driver>postgresql-9.2-1002.jdbc4.jar</driver>
  <security>
    <user-name>i2b2demodata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```



```

<datasource jta="false" jndi-name="java:/CRCBootStrapDS"
  pool-name="CRCBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc: sqlserver://localhost:1433</connection-url>
  <driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>
  <driver>sqljdbc4.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <valid-connection-checker
class-name="org.jboss.jca.adapters.jdbc.extensions.mssql.MSSQLValidConnectionChecker">
  </valid-connection-checker>
    <validate-on-match>false</validate-on-match>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/QueryToolDemoDS"
  pool-name="QueryToolDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc: sqlserver://localhost:1433</connection-url>
  <driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>
  <driver>sqljdbc4.jar</driver>
  <security>
    <user-name>i2b2demodata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <valid-connection-checker
class-name="org.jboss.jca.adapters.jdbc.extensions.mssql.MSSQLValidConnectionChecker">
  </valid-connection-checker>
    <validate-on-match>false</validate-on-match>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```

3. If your environment has multiple projects pointing to different data sources then copy the **<datasource>** section for each project data source.
4. Update the **jndi-name** and **pool-name** to reflect the name of the second project .
Example: A second project called Demo2 would have the following entry:

Second Data Source Configuration

```

<datasource jta="false" jndi-name="java:/QueryToolDemoDS"
  pool-name="QueryToolDemo2DS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:XE</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2demodata2</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```

Note

The above example is for an Oracle database. If your database is SQL Server or PostgreSQL then you will need to copy the <datasource> section for your type database connection. Do not use this one as it will not work.

5. Save the changes and close the file.

10.5 Deployment

The deployment process at this stage of the installation will install the **Data Repository (CRC) Cell** on the *JBoss Web Server*.

Deploy edu.harvard.i2b2.crc

The following steps will walk you through the deployment process. The commands on a Windows Server may differ slightly on a Linux Machine and will be noted when appropriate.

Step 1: Change working directory

The **first step** in the deployment process is to change your working directory to the location of your **edu.harvard.i2b2.crc**.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.crc
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: `CD /opt/i2b2/edu.harvard.i2b2.crc`

Windows Command: `CD C:\opt\i2b2\edu.harvard.i2b2.crc`

Step 2: Deploy edu.harvard.i2b2.crc

The **second** and **final step** in the deployment process is to run the Ant script to deploy edu.harvard.i2b2.server.crc.

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f master_build.xml clean build-all deploy
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f master_build.xml clean build-all deploy
```

Note

If the commands **ant** or **%ANT_HOME%** do not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace **%ANT_HOME%** with the full path to your Ant directory.

Provided there were no problems running the script you will see **Build Successful** when the script finishes and the edu.harvard.i2b2.crc has been deployed.

10.6 Start Services

Start JBoss

Once the cell has been deployed the JBoss Server has to be **running** in order to use the i2b2. The process of starting your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Start JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Start JBoss Windows Service**.

Start JBoss Linux Service

The following steps will walk you through the process of starting your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to start JBoss.

Stop JBoss Command

```
/etc/init.d/jboss start
```

3. The script to start JBoss will run.

Start JBoss Windows Service

The following steps will walk you through the process of starting your JBoss server via a windows service.

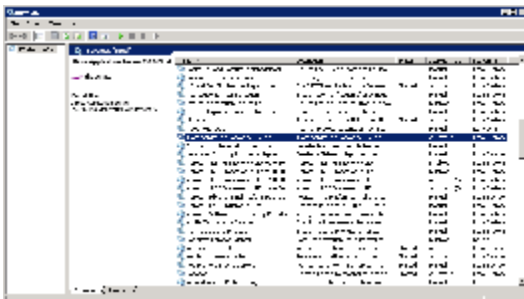
Note

These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss Web Server as a Windows Service* in the *Requirements Chapter*.

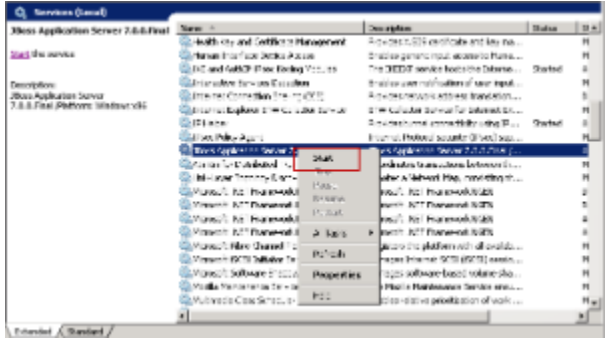
1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

Important

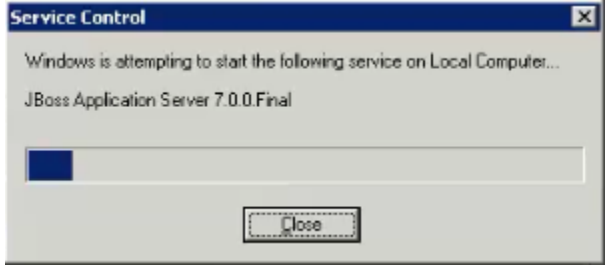
The actual name that appears in the list of services depends on what you entered in the `service.bat` file for the **SVCDISP** setting.



- Using the mouse, *right click* on the name of the service to display the pop-up menu.
- Select **Start** to start the service.



- A window will open displaying the progress.



- The progress window will close once the service has started running.

10.7 Update CRC Cell Data in i2b2 Admin

Now that you have installed the CRC cell the next step is to update the cell data in the i2b2 Administration Module. The following steps will guide you through the process of editing existing cell data.

Important

In the *Data Installation* chapter, the cell data for the required i2b2 core cells was loaded into the cell data table when installing the Pmdata.

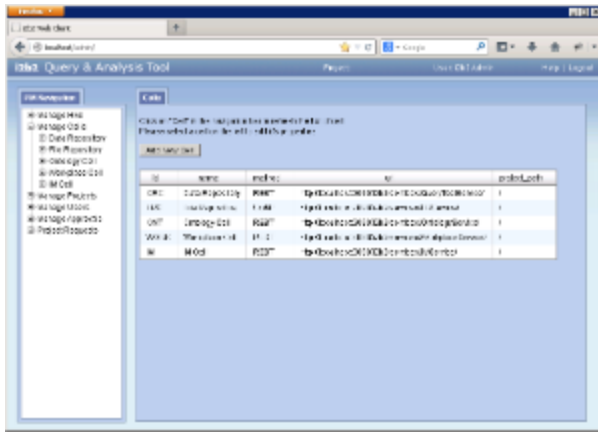
By default the cells are configured to work with the i2b2 demo database. This means *localhost* and port *9090* are part of the cell's address.

- You will need to edit the cells data if you changed any of default settings.
- You can skip this step if you did not change the default settings.

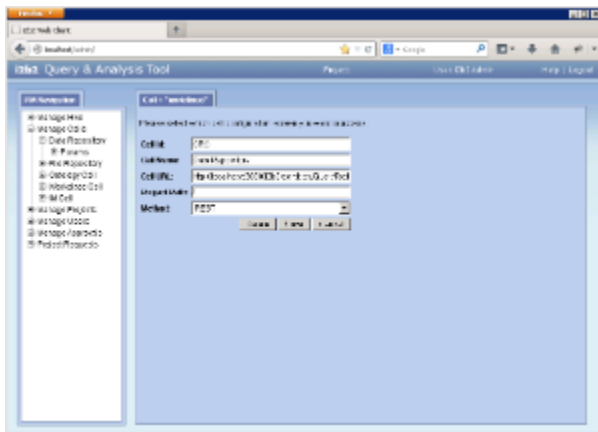
To be safe you may want to review the default settings at least once to determine if anything is different in your environment.

Edit Existing Cell Data

- Log into the i2b2 Administration Module.
`http://localhost/admin`
- Click on **Manage Cells** located in the navigation panel on the left.
- The *Manage Cells* page will display in the panel on the right.



4. In the left navigation panel, click on **Data Repository** to display the edit page.



5. Modify the **Cell URL** to the IP or domain name that the CRC cell is located.
6. Click on **Save** to file the changes in the table.

The i2b2 Web Client and Workbench will now be able to connect to the CRC cell. For additional setup information regarding projects, users, parameters, etc. please see the chapter titled *Initial Setup*

10.8 Update Path in CRC Tables

Important

You only need to update the QT_BREAKDOWN_PATH table if you loaded your own metadata during the Data Installation process.

- If you loaded the data that is supplied in the metadata and crdata (demodata) packages then no changes are necessary.
- If you loaded your own metadata then you need to change the entries in the VALUE column of the QT_BREAKDOWN_PATH table to point to the metadata key (TABLE_CD\FULLNAME) for your analysis breakdowns.

Update the path in the QT_BREAKDOWN_PATH table

In the i2b2 users will select the type of results they would like returned when running a query (e.g. *Patient set*, *Encounter set*, *Number of Patients*, etc.). Some of the result types are a breakdown of pre-defined concepts such as gender, vital status, race, and age. The metadata keys for these analysis breakdowns are defined in the QT_BREAKDOWN_PATH table that was created during the CRC data installation.

- The standard i2b2 **breakdowns** are the demographic concepts of gender, vital status, race, and age.
- The **metadata key** is a concatenation of two columns in two different ontology tables. This key tells the CRC where the concepts for the breakdowns are located. The CRC uses this information to query the Ontology cell to retrieve the query parameters associated with the concept

METADATA KEY

The metadata key is comprised of two parts:

Part 1: the first part of the key is the **TABLE_CD** which is equivalent to the C_TABLE_CD column in the TABLE_ACCESS table.

Part 2: the second part of the key is the **FULLNAME** which is equivalent to the C_FULLNAME column in your metadata table.

The format of the metadata key is: \\TABLE_CD\FULLNAME\

EXAMPLE DATA FROM I2B2 DEMO

The following is an example of the i2b2 demo data that was loaded into the QT_BREAKDOWN, TABLE_ACCESS, and I2B2 tables during the data installation process.

Table: QT_BREAKDOWN_PATH

NAME	VALUE
PATIENT_AGE_COUNT_XML	\\i2b2_DEMO\i2b2\Demographics\Age\
PATIENT_GENDER_COUNT_XML	\\i2b2_DEMO\i2b2\Demographics\Gender\
PATIENT_RACE_COUNT_XML	\\i2b2_DEMO\i2b2\Demographics\Race\
PATIENT_VITALSTATUS_COUNT_XML	\\i2b2_DEMO\i2b2\Demographics\Vital Status\

Table: TABLE_ACCESS

(Only those columns and rows that are relevant to this example are shown)

C_TABLE_CD	C_TABLE_NAME	C_FULLNAME	C_NAME
i2b2_DEMO	I2B2	\\i2b2\Demographics\	Demographics

Table: I2B2

(Only those columns and rows that are relevant to this example are shown)

C_FULLNAME	C_NAME
\\i2b2\Demographics\Age\	Age
\\i2b2\Demographics\Gender\	Gender
\\i2b2\Demographics\Race\	Race
\\i2b2\Demographics\VitalStatus\	Vital Status

10.9 Verify CRC Installation

Although this step of the installation is optional it is highly recommended that you do a "Sanity Check" to make sure the CRC Cell was installed correctly before installing another cell. There are basically two things we want to do to verify the installation.

1. Verify the web service is running
2. Log into the i2b2 web client and workbench to verify there are no errors with the CRC cell.

Note

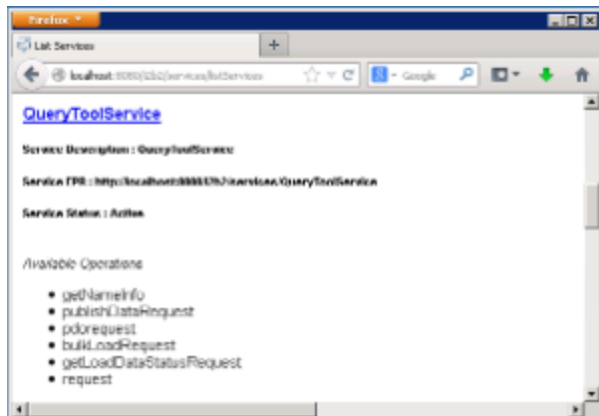
The second step of logging into the clients can only be done if you chose to install the web client and workbench after installing the i2b2 Admin Module. If you did not install them you can either skip this step or choose to install them now.

Verify Web Services

At this point in the installation process you want to do a quick check to make sure the Web Service for the CRC Cell is running.

Steps to verify web services

1. Open your web browser and enter the following URL:
<http://yourHost:9090/i2b2/services/listServices>
2. Verify the **QueryToolService** is listed as active.



Log into the Web Client and Workbench

The best "sanity check" you can do is to log into the i2b2 Web Client and Workbench. If there is a problem with the CRC cell you will see an error in the Query Tool and Previous Queries views.

Note

The communication with the PM and other cells does differ slightly when logging into the two clients, which is why we recommend you log into both the Web Client and the Workbench.

Things to check:

- Can run a query without any errors.
- Display the query results in the Timeline.
- Expand and collapse folders in Previous Queries View.

Things to keep in mind:

Assuming you have been installing the cells in the order in which they appear in this installation guide you most likely have not installed the Workplace Cell yet. This means you will see valid errors in the Workplace view when you log into either one of the clients. On the other hand you have installed the PM, Ontology and CRC cells so you should not see any errors relating to these installations.

References for logging in and troubleshooting

- For steps on how to log into the Web Client please see the *Install i2b2 Web Client chapter*.
- For steps on how to log into the Workbench please see the *Install i2b2 Workbench chapter*.
- If you are getting errors when logging into either client please see the *Troubleshooting chapter*.

10.10 Next Steps

Steps Completed

The following steps were completed during this chapter on installing the CRC Cell.



Install Data Repository (CRC) Cell Chapter



Stopped JBoss services



Configured the build properties



Configured the application directory properties



Configured the CRC Loader properties



Configured FR cell properties



Configured PM cell properties



Configured data source lookup (*schema name for hivedata tables*)



Configured the CRC properties



Configured PM cell properties



Configured data source lookup (*schema name for hivedata tables*)



Configured ONT cell properties



Configured CRC service account properties



Configured the optional "performance" properties



Configured the data sources



Deployed edu.harvard.i2b2.crc



Started JBoss services



Verified installation



CRC Web Services are running



Able to log into the i2b2 Web Client and Workbench

Next Steps

Provided there are no issues with the installation of the CRC cell, your **next step** is to proceed with installing the remaining cells. The remaining cells do not need to be installed in any particular order. The next chapter will guide you through the installation of the Workplace Framework (WORK) Cell.

Chapter 11. Workplace (WORK) Cell Install

The Workplace Framework (WORK) Cell manages and stores project specific i2b2 XML data objects for a user of a given project.

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- 11.4.4 Data Source Configuration

11.5 Deployment

11.6 Start Services

11.7 Update WORK Cell Data in i2b2 Admin

11.8 Verify Workplace Installation

11.9 Next Steps

11.1 Prerequisites

The following installations **must be completed** prior to beginning the process of installing the Workplace Framework (WORK) Cell.



Requirements Chapter



Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)



Installed Java, JBoss, Apache Ant and Apache Axis2



Downloaded the i2b2 Software



Data Installation Chapter



Created database user accounts for i2b2 schemas



Created all the data tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



Created the stored procedures for the Crcdata tables and the triggers for the Pmdata tables



Loaded data into all the tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



i2b2 Server-common Install Chapter



Extracted all the i2b2 source code to a directory a directory of your choice (*YOUR_I2B2_SRC_DIR*)



Configured Server-common properties



Deployed edu.harvard.i2b2.server-common



Project Management (PM) Cell Install Chapter



Configured PM cell properties



Deployed edu.harvard.i2b2.pm



i2b2 Administration Module Install Chapter



Copied Admin files to your web server directory



Updated i2b2_config_data.js file with domain information and the location of the PM Cell.



Verified admin installation

The following installations are **not required** to occur before installing the Workplace Framework (WORK) Cell but **are recommended**.



i2b2 Web Client Install Chapter



i2b2 Web Client installed



Able to log into the i2b Web Client



i2b2 Workbench Install Chapter



i2b2 Workbench installed



Able to log into the i2b Workbench



Ontology Management (ONT) Cell Install Chapter



Configured Ontology cell properties



Deployed edu.harvard.i2b2.ontology



Updated Ontology cell data in Admin



Verified ontology installation



Data Repository (CRC) Cell Install Chapter



Configured both the CRC Loader and CRC property files



Deployed edu.harvard.i2b2.crc



Updated CRC cell data in Admin



Updated metadata key in the QT_BREAKDOWN_PATH table



Verified CRC installation

11.2 Workplace Installation Overview

In this chapter we will be installing the Workplace Framework (WORK) Cell.

Order of Installation

The basic steps that will be taken during this installation are as follows:

- Step 1:** Stop services (JBoss)
- Step 2:** Edit WORK configuration files
- Step 3:** Deploy the WORK Cell
- Step 4:** Start services (JBoss)
- Step 5:** Update WORK Data in i2b2 Admin
- Step 6:** Verify installation

Important

The details of what is to be done for each step are defined in the different sections within this chapter. It is important to follow steps in the order they are defined and not to skip any of them unless otherwise noted.

11.2.1 Source Code and Directory Structure

Source Code for Workplace Framework (WORK) Cell

In the chapter titled *Install i2b2 Server-Common*, you extracted the files from the i2b2 Core Source Code zip file into a directory of your choosing (*YOUR_I2B2_SRC_DIR*). One of the files extracted was a folder called **edu.harvard.i2b2.workplace** and it is in this folder where the files for the workplace installation reside.

Workplace Directory Structure

In this step of the installation process we will be working with the **edu.harvard.i2b2.workplace** directory. Within this directory are the files we will be editing in order to build and deploy the Workplace Cell on your i2b2 Server. The files and their location within your working directory are as follows:

Main Workplace Directory: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.workplace\

File Name	Description
build.properties	Contains properties needed during the building of the Workplace Cell.

Directory for Workplace Property Files: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.workplace\etc\spring\

File Name	Description
workplace_application_directory.properties	Define the location for your application properties directory.
workplace.properties	Define the properties for the Ontology cell, CRC service account, and various parameters that are used by the CRC when running queries on the server.

Directory for Data Source Configuration: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.workplace\etc\jboss\

File Name	Description
work-ds.xml	Configure the JBoss Data source for the Workplace cell.

11.3 Stop Services

Stop JBoss

In order to configure and deploy the Workplace cell correctly on your i2b2 server it is important that JBoss is not running.

The process of stopping your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Stop JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Stop JBoss Windows Service**.

Stop JBoss Linux Service

The following steps will walk you through the process of stopping your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to stop JBoss.

Stop JBoss Command

```
/etc/init.d/jboss stop
```

3. The script to stop JBoss will run.
4. Provided there are no issues JBoss will no longer be running.

Stop JBoss Windows Service

The following steps will walk you through the process of stopping your JBoss server via a windows service.

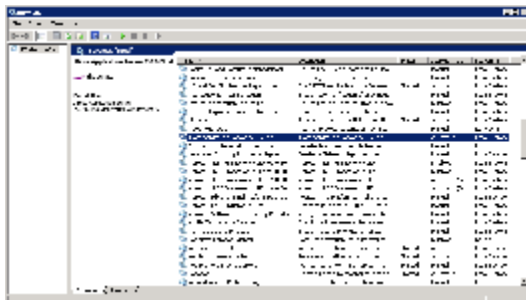
Note

These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss as a Windows Service* in the *Requirements Chapter*.

1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

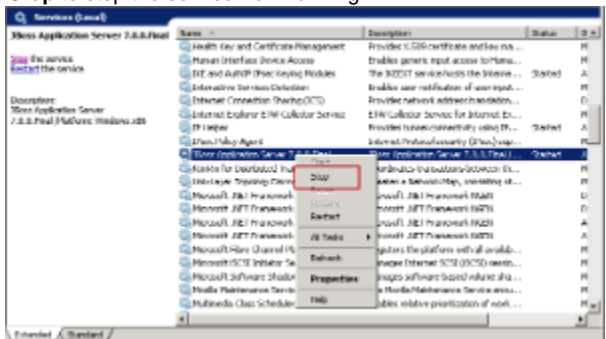
Important

The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.

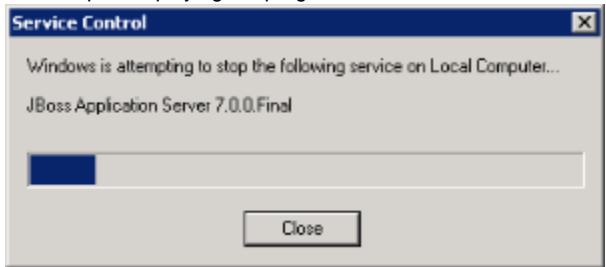


4. Using the mouse, *right click* on the name of the service to display the pop-up menu.

5. Select **Stop** to stop the service from running.



6. A window will open displaying the progress.



7. The progress window will close once the service has stopped running.

11.4 Configuration

Configure the Workplace Cell for Installation

As stated in the previous section, there are a number of files in the **edu.harvard.i2b2.workplace** directory that will need to be edited to reflect the appropriate configuration at your site. The following outlines the steps that need to be taken during the configuration stage of the installation.

- Step 1:** Change your working directory
- Step 2:** Configure the build properties
- Step 3:** Configure the Workplace Application Directory properties
- Step 4:** Workplace properties: Set location of Hivedata tables
- Step 5:** Workplace properties: Configure PM Cell Properties
- Step 6:** Configure the data sources

Note

The configuration files you will be editing are delivered with examples. In some instances these files may contain multiple examples for the three different database management systems supported by the i2b2.

Assumptions

The steps in this section are based on the following assumptions

Linux: your user has the appropriate **administrative access** to the opt directory.

Windows: You are logged into the Windows Command Prompt as an **Administrator**.

If you do not have the appropriate access you will have problems running the scripts.

Step 1: Change working directory

The **first step** in the cell configuration process is to change your working directory to the location of your **edu.harvard.i2b2.workplace** folder.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.workplace
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: CD /opt/i2b2/edu.harvard.i2b2.workplace

Windows Command: CD C:\opt\i2b2\edu.harvard.i2b2.workplace

11.4.1 Configure the Workplace Build Properties

Step 2: Configure the build properties

The **second step** in the cell configuration process is to edit the **build.properties** file for edu.harvard.i2b2.workplace. During this step you need to set the *jboss.home* and *axis2.war.name* properties for your environment.

Error rendering macro 'excerpt-include' : No link could be created for '5.4.1 Configure the PM Build Properties '.

11.4.2 Configure the Workplace Application Directory Properties

Step 3: Configure the Application Directory properties

The **third step** in the cell configuration process is to edit the **workplace_application_directory.properties** file for edu.harvard.i2b2.workplace. During this step you need to specify a location for the application properties directory. This location can be anything you desire but it must be a directory path that your Windows or Linux user has been granted permission to access.

Steps to update workplace_application_directory.properties

1. At the command prompt type the following:

Linux Command

```
open YOUR_I2B2_SRC_DIR/edu.harvard.i2b2.workplace/etc/spring/workplace_application_directory.properties
```


Windows Command

```
YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.workplace\etc\spring\workplace_application_directory.properties
```

EXAMPLES:

Linux Command: `open /opt/i2b2/edu.harvard.i2b2.workplace/etc/spring/workplace_application_directory.properties`

Windows Command: `C:\opt\i2b2\edu.harvard.i2b2.workplace\etc\spring\workplace_application_directory.properties`

2. The **workplace_application_directory.properties** file will open. Set the following properties to reflect your environment:

Application properties for WORK Cell

```
edu.harvard.i2b2.workplace.applicationdir=/YOUR\_JBOSS\_HOME\_DIR/standalone/configuration/workplaceapp
```

3. Save the changes and close the file.

11.4.3 Configure the Workplace Properties

Workplace Properties Configuration

The **workplace.properties** file contains a number of properties that need to be modified with the variables that are specific to your environment. The Workplace cell needs these properties to deploy correctly and to set required parameters.

The properties within the workplace.properties file have been grouped together based on their function. For instance, the group of PM Cell Properties addresses the communication between the Workplace and PM Cell. The following list shows the groups we will be editing during this step of the installation.

Group 1: Metadata schema name

Group 2: Project Management Cell Properties

Open workplace.properties file

The following steps outline how to open the workplace.properties file. This file will remain open as you move through the next few sections editing all the required properties.

1. At the command prompt type the following:

Linux Command

```
open YOUR_I2B2_SRC_DIR/edu.harvard.i2b2.workplace/etc/spring/workplace.properties
```

Windows Command

```
YOUR_I2B2_SRC_DIR\i2b2\edu.harvard.i2b2.workplace\etc\spring\workplace.properties
```

EXAMPLES:

Linux Command:

open /opt/i2b2/edu.harvard.i2b2.workplace/etc/spring/workplace.properties

Windows Command:

C:\opt\i2b2\edu.harvard.i2b2.workplace\etc\spring\workplace.properties

2. The **workplace.properties** file will open.
3. Once the file opens proceed to the next section titled *Set Metadata Schema Name*.

11.4.3.1 Set Metadata Schema Name

Step 4: Set Metadata schema name to the location of the hivedata tables

During the hivedata installation one of the tables created was the WORK_DB_LOOKUP table. The Workplace needs to communicate with this table and in order to do this we need to tell it where to find the Hivedata tables. During this step we will set the database schema name for the hivedata.

Prerequisite

You need to know the location of your Hivedata tables. These are owned by the PM cell.

Steps to set the location of the WORK_DB_LOOKUP table

These steps include example configurations for Oracle, PostgreSQL and SQL Server.

1. In the **workplace.properties** file scroll to the section called **METADATA schema name**.
2. Set the metadataschema to the name of the database / schema where your hivedata tables are located.

METADATA schema name	
Oracle Configuration	workplace.bootstrapdb.metadataschema=i2b2hive
PostgreSQL Configuration	workplace.bootstrapdb.metadataschema=i2b2hive
SQL Server Configuration	workplace.bootstrapdb.metadataschema=i2b2hive.dbo

3. Save your changes and close the file.

11.4.3.2 Project Management Cell Properties

Step 5: PM Cell Properties

In order for the Workplace cell to communication with the PM cell the following properties need to be modified to reflect you environment.

1. In the **workplace.properties** file scroll to the section called **Project Management Cell Integration**.
 2. Edit the workplace.ws.pm.url property to reflect the location of the PM cell in your environment.
-

Important

When you edit the **workplace.ws.pm.url** property with the location of your PM Cell it is **extremely important** that you only edit the **hostname** (*localhost*) and the **port** (9090). The remainder of the URL is required as it is written and should not be changed.

Project Management Cell Integration

```
workplace.ws.pm.url=http://localhost:9090/i2b2/services/PMService/getServices
workplace.ws.pm.webServiceMethod=REST
# Set this flag to bypass project management cell
workplace.ws.pm.bypass=false
workplace.ws.pm.bypass.project=Demo
workplace.ws.pm.bypass.role=ADMIN
```

3. Save your changes but do not close the file. You will be continuing to edit the file in the next section.

11.4.4 Data Source Configuration

Step 6: Configure the data sources for the Workplace Cell

The Workplace cell needs to communicate with your **i2b2 database** and in order to do this it needs to know where the tables for the **workdata** and **hivedata** reside. Therefore the **sixth** and **final step** in the cell configuration process is to configure the data sources for the Workplace Cell. This information is configured in the **work-ds.xml** file.

Things to keep in mind when configuring your datasources:

- The **workdata** and **hivedata** tables were created during the chapter on Data Installation.
- The **WorkplaceDemoDS** points to the data source for your workdata tables.
 - The **<user-name>** and **<password>** need to match the database user you set up for your workdata. In the i2b2 demo database this is *i2b2workdata* and *demouser*.
- The **WorkplaceBootStrapDS** points to the data source for your WORK_DB_LOOKUP table which is a hivedata table.
 - The **<user-name>** and **<password>** need to match the database user you set up for your hivedata. In the i2b2 demo database this is *i2b2hive* and *demouser*.
- The **<connection_url>** needs to have the following:
 - The correct JDBC information for your type of database.
 - The correct location of the database containing your workdata or hivedata tables. *(These may or may not reside in the same location)*
- Both the **<driver-class>** and **<driver>** need to accurately reflect the type of database you are connecting to.

Steps to configure data sources

The following steps define how to configure your data sources for the Workplace Cell. These steps include example configurations for Oracle,

PostgreSQL and SQL Server.

1. The **work-ds.xml** file is located in the following directory:
YOUR_I2B2_SRC_DIRedu.harvard.i2b2.workplace\etc\jboss
2. Open the work-ds.xml file to configure your data sources. (see examples shown below)

Oracle Database Configuration

```
<datasource jta="false" jndi-name="java:/WorkplaceBootStrapDS"
  pool-name="WorkplaceBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:xe</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>>false</validate-on-match>
    <background-validation>>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/WorkplaceDemoDS"
  pool-name="WorkplaceDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:XE</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2workdata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>>false</validate-on-match>
    <background-validation>>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>>false</share-prepared-statements>
  </statement>
</datasource>
```

PostgreSQL Database Configuration

```

<datasource jta="false" jndi-name="java:/WorkplaceBootStrapDS"
  pool-name="WorkplaceBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:postgresql://localhost:5432/i2b2</connection-url>
  <driver-class>org.postgresql.Driver</driver-class>
  <driver>postgresql-9.2-1002.jdbc4.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/WorkplaceDemoDS"
  pool-name="WorkplaceDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:postgresql://localhost:5432/i2b2</connection-url>
  <driver-class>org.postgresql.Driver</driver-class>
  <driver>postgresql-9.2-1002.jdbc4.jar</driver>
  <security>
    <user-name>i2b2workdata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```

```

<datasource jta="false" jndi-name="java:/WorkplaceBootStrapDS"
  pool-name="WorkplaceBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:sqlserver://localhost:1433</connection-url>
  <driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>
  <driver>sqljdbc4.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <valid-connection-checker
class-name="org.jboss.jca.adapters.jdbc.extensions.mssql.MSSQLValidConnectionChecker">
</valid-connection-checker>
    <validate-on-match>false</validate-on-match>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/WorkplaceDemoDS"
  pool-name="WorkplaceDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:sqlserver://localhost:1433</connection-url>
  <driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>
  <driver>sqljdbc4.jar</driver>
  <security>
    <user-name>i2b2workdata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <valid-connection-checker
class-name="org.jboss.jca.adapters.jdbc.extensions.mssql.MSSQLValidConnectionChecker">
</valid-connection-checker>
    <validate-on-match>false</validate-on-match>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```

3. If your environment has multiple projects pointing to different data sources then copy the **<datasource>** section for each project data source.

4. Update the **jndi-name** and **pool-name** to reflect the name of the second project .

Example: A second project called Demo2 would have the following entry:

Second Data Source Configuration

```
<datasource jta="false" jndi-name="java:/WorkplaceDemo2DS"
  pool-name="WorkplaceDemo2DS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:xe</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2workdata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
```

Note

The above example is for an Oracle database. If your database is SQL Server or PostgreSQL then you will need to copy the <datasource> section for your type database connection. Do not use this one as it will not work.

5. Save the changes and close the file.

11.5 Deployment

The deployment process at this stage of the installation will install the **Workplace Framework (WORK) Cell** on the *JBoss Web Server*.

Deploy edu.harvard.i2b2.workplace

The following steps will walk you through the deployment process. The commands on a Windows Server may differ slightly on a Linux Machine and will be noted when appropriate.

Step 1: Change working directory

The **first step** in the deployment process is to change your working directory to the location of your **edu.harvard.i2b2.workplace**.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.workplace
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path*: use a forward slash.
- *Windows Path*: use a backward slash.

EXAMPLES:

Linux Command: `CD /opt/i2b2/edu.harvard.i2b2.workplace`

Windows Command: `CD C:\opt\i2b2\edu.harvard.i2b2.workplace`

Step 2: Deploy edu.harvard.i2b2.workplace

The **second** and **final step** in the deployment process is to run the Ant script to deploy edu.harvard.i2b2.server.workplace.

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f master_build.xml clean build-all deploy
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f master_build.xml clean build-all deploy
```

Note

If the commands **ant** or **%ANT_HOME%** do not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace **%ANT_HOME%** with the full path to your Ant directory.

Provided there were no problems running the script you will see **Build Successful** when the script finishes and the edu.harvard.i2b2.workplace has been deployed.

11.6 Start Services

Start JBoss

Once the cell has been deployed the JBoss Server has to be **running** in order to use the i2b2. The process of starting your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Start JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Start JBoss Windows Service**.

Start JBoss Linux Service

The following steps will walk you through the process of starting your JBoss server via a Linux service.

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

- ## Stop JBoss Command

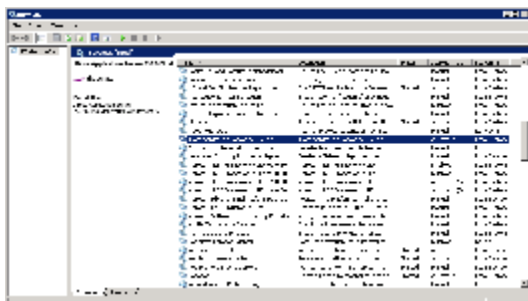
3. The script to start JBoss will run.

The following steps will walk you through the process of starting your JBoss server via a windows service.

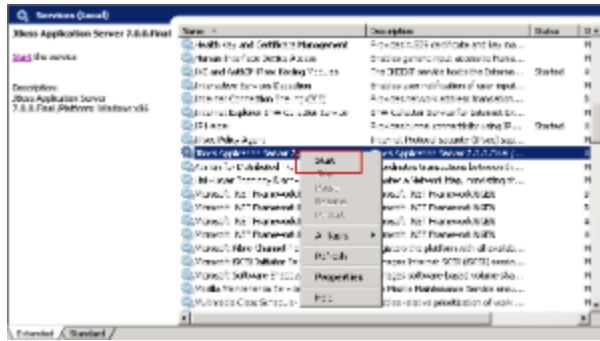
These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss Web Server as a Windows Service* in the *Requirements Chapter*.

1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

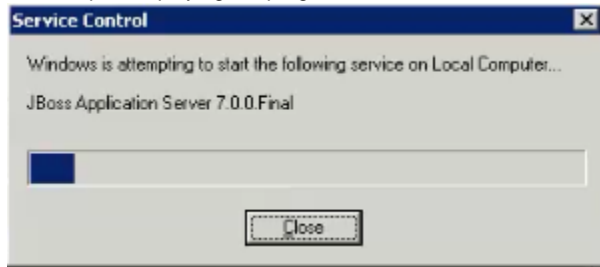
The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.



4. Using the mouse, *right click* on the name of the service to display the pop-up menu.
5. Select **Start** to start the service.



6. A window will open displaying the progress.



7. The progress window will close once the service has started running.

11.7 Update WORK Cell Data in i2b2 Admin

Now that you have installed the Workplace cell the next step is to update the cell data in the i2b2 Administration Module. The following steps will guide you through the process of editing existing cell data.

Important

In the *Data Installation* chapter, the cell data for the required i2b2 core cells was loaded into the cell data table when installing the Pmdata.

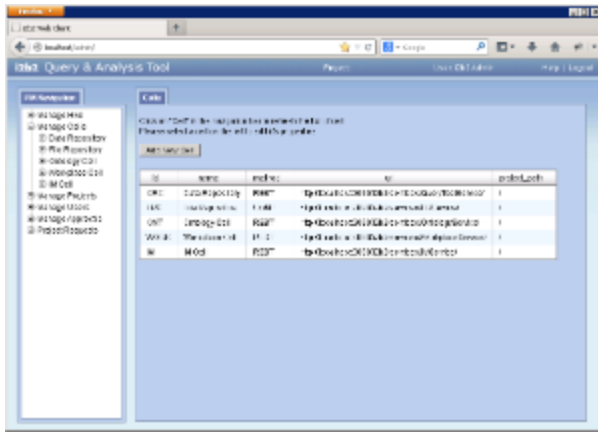
By default the cells are configured to work with the i2b2 demo database. This means *localhost* and port *9090* are part of the cell's address.

- You will need to edit the cells data if you changed any of default settings.
- You can skip this step if you did not change the default settings.

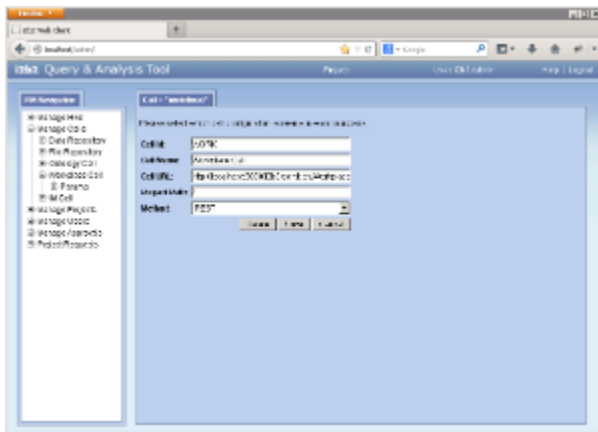
To be safe you may want to review the default settings at least once to determine if anything is different in your environment.

Edit Existing Cell Data

1. Log into the i2b2 Administration Module.
<http://localhost/admin>
2. Click on **Manage Cells** located in the navigation panel on the left.
3. The *Manage Cells* page will display in the panel on the right.



4. In the left navigation panel, click on **Workplace Cell** to display the edit page.



5. Modify the **Cell URL** to the IP or domain name that the Workplace cell is located.
6. Click on **Save** to file the changes in the table.

The i2b2 Web Client and Workbench will now be able to connect to the Workplace cell. For additional setup information regarding projects, users, parameters, etc. please see the chapter titled *Initial Setup*

11.8 Verify Workplace Installation

Although this step of the installation is optional it is highly recommended that you do a "Sanity Check" to make sure the Workplace Cell was installed correctly before installing another cell. There are basically two things we want to do to verify the installation.

1. Verify the web service is running
2. Log into the i2b2 web client and workbench to verify there are no errors with the workplace cell.

Note

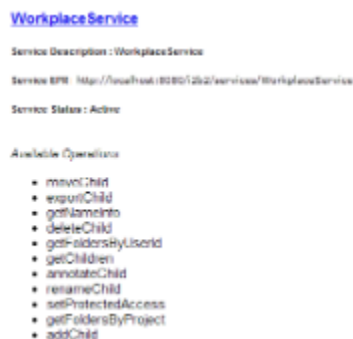
The second step of logging into the clients can only be done if you chose to install the web client and workbench after installing the i2b2 Admin Module. If you did not install them you can either skip this step or choose to install them now.

Verify Web Services

At this point in the installation process you want to do a quick check to make sure the Web Service for the Workplace Cell is running.

Steps to verify web services

1. Open your web browser and enter the following URL:
http://yourHost:9090/i2b2/services/listServices
_
2. Verify the **WorkplaceService** is listed as active.



Log into the Web Client and Workbench

The best "sanity check" you can do is to log into the i2b2 Web Client and Workbench. If there is a problem with the Workplace cell you will see an error in the Workplace view.

Note

The communication with the PM and other cells does differ slightly when logging into the two clients, which is why we recommend you log into both the Web Client and the Workbench.

Things to check:

- Verify no error message in the Workplace View.
- Expand and collapse folders in the Workplace View.
- Create a new folder within your user folder.
- Add a term by dragging it from the Navigate Terms or Find Terms views.

Things to keep in mind:

Assuming you have been installing the cells in the order in which they appear in this installation guide you most likely have installed all four of the main core i2b2 cells (PM, ONT, CRC & WORK). At this point you should not be encountering any errors in any of the standard i2b2 views.

References for logging in and troubleshooting

- For steps on how to log into the Web Client please see the *Install i2b2 Web Client chapter*.

- For steps on how to log into the Workbench please see the *Install i2b2 Workbench chapter*.
- If you are getting errors when logging into either client please see the *Troubleshooting chapter*.

11.9 Next Steps

Steps completed in this chapter

The following steps were completed during this chapter on installing the Workplace Cell.



Install Workplace Framework (WORK) Cell Chapter



Stopped JBoss services



Configured the build properties



Configured the application directory properties



Configured the Workplace properties



Set the Metadata Schema Name (*location of hivedata tables*)



Set the PM cell properties



Configured the data sources



Deployed edu.harvard.i2b2.workplace



Started JBoss services



Verified installation



Workplace Web Services are running



Able to log into the i2b2 Web Client and Workbench

Next Steps

Provided there are no issues with the installation of the Workplace cell, your **next step** is to proceed with installing the remaining cells. The remaining cells do not need to be installed in any particular order. The next chapter will guide you through the installation of the File Repository (FR) Cell.

Chapter 12. File Repository (FR) Cell Install

The File Repository (FR) Cell manages i2b2 files between cells and within i2b2 applications such as the i2b2 Workbench.

Note

Under most conditions users will use the REST / SOAP service calls to access files on the FRC. In the rare conditions where users will need to have more direct access, an administrator of the server will need to create an account on the server with the same username and password as the one in the Project Management (PM) cell. At this point the user can use the File Viewer in the workbench to

access the server with FTP, SFTP or a third-party client.

Chapter 12. Table of Contents

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- 12.4.1 Configure the FR Build Properties
- 12.4.2 Configure the FR Application Directory Properties
- 12.4.3 Configure the FR Properties

12.5 Deployment

12.6 Start Services

12.7 Update FR Cell Data in i2b2 Admin

12.8 Verify FR Installation

12.9 SFTP Setup * Optional *

12.10 Next Steps

12.1 Prerequisites

The following installations **must be completed** prior to beginning the process of installing the File Repository (FR) Cell.



Requirements Chapter



Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)



Installed Java, JBoss, Apache Ant and Apache Axis2



Downloaded the i2b2 Software



Data Installation Chapter



Created database user accounts for i2b2 schemas



Created all the data tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



Created the stored procedures for the Crcdata tables and the triggers for the Pmdata tables



Loaded data into all the tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



i2b2 Server-common Install Chapter



Extracted all the i2b2 source code to a directory of your choice (*YOUR_I2B2_SRC_DIR*)



Configured Server-common properties



Deployed edu.harvard.i2b2.server-common



Project Management (PM) Cell Install Chapter



Configured PM cell properties



Deployed edu.harvard.i2b2.pm



i2b2 Administration Module Install Chapter



Copied Admin files to your web server directory



Updated i2b2_config_data.js file with domain information and the location of the PM Cell.



Verified admin installation

The following installations are **not required** to occur before installing the File Repository (FR) Cell but **are recommended**.



i2b2 Web Client Install Chapter



i2b2 Web Client installed



Able to log into the i2b Web Client



i2b2 Workbench Install Chapter



i2b2 Workbench installed



Able to log into the i2b Workbench



Ontology Management (ONT) Cell Install Chapter



Configured Ontology cell properties



Deployed edu.harvard.i2b2.ontology



Updated Ontology cell data in Admin



Verified ontology installation



Data Repository (CRC) Cell Install Chapter



Configured both the CRC Loader and CRC property files



Deployed edu.harvard.i2b2.crc



Updated CRC cell data in Admin



Updated metadata key in the QT_BREAKDOWN_PATH table



Verified CRC installation



Workplace (WORK) Cell Install Chapter



Configured Workplace cell properties



Deployed edu.harvard.i2b2.workplace



Updated Workplace cell data in Admin



Verified workplace installation

12.2 File Repository Installation Overview

In this chapter we will be installing the File Repository (FR) Cell.

Order of Installation

The basic steps that will be taken during this installation are as follows:

- Step 1:** Stop services (JBoss)
- Step 2:** Edit File Repository configuration files
- Step 3:** Deploy the File Repository Cell
- Step 4:** Start services (JBoss)
- Step 5:** Update FRC Data in i2b2 Admin
- Step 6:** Verify installation

Important

The details of what is to be done for each step are defined in the different sections within this chapter. It is important to follow steps in the order they are defined and not to skip any of them unless otherwise noted.

12.2.1 Source Code and Directory Structure

Source Code for File Repository (FR) Cell

In the chapter titled *Install i2b2 Server-Common*, you extracted the files from the i2b2 Core Source Code zip file into a directory of your choosing (*YOUR_I2B2_SRC_DIR*). One of the files extracted was a folder called **edu.harvard.i2b2.fr** and it is in this folder where the files for the File Repository installation reside.

File Repository Directory Structure

In this step of the installation process we will be working with the **edu.harvard.i2b2.fr** directory. Within this directory are the files we will be editing

in order to build and deploy the File Repository Cell on your i2b2 Server. The files and their location within your working directory are as follows:

Main File Repository Directory: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.fr\

File Name	Description
build.properties	Contains properties needed during the building of the FR Cell.

Directory for FR Property Files: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.fr\etc\spring\

File Name	Description
fr_application_directory.properties	Define the location for your application properties directory.
edu.harvard.i2b2.fr.properties	Define the properties for communicating with the PM Cell.

12.3 Stop Services

Stop JBoss

In order to configure and deploy the File Repository Cell correctly on your i2b2 server it is important that JBoss is not running.

The process of stopping your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Stop JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Stop JBoss Windows Service**.

Stop JBoss Linux Service

The following steps will walk you through the process of stopping your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to stop JBoss.

Stop JBoss Command

```
/etc/init.d/jboss stop
```

3. The script to stop JBoss will run.
4. Provided there are no issues JBoss will no longer be running.

Stop JBoss Windows Service

The following steps will walk you through the process of stopping your JBoss server via a windows service.

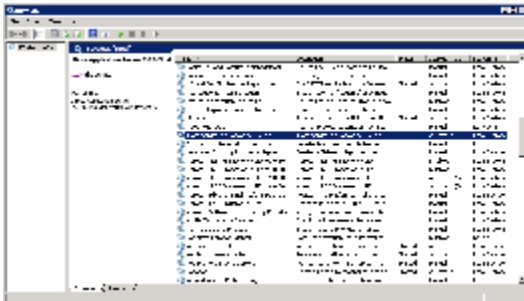
Note

These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss as a Windows Service* in the *Requirements Chapter*.

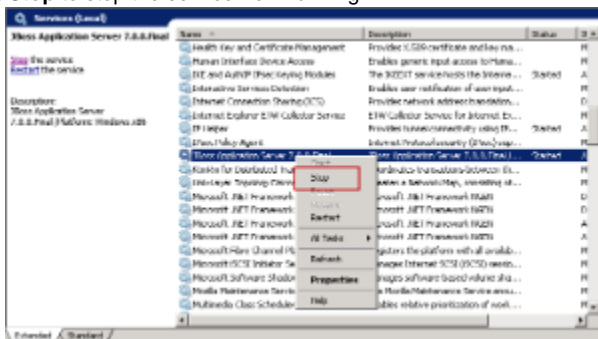
1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

Important

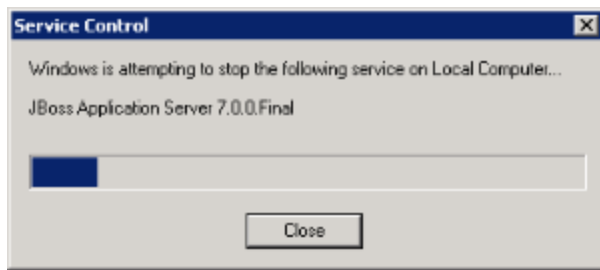
The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.



4. Using the mouse, *right click* on the name of the service to display the pop-up menu.
5. Select **Stop** to stop the service from running.



6. A window will open displaying the progress.



7. The progress window will close once the service has stopped running.

12.4 Configuration

Configure the File Repository Cell for Installation

As stated in the previous section, there are a couple of files in the **edu.harvard.i2b2.fr** directory that will need to be edited to reflect the appropriate configuration at your site. The following outlines the steps that need to be taken during the configuration stage of the installation.

- Step 1:** Change your working directory
- Step 2:** Configure the build properties
- Step 3:** Configure the FR Application Directory properties
- Step 4:** FR properties: Configure the Project Management Cell

Note

The configuration files you will be editing are delivered with examples. In some instances these files may contain multiple examples for the three different database management systems supported by the i2b2.

Assumptions

The steps in this section are based on the following assumptions

Linux: your user has the appropriate **administrative access** to the opt directory.

Windows: You are logged into the Windows Command Prompt as an **Administrator**.

If you do not have the appropriate access you will have problems running the scripts.

Step 1: Change working directory

The **first step** in the cell configuration process is to change your working directory to the location of your **edu.harvard.i2b2.fr** folder.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.fr
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: `CD /opt/i2b2/edu.harvard.i2b2.fr`

Windows Command: `CD C:\opt\i2b2\edu.harvard.i2b2.fr`

12.4.1 Configure the FR Build Properties

Step 2: Configure the build properties

The **second step** in the cell configuration process is to edit the **build.properties** file for edu.harvard.i2b2.fr. During this step you need to set the *jboss.home* and *axis2.war.name* properties for your environment.

Error rendering macro 'excerpt-include' : No link could be created for '5.4.1 Configure the PM Build Properties '.

12.4.2 Configure the FR Application Directory Properties

Step 3: Configure the Application Directory properties

The **second step** in the cell configuration process is to edit the **fr_application_directory.properties** file for edu.harvard.i2b2.ontology. During this step you need to specify a location for the application properties directory. This location can be anything you desire but it must be a directory path that the Windows or Linux user has been granted permission to access.

Steps to update *fr_application_directory.properties*

1. At the command prompt type the following:

Linux Command

```
open YOUR_I2B2_SRC_DIR/edu.harvard.i2b2.fr/etc/spring/fr_application_directory.properties
```

Windows Command

```
YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.fr\etc\spring\fr_application_directory.properties
```

EXAMPLES:

Linux Command: `open /opt/i2b2/edu.harvard.i2b2.fr/etc/spring/fr_application_directory.properties`

Windows Command: `C:\opt\i2b2\edu.harvard.i2b2.fr\etc\spring\fr_application_directory.properties`

2. The **fr_application_directory.properties** file will open. Set the following properties to reflect your environment:

Application properties for FR Cell

```
edu.harvard.i2b2.fr.applicationdir=/YOUR_JBOSS_HOME_DIR/standalone/configuration/frapp
```

3. Save the changes and close the file.

12.4.3 Configure the FR Properties

File Repository Properties Configuration

The **edu.harvard.i2b2.fr.properties** file contains a number of properties that need to be modified with the variables that are specific to your environment. The File Repository Cell needs these properties to deploy correctly and to set required parameters.

Step 4: PM Cell Properties

In order for the File Repository Cell to communication with the PM Cell the following properties need to be modified to reflect you environment.

1. At the command prompt type the following:

Linux Command

```
open YOUR_I2B2_SRC_DIR/edu.harvard.i2b2.fr/etc/spring/edu.harvard.i2b2.fr.properties
```

Windows Command

```
YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.fr\etc\spring\edu.harvard.i2b2.fr.properties
```

EXAMPLES:

Linux Command:

```
open /opt/i2b2/edu.harvard.i2b2.fr/etc/spring/edu.harvard.i2b2.fr.properties
```

Windows Command:

```
C:\opt\i2b2\edu.harvard.i2b2.fr\etc\spring\edu.harvard.i2b2.fr.properties
```

2. The **edu.harvard.i2b2.fr.properties** file will open.
3. Scroll to the section called **Project Management Cell**.
4. Edit the **edu.harvard.i2b2.fr.ws.pm.url** property to reflect the location of the PM cell in your environment.

Important

When you edit the **edu.harvard.i2b2.fr.ws.pm.url** property with the location of your PM Cell it is **extremely important** that you only edit the **hostname** (*localhost*) and the **port** (9090). The remainder of the URL is required as it is written and should not be changed.

Project Management Cell

```
edu.harvard.i2b2.fr.ws.pm.url=http://localhost:9090/i2b2/services/PMService/getServices
edu.harvard.i2b2.fr.ws.pm.webServiceMethod=REST
# Flag to bypass project management cell
edu.harvard.i2b2.fr.ws.pm.bypass=false
edu.harvard.i2b2.fr.ws.pm.bypass.role=ADMIN
edu.harvard.i2b2.fr.ws.pm.bypass.project=Demo
```

5. Save your changes and close the file.

12.5 Deployment

The deployment process at this stage of the installation will install the **File Repository (FR) Cell** on the *JBoss Web Server*.

Deploy edu.harvard.i2b2.fr

The following steps will walk you through the deployment process. The commands on a Windows Server may differ slightly on a Linux Machine and will be noted when appropriate.

Step 1: Change working directory

The **first step** in the deployment process is to change your working directory to the location of your **edu.harvard.i2b2.fr**.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.fr
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: CD /opt/i2b2/edu.harvard.i2b2.fr

Windows Command: CD C:\opt\i2b2\edu.harvard.i2b2.fr

Step 2: Deploy edu.harvard.i2b2.fr

The **second** and **final step** in the deployment process is to run the Ant script to deploy edu.harvard.i2b2.server.fr.

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f master_build.xml clean build-all deploy
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f master_build.xml clean build-all deploy
```

Note

If the commands **ant** or **%ANT_HOME%** do not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace **%ANT_HOME%** with the full path to your Ant directory.

Provided there were no problems running the script you will see **Build Successful** when the script finishes and the edu.harvard.i2b2.fr has been deployed.

12.6 Start Services

Start JBoss

Once the cell has been deployed the JBoss Server has to be **running** in order to use the i2b2. The process of starting your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Start JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Start JBoss Windows Service**.

Start JBoss Linux Service

The following steps will walk you through the process of starting your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to start JBoss.

Stop JBoss Command

```
/etc/init.d/jboss start
```

3. The script to start JBoss will run.

Start JBoss Windows Service

The following steps will walk you through the process of starting your JBoss server via a windows service.

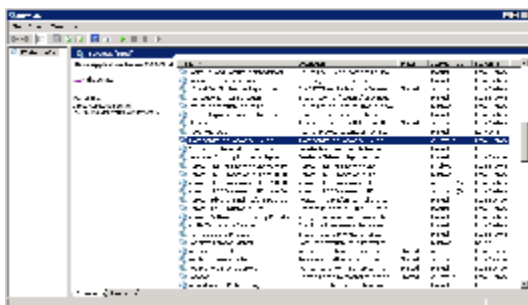
Note

These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss Web Server as a Windows Service* in the *Requirements Chapter*.

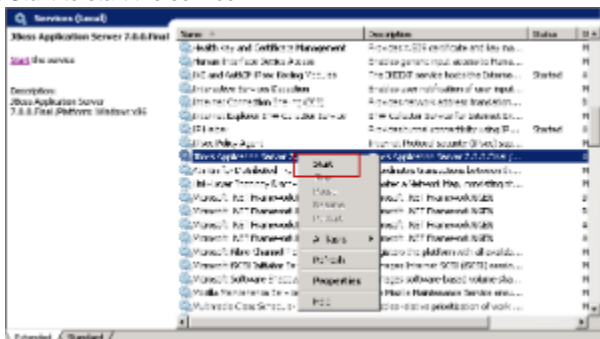
1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

Important

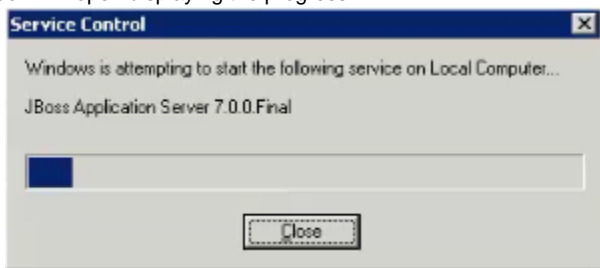
The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.



4. Using the mouse, *right click* on the name of the service to display the pop-up menu.
5. Select **Start** to start the service.



6. A window will open displaying the progress.



7. The progress window will close once the service has started running.

12.7 Update FR Cell Data in i2b2 Admin

Now that you have installed the File Repository cell the next step is to update the cell data in the i2b2 Administration Module. The following steps will guide you through the process of editing existing cell data.

Important

In the *Data Installation* chapter, the cell data for the required i2b2 core cells was loaded into the cell data table when installing the Pmdata.

By default the cells are configured to work with the i2b2 demo database. This means *localhost* and port *9090* are part of the cell's address.

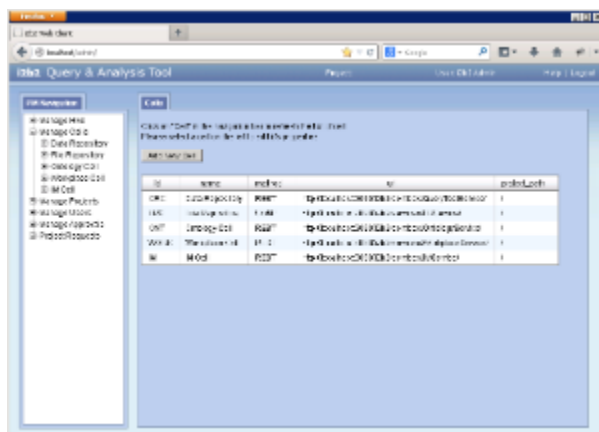
- You will need to edit the cells data if you changed any of default settings.
- You can skip this step if you did not change the default settings.

To be safe you may want to review the default settings at least once to determine if anything is different in your environment.

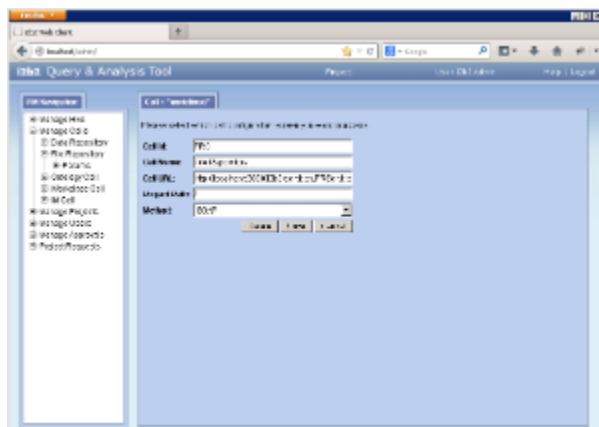
Edit Existing Cell Data

1. Log into the i2b2 Administration Module.
`http://localhost/admin`

2. Click on **Manage Cells** located in the navigation panel on the left.
3. The *Manage Cells* page will display in the panel on the right.



4. In the left navigation panel, click on **File Repository** to display the edit page.



5. Modify the **Cell URL** to the IP or domain name that the FR cell is located.
6. Click on **Save** to file the changes in the table.

The i2b2 Web Client and Workbench will now be able to connect to the FR cell. For additional setup information regarding projects, users, parameters, etc. please see the chapter titled *Initial Setup*

12.8 Verify FR Installation

Although this step of the installation is optional it is highly recommended that you do a "Sanity Check" to make sure the IM Cell was installed correctly before installing another cell.

Verify Web Services

At this point in the installation process you want to do a quick check to make sure the Web Service for the IM Cell is running.

Steps to verify web services

1. Open your web browser and enter the following URL:
[_http://yourHost:9090/i2b2/services/listServices_](http://yourHost:9090/i2b2/services/listServices_)
2. Verify the **FRService** is listed as active.

12.9 SFTP Setup * Optional *

Setting up Secure File Transfer Protocol (SFTP)

By default, the File Repository Cell uses SOAP to transfer files in i2b2. If you prefer your admin user transfer files directly via SFTP you will need to take the following steps.

- Step 1:** Enter cell parameters in i2b2 Administration Module
Step 2: Create an FRC directory

Step 1: Enter Cell Parameters in i2b2 Admin

The **first step** in setting up the File Repository to use SFTP is to enter a few parameters on the File Repository cell. These **cell parameters** will define the Method, Host and Port to be used when transferring files.

Parameter Name	Values	Required	Description
FRMethod	SFTP or local	Yes	Defines the method to be used when retrieving files
FRHost	<i>Name of your JBoss Server</i>	Yes	The name of the machine where JBoss is installed
FRPort	<i>Example: 22</i>	No	The port to be used when retrieving files

Steps to Add Parameters to File Repository Cell

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Cells** to display a list of cells.



2. Expand the **name of the cell** you want to add a parameter to.
3. Click on the **Params** option that displays under the cell's name.
4. The **Parameters List** page will display on the right side of the window pane.
5. Click on **Add New Parameter**. The *Enter Parameter* page will display.

A screenshot of the 'Parameter List' form. It contains three input fields: 'Parameter Name', 'Parameter Value', and 'Parameter Data Type'. The 'Parameter Data Type' field has a dropdown menu with 'Text' selected. At the bottom of the form are three buttons: 'Delete', 'Save', and 'Cancel'. Above the input fields, there is a small instruction: 'Click on "Parameter" in the navigation bar to refresh the list of parameters. Please select a parameter on the left to edit its properties.'

6. Enter the following parameter to define the **method of transfer**.
Parameter Name: FRMethod
Parameter Value: SFTP **or** local
Parameter Data Type: Text

Important

If the CRC is on the same JBoss as the File Repository then you will want to set the FRMethod to **local**. This will prevent the CRC Loader from accessing the File Repository via a web service call, which will result in faster responses.

7. Click on **Save** to save the new parameter.
8. The *Parameters List* page will display with the new parameter.

Note

The Navigation panel will not automatically refresh to display the new parameter. If you wish to update the list in the Navigation panel you can click on *Params* and it will refresh the hierarchical tree.

9. In the *Parameters List* page click on **Add New Parameter** to enter another parameter.
10. Enter the following parameter for the ***name of the machine*** where your JBoss resides.

Parameter Name: FRHost
Parameter Value: *Machine_Name_Where_JBoss_Resides*
Parameter Data Type: Text

11. Click on **Save** to save the new parameter.
12. In the *Parameters List* page click on **Add New Parameter** to enter another parameter.
13. Enter the following parameter for the ***port*** to be used by the FRC to connect. *This parameter is optional. The value is usually set to 22.*

Parameter Name: FRPort
Parameter Value: 22
Parameter Data Type: Text

14. Click on **Save** to save the new parameter.
15. The *Parameters List* page will display all the new parameters you have entered.
16. In the Navigation panel click on **Params** to refresh the hierarchical tree and display the new parameters.

Step 2: Create an FRC directory

The **second** and **last step** in setting up File Repository to use SFTP is to create a directory on the server to host the files. This new directory will be called **FRC** and will reside on the same server as your JBoss installation.

Location of New "FRC" Directory

Linux Server:

- The new directory will reside in the /opt/ directory.
Example: /opt/FRC/

Windows Server:

- The FRC directory needs to reside in a directory called **opt**. Since Windows does not typically come installed with an **opt** directory you will need to create one in the root directory.
- Once you have an opt directory you can create the new FRC directory within it.
Example: C:\opt\FRC\

Important

When creating the new directory you need to log onto the server with the same user that will be running JBoss.

12.10 Next Steps

Steps completed in this chapter

The following steps were completed during this chapter on installing the FR Cell.



Install File Repository (FR) Cell Chapter



Stopped JBoss services



Configured the build properties



Configured the application directory properties



Configured the FR Properties: Defined the PM cell



Deployed edu.harvard.i2b2.fr



Started JBoss services



Verified installation



File Repository Web Services are running

Next Steps

Provided there are no issues with the installation of the FR cell, your **next step** is to proceed with installing the remaining cell. The next chapter will guide you through the installation of the Identity Management (IM) Cell.

Chapter 13. Identity Management (IM) Cell Install

The Identity Management (IM) Cell manages information related to the setup, maintenance and security of patients from heterogeneous sources. This data may be encrypted and is restricted by project and user.

Note

The installation of this cell is optional. If you do not wish to install it you can proceed to the next chapter on *Initial Setup*.

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 - 13.4.3.4 Other EMPI Service Properties
- 13.4.4 Data Source Configuration

13.5 Deployment

13.6 Start Services

13.7 Update IM Cell Data in i2b2 Admin

13.8 Verify IM Installation

13.9 Next Steps

13.1 Prerequisites

The following installations **must be completed** prior to beginning the process of installing the Identity Management (IM) Cell.



Requirements Chapter



Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)



Installed Java, JBoss, Apache Ant and Apache Axis2



Downloaded the i2b2 Software



Data Installation Chapter



Created database user accounts for i2b2 schemas



Created all the data tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



Created the stored procedures for the Crcdata tables and the triggers for the Pmdata tables



Loaded data into all the tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



i2b2 Server-common Install Chapter



Extracted all the i2b2 source code to a directory of your choice (*YOUR_I2B2_SRC_DIR*)



Configured Server-common properties



Deployed edu.harvard.i2b2.server-common



Project Management (PM) Cell Install Chapter



Configured PM cell properties



Deployed edu.harvard.i2b2.pm



i2b2 Administration Module Install Chapter



Copied Admin files to your web server directory



Updated i2b2_config_data.js file with domain information and the location of the PM Cell.



Verified admin installation

The following installations are **not required** to occur before installing the Identity Management (IM) Cell but **are recommended**.



i2b2 Web Client Install Chapter



i2b2 Web Client installed



Able to log into the i2b Web Client



i2b2 Workbench Install Chapter



i2b2 Workbench installed



Able to log into the i2b Workbench



Ontology Management (ONT) Cell Install Chapter



Configured Ontology cell properties



Deployed edu.harvard.i2b2.ontology



Updated Ontology cell data in Admin



Verified ontology installation



Data Repository (CRC) Cell Install Chapter



Configured both the CRC Loader and CRC property files



Deployed edu.harvard.i2b2.crc



Updated CRC cell data in Admin



Updated metadata key in the QT_BREAKDOWN_PATH table



Verified CRC installation



Workplace (WORK) Cell Install Chapter



Configured Workplace cell properties



Deployed edu.harvard.i2b2.workplace



Updated Workplace cell data in Admin



Verified workplace installation



File Repository (FR) Cell Install Chapter



Configured File Repository cell properties



Deployed edu.harvard.i2b2.fr



Updated file repository cell data in Admin



Verified file repository installation

13.2 Identity Management Installation Overview

In this chapter we will be installing the Identity Management (IM) Cell.

Order of Installation

The basic steps that will be taken during this installation are as follows:

- Step 1:** Stop services (JBoss)
- Step 2:** Edit IM configuration files
- Step 3:** Deploy the IM Cell
- Step 4:** Start services (JBoss)
- Step 5:** Update IM Data in i2b2 Admin
- Step 6:** Verify installation

Important

The details of what is to be done for each step are defined in the different sections within this chapter. It is important to follow steps in the order they are defined and not to skip any of them unless otherwise noted.

13.2.1 Source Code and Directory Structure

Source Code for Identity Management (IM) Cell

In the chapter titled *Install i2b2 Server-Common*, you extracted the files from the i2b2 Core Source Code zip file into a directory of your choosing (*YOUR_I2B2_SRC_DIR*). One of the files extracted was a folder called **edu.harvard.i2b2.im** and it is in this folder where the files for the IM installation reside.

Identity Management Directory Structure

In this step of the installation process we will be working with the **edu.harvard.i2b2.im** directory. Within this directory are the files we will be editing in order to build and deploy the Identity Management Cell on your i2b2 Server. The files and their location within your working directory are as follows:

Main IM Directory: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.im\

File Name	Description
build.properties	Contains properties needed during the building of the IM Cell.

Directory for IM Property Files: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.im\etc\spring\

File Name	Description
im_application_directory.properties	Define the location for your application properties directory.
im.properties	Define the properties for the PM Cell, the schema name for the hivedata and the properties for a third party EMPI system.

Directory for Data Source Configuration: *YOUR_I2B2_SRC_DIR*\i2b2\edu.harvard.i2b2.im\etc\jboss\

File Name	Description
im-ds.xml	Configure the JBoss Data source for the IM cell.

13.3 Stop Services

Stop JBoss

In order to configure and deploy the Identity Management Cell correctly on your i2b2 server it is important that JBoss is not running.

The process of stopping your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Stop JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Stop JBoss Windows Service**.

Stop JBoss Linux Service

The following steps will walk you through the process of stopping your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to stop JBoss.

Stop JBoss Command

```
/etc/init.d/jboss stop
```

3. The script to stop JBoss will run.
4. Provided there are no issues JBoss will no longer be running.

Stop JBoss Windows Service

The following steps will walk you through the process of stopping your JBoss server via a windows service.

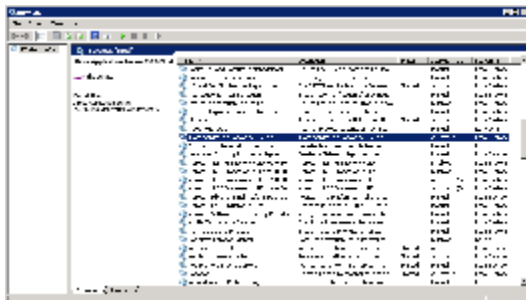
Note

These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss as a Windows Service* in the *Requirements Chapter*.

1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

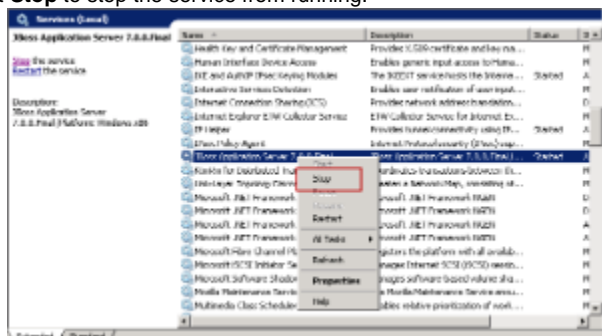
Important

The actual name that appears in the list of services depends on what you entered in the *service.bat* file for the **SVCDISP** setting.

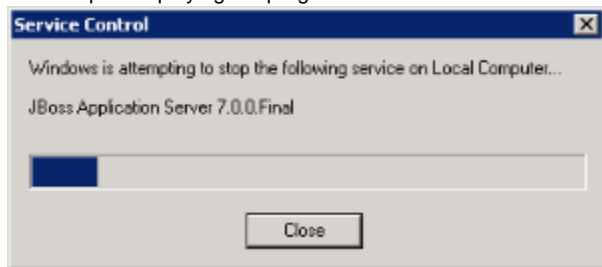


4. Using the mouse, *right click* on the name of the service to display the pop-up menu.

5. Select **Stop** to stop the service from running.



6. A window will open displaying the progress.



7. The progress window will close once the service has stopped running.

13.4 Configuration

Configure the Identity Management Cell for Installation

As stated in the previous section, there are a number of files in the **edu.harvard.i2b2.im** directory that will need to be edited to reflect the appropriate configuration at your site. The following outlines the steps that need to be taken during the configuration stage of the installation.

- Step 1:** Change working directory
- Step 2:** Configure the build properties
- Step 3:** Configure the IM Application Directory properties
- Step 4:** IM properties: Set schema name for Hivedata tables
- Step 5:** IM properties: Configure PM Cell Properties
- Step 6:** IM properties: Check Patient in Project
- Step 7:** IM properties: Configure third party EMPI services *Optional*
- Step 8:** Configure the data sources

Note

The configuration files you will be editing are delivered with examples. In some instances these files may contain multiple examples for the three different database management systems supported by the i2b2.

Assumptions

The steps in this section are based on the following assumptions

Linux: your user has the appropriate **administrative access** to the opt directory.

Windows: You are logged into the Windows Command Prompt as an **Administrator**.

If you do not have the appropriate access you will have problems running the scripts.

Step 1: Change working directory

The **first step** in the cell configuration process is to change your working directory to the location of your **edu.harvard.i2b2.im** folder.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\i2b2\edu.harvard.i2b2.im
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path*: use a forward slash.
- *Windows Path*: use a backward slash.

EXAMPLES:

Linux Command: CD /opt/i2b2/edu.harvard.i2b2.im

Windows Command: CD C:\opt\i2b2\edu.harvard.i2b2.im

13.4.1 Configure the IM Build Properties

Step 2: Configure the build properties

The **second step** in the cell configuration process is to edit the **build.properties** file for edu.harvard.i2b2.im. During this step you need to set the *jboss.home* and *axis2.war.name* properties for your environment.

Error rendering macro 'excerpt-include' : No link could be created for '5.4.1 Configure the PM Build Properties '.

13.4.2 Configure the IM Application Directory Properties

Step 3: Configure the Application Directory properties

The **third step** in the cell configuration process is to edit the **im_application_directory.properties** file for edu.harvard.i2b2.im. During this step you need to specify a location for the application properties directory. This location can be anything you desire but it must be a directory path that the Windows or Linux user has been granted permission to access.

Steps to update *im_application_directory.properties*

1. At the command prompt type the following:

Linux Command

```
open YOUR_I2B2_SRC_DIR/edu.harvard.i2b2.im/etc/spring/im_application_directory.properties
```

Windows Command

```
YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.im\etc\spring\im_application_directory.properties
```

EXAMPLES:

Linux Command: open /opt/i2b2/edu.harvard.i2b2.im/etc/spring/im_application_directory.properties

Windows Command: C:\opt\i2b2\edu.harvard.i2b2.im\etc\spring\im_application_directory.properties

2. The **im_application_directory.properties** file will open. Set the following properties to reflect your environment:

Application properties for IM Cell

```
edu.harvard.i2b2.im.applicationdir=/YOUR\_JBOSS\_HOME\_DIR/standalone/configuration/imapp
```

3. Save the changes and close the file.

13.4.3 Configure the IM Properties

Identity Management Properties Configuration

The **im.properties** file contains a number of properties that need to be modified with the variables that are specific to your environment. The Identity Management cell needs these properties to deploy correctly and to set required parameters.

The properties within the im.properties file have been grouped together based on their function. For instance, the group of PM Cell Properties addresses the communication between the IM and PM Cells. The following list shows the groups we will be editing during this step of the installation.

- Group 1:** Bootstrap schema name
- Group 2:** Project Management Cell Properties
- Group 3:** Check Patient in Project
- Group 4:** Properties for third party EMPI services

Open im.properties file

The following steps outline how to open the im.properties file. This file will remain open as you move through the next few sections editing all the required properties.

1. At the command prompt type the following:

Linux Command

```
open YOUR_I2B2_SRC_DIR/edu.harvard.i2b2.im/etc/spring/im.properties
```

Windows Command

```
YOUR_I2B2_SRC_DIR\edu.harvard.i2b2.im\etc\spring\im.properties
```

EXAMPLES:

Linux Command: open /opt/i2b2/edu.harvard.i2b2.im/etc/spring/im.properties
Windows Command: C:\opt\i2b2\edu.harvard.i2b2.im\etc\spring\im.properties

2. The **im.properties** file will open.
3. Once the file opens proceed to the next section titled *Set Schema Name*.

13.4.3.1 Set Schema Name

Step 4: Set schema name to the location of the hivedata tables

During the hivedata installation one of the tables created was the IM_DB_LOOKUP table. The IM needs to communicate with this table and in order to do this we need to tell it where to find the Hivedata tables. During this step we will set the database schema name for the hivedata.

Prerequisite

You need to know the location of your Hivedata tables. These are owned by the PM cell.

Steps to set the location of the IM_DB_LOOKUP table

These steps include example configurations for Oracle, PostgreSQL and SQL Server.

1. In the **im.properties** file scroll to the section called **Bootstrap schema name**.
2. Set the **imschema** to the name of the database / schema where your hivedata tables are located.

Bootstrap schema name
Oracle Configuration im.bootstrapdb.imschema=i2b2hive
PostgreSQL Configuration im.bootstrapdb.imschema=i2b2hive
SQL Server Configuration im.bootstrapdb.imschema=i2b2hive.dbo

3. Save your changes and close the file.

13.4.3.2 Project Management Cell Properties

Step 5: PM Cell Properties

In order for the Identity Management Cell to communication with the PM Cell the following properties need to be modified to reflect you environment.

1. In the **im.properties** file scroll to the section called **Project Management Cell**.
2. Edit the **im.ws.pm.url** property to reflect the location of the PM cell in your environment.

Important

When you edit the **im.ws.pm.url** property with the location of your PM Cell it is **extremely important** that you only edit the **hostname** (*localhost*) and the **port** (*9090*). The remainder of the URL is required as it is written and should not be changed.

Project Management Cell

```
im.ws.pm.url=http://localhost:9090/i2b2/services/PMService/getServices
im.ws.pm.webServiceMethod=REST
# Set this flag to bypass project management cell
im.ws.pm.bypass=false
im.ws.pm.bypass.role=ADMIN
im.ws.pm.bypass.project=Demo
```

3. Save your changes but do not close the file. You will be continuing to edit the file in the next section.

13.4.3.3 Patient in Project Property

Step 6: Check Patient in Project

When a *get* request is sent to the IM cell it has the capability to verify whether or not a patient is part of the project requesting the patient data. By default the property is set to **true**, if you do not wish to check the project then you can set it to **false**.

Note

In addition to setting this property to true, the IM_PROJECT_PATIENTS table has to be populated with the appropriate data in order to check if the patient is in a project. For more information on this table please see the IM Design Document.

1. In the **im.properties** file scroll to the section called **Patient in Project**.
2. Edit the **im.checkPatientInProject** to either *true* or *false*.

EMPI Service

```
im.checkPatientInProject=true
```

3. Save your changes but do not close the file. You will be continuing to edit the file in the next section.

13.4.3.4 Other EMPI Service Properties

Step 7: Third Party EMPI Service Properties *Optional*

The Identity Management (IM) Cell can be configured to work with a third party EMPI service such as OpenEMPI. To do this you will need to create the service to the other system and then update the **im.properties** file with the appropriate information.

Warning

You will need to create a service for interfacing the IM cell with the other EMPI system. For information on how to create a service please refer to the **architecture documentation**.

1. In the **im.properties** file scroll to the section called **EMPI Service**.
2. Edit the **im.empi.service** to the name of the interface.
3. Add the service classname and any parameters that are needed.

Example: The following is an example of how you might set the IM cell up to work with OpenEMPI

EMPI Service
<pre>im.empi.service=OpenEMPI im.empi.openempi.url=http://localhost:8080/openempi-admin/openempi-ws-rest im.empi.openempi.username=admin im.empi.openempi.password=admin</pre>

4. Save the changes and close the file.

13.4.4 Data Source Configuration

Step 8: Configure the data sources for the IM Cell

The IM cell needs to communicate with your **i2b2 database** and in order to do this it needs to know where the tables for the **imdata** and **hivedata** reside. Therefore the **eighth** and **final step** in the cell configuration process is to configure the data sources for the IM Cell. This information is configured in the **im-ds.xml** file.

Things to keep in mind when configuring your datasources:

- The **imdata** and **hivedata** tables were created during the chapter on Data Installation.
- The **IMBootStrapDS** points to the data source for your WORK_DB_LOOKUP table which is a hivedata table.
 - The **<user-name>** and **<password>** need to match the database user you set up for your hivedata. In the i2b2 demo database this is *i2b2hive* and *demouser*.
- The **IMDemoDS** points to the data source for your imdata tables.
 - The **<user-name>** and **<password>** need to match the database user you set up for your imdata. In the i2b2 demo database this is *i2b2imdata* and *demouser*.
- The **<connection_url>** needs to have the following:
 - The correct JDBC information for your type of database.
 - The correct location of the database containing your imdata or hivedata tables. *(These may or may not reside in the same location)*
- Both the **<driver-class>** and **<driver>** need to accurately reflect the type of database you are connecting to.

Steps to configure data sources

The following steps define how to configure your data sources for the IM Cell. These steps include example configurations for Oracle, PostgreSQL

and SQL Server.

1. The **im-ds.xml** file is located in the following directory:
YOUR_I2B2_SRC_DIRedu.harvard.i2b2.im\etc\jboss
2. Open the im-ds.xml file to configure your data sources. *(see examples shown below)*

Oracle Database Configuration

```
<datasource jta="false" jndi-name="java:/IMBootStrapDS"
  pool-name="IMBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:xe</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>>false</validate-on-match>
    <background-validation>>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/IMDemoDS"
  pool-name="IMDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:XE</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2imdata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>>false</validate-on-match>
    <background-validation>>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>>false</share-prepared-statements>
  </statement>
</datasource>
```

PostgreSQL Database Configuration

```

<datasource jta="false" jndi-name="java:/IMBootStrapDS"
  pool-name="IMBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:postgresql://localhost:5432/i2b2</connection-url>
  <driver-class>org.postgresql.Driver</driver-class>
  <driver>postgresql-9.2-1002.jdbc4.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/IMDemoDS"
  pool-name="IMDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc:postgresql://localhost:5432/i2b2</connection-url>
  <driver-class>org.postgresql.Driver</driver-class>
  <driver>postgresql-9.2-1002.jdbc4.jar</driver>
  <security>
    <user-name>i2b2imdata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```

```

<datasource jta="false" jndi-name="java:/IMBootStrapDS"
  pool-name="IMBootStrapDS" enabled="true" use-ccm="false">
  <connection-url>jdbc: sqlserver://localhost:1433</connection-url>
  <driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>
  <driver>sqljdbc4.jar</driver>
  <security>
    <user-name>i2b2hive</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <valid-connection-checker
class-name="org.jboss.jca.adapters.jdbc.extensions.mssql.MSSQLValidConnectionChecker">
  </valid-connection-checker>
    <validate-on-match>false</validate-on-match>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
<datasource jta="false" jndi-name="java:/IMDemoDS"
  pool-name="IMDemoDS" enabled="true" use-ccm="false">
  <connection-url>jdbc: sqlserver://localhost:1433</connection-url>
  <driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>
  <driver>sqljdbc4.jar</driver>
  <security>
    <user-name>i2b2imdata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <valid-connection-checker
class-name="org.jboss.jca.adapters.jdbc.extensions.mssql.MSSQLValidConnectionChecker">
  </valid-connection-checker>
    <validate-on-match>false</validate-on-match>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>

```

3. If your environment has multiple projects pointing to different data sources then copy the **<datasource>** section for each project data source.
4. Update the **jndi-name** and **pool-name** to reflect the name of the second project .
Example: A second project called Demo2 would have the following entry:

Second Data Source Configuration

```
<datasource jta="false" jndi-name="java:/IMDemo2DS"
  pool-name="IMDemo2DS" enabled="true" use-ccm="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:XE</connection-url>
  <driver-class>oracle.jdbc.OracleDriver</driver-class>
  <driver>ojdbc6.jar</driver>
  <security>
    <user-name>i2b2imdata</user-name>
    <password>demouser</password>
  </security>
  <validation>
    <validate-on-match>false</validate-on-match>
    <background-validation>false</background-validation>
  </validation>
  <statement>
    <share-prepared-statements>false</share-prepared-statements>
  </statement>
</datasource>
```

Note

The above example is for an Oracle database. If your database is SQL Server or PostgreSQL then you will need to copy the <datasource> section for your type database connection. Do not use this one as it will not work.

5. Save the changes and close the file.

13.5 Deployment

The deployment process at this stage of the installation will install the **Identity Management (IM) Cell** on the *JBoss Web Server*.

Deploy edu.harvard.i2b2.im

The following steps will walk you through the deployment process. The commands on a Windows Server may differ slightly on a Linux Machine and will be noted when appropriate.

Step 1: Change working directory

The **first step** in the deployment process is to change your working directory to the location of your **edu.harvard.i2b2.im**.

Change Directory Command

```
CD YOUR_I2B2_SRC_DIR\i2b2\edu.harvard.i2b2.im
```

Important

The change directory command shown above is written for Windows. The command itself is the same for both Linux and Windows with the only exceptions being the slashes in the path name and Linux does not include the "drive".

- *Linux Path:* use a forward slash.
- *Windows Path:* use a backward slash.

EXAMPLES:

Linux Command: `CD /opt/i2b2/edu.harvard.i2b2.im`

Windows Command: `CD C:\opt\i2b2\edu.harvard.i2b2.im`

Step 2: Deploy edu.harvard.i2b2.im

The **second** and **final step** in the deployment process is to run the Ant script to deploy edu.harvard.i2b2.server.im.

Select the command line that is appropriate for your environment.

Linux Run Command

```
ant -f master_build.xml clean build-all deploy
```

Windows Run Command

```
%ANT_HOME%\bin\ant.bat -f master_build.xml clean build-all deploy
```

Note

If the commands **ant** or **%ANT_HOME%** do not work it may be because you did not set your environment variables as suggested in the Requirements Chapter. If you do not wish to set this variable then you will need to replace **%ANT_HOME%** with the full path to your Ant directory.

Provided there were no problems running the script you will see **Build Successful** when the script finishes and the edu.harvard.i2b2.im has been deployed.

13.6 Start Services

Start JBoss

Once the cell has been deployed the JBoss Server has to be **running** in order to use the i2b2. The process of starting your JBoss Server depends on your environment and the appropriate steps have been outlined in one of the following sections.

- If your JBoss is running as a **Linux Service** please proceed to the section on this page titled **Start JBoss Linux Service**.
- If your JBoss is running as a **Windows Service** please proceed to the section on this page titled **Start JBoss Windows Service**.

Start JBoss Linux Service

The following steps will walk you through the process of starting your JBoss server via a Linux service.

Note

These steps are written as if your JBoss Server is running as a Linux service. If you have not setup your JBoss to run as a Linux service and would like to do so please see *Run JBoss as a Linux Service* in the *Requirements Chapter*.

1. Open the terminal on your server.
2. Enter the following command to start JBoss.

Stop JBoss Command

```
/etc/init.d/jboss start
```

3. The script to start JBoss will run.

Start JBoss Windows Service

The following steps will walk you through the process of starting your JBoss server via a windows service.

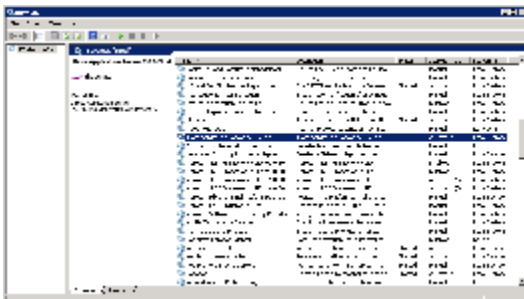
Note

These steps are written as if your JBoss Server is running as a Windows service. If you have not setup your JBoss to run as a Windows service and would like to do so please see *Run JBoss Web Server as a Windows Service* in the *Requirements Chapter*.

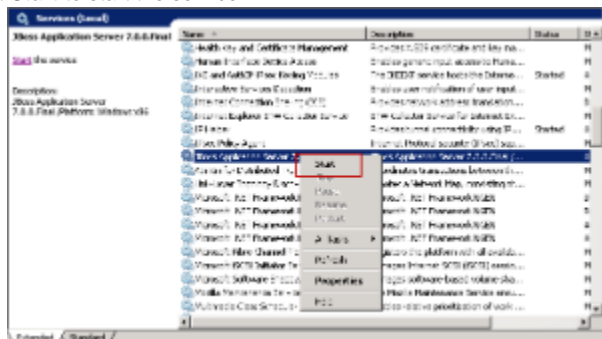
1. Go to your **Administrative Tools** directory
 - a. Click on **Start** and select **Control Panel**.
 - b. In the Control Panel click on **System and Security**.
 - c. Click on **Administrative Tools**
2. Double click on **Services** to display a list of local services installed on your server.
3. Scroll to the service called *JBoss Application Server 7.0.0.Final*.

Important

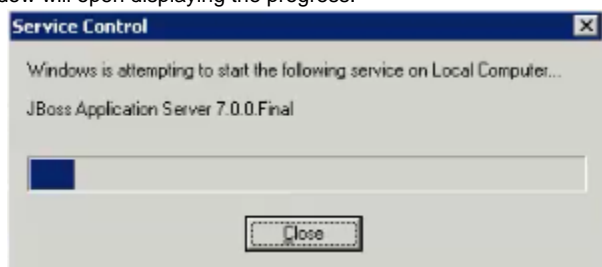
The actual name that appears in the list of services depends on what you entered in the `service.bat` file for the **SVCDISP** setting.



- Using the mouse, *right click* on the name of the service to display the pop-up menu.
- Select **Start** to start the service.



- A window will open displaying the progress.



- The progress window will close once the service has started running.

13.7 Update IM Cell Data in i2b2 Admin

Now that you have installed the Identity Management cell the next step is to update the cell data in the i2b2 Administration Module. The following steps will guide you through the process of editing existing cell data.

Important

In the *Data Installation* chapter, the cell data for the required i2b2 core cells was loaded into the cell data table when installing the Pmdata.

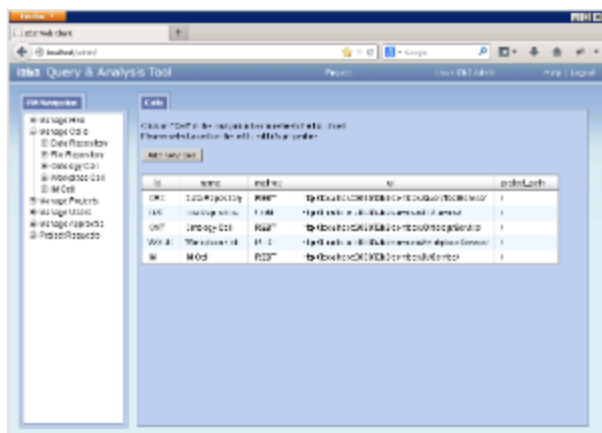
By default the cells are configured to work with the i2b2 demo database. This means *localhost* and port *9090* are part of the cell's address.

- You will need to edit the cells data if you changed any of default settings.
- You can skip this step if you did not change the default settings.

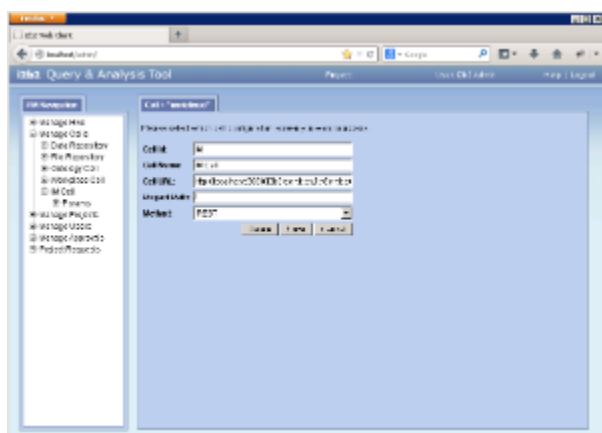
To be safe you may want to review the default settings at least once to determine if anything is different in your environment.

Edit Existing Cell Data

- Log into the i2b2 Administration Module.
`http://localhost/admin`
- Click on **Manage Cells** located in the navigation panel on the left.
- The *Manage Cells* page will display in the panel on the right.



4. In the left navigation panel, click on **IM Cell** to display the edit page.



5. Modify the **Cell URL** to the IP or domain name that the IM cell is located.
6. Click on **Save** to file the changes in the table.

The i2b2 Web Client and Workbench will now be able to connect to the IM cell. For additional setup information regarding projects, users, parameters, etc. please see the chapter titled *Initial Setup*

13.8 Verify IM Installation

Although this step of the installation is optional it is highly recommended that you do a "Sanity Check" to make sure the IM Cell was installed correctly before installing another cell.

Verify Web Services

At this point in the installation process you want to do a quick check to make sure the Web Service for the IM Cell is running.

Steps to verify web services

1. Open your web browser and enter the following URL:
[_http://yourHost:9090/i2b2/services/listServices_](http://yourHost:9090/i2b2/services/listServices_)

2. Verify the **IMService** is listed as active.

13.9 Next Steps

Steps completed in this chapter

The following steps were completed during this chapter on installing the IM Cell.



Install Identity Management (IM) Cell Chapter



Stopped JBoss services



Configured the build properties



Configured the application directory properties



Configured the IM properties



Set the Schema Name (*location of hivedata tables*)



Set the PM cell properties



Set the properties for a third party EMPI service *Optional*



Configured the data sources



Deployed edu.harvard.i2b2.im



Started JBoss services



Verified installation



IM Web Services are running

Next Steps

Congratulations! You have finished installing all the cells that make up the i2b2 Hive as well as installed the i2b2 Administration Module, Web Client and Workbench. Your **next step** is to take a look at the next chapter on Initial Setup. This chapter will guide you through the process of setting up projects and users in the i2b2 Admin as well as how to arrange the desktop of the i2b2 Workbench.

Chapter 14. Initial Setup of i2b2 in Admin

Now that you have finished installing the i2b2 cells and clients the next step is to setup your projects and users in the i2b2 Administration Module. This chapter will contain various sections on how to save data and parameters for the hive, projects and users. There is also a section on the different Authentication Methods supported by the i2b2.

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14.9 Next Steps

14.1 Prerequisites

The following installations must be completed prior to setting up your i2b2 environment in the i2b2 Administration module.



Requirements Chapter



Installed a Database Management System (*Oracle, PostgreSQL or SQL Server*)



Installed Java, JBoss, Apache Ant and Apache Axis2



Downloaded the i2b2 Software



Data Installation Chapter



Created database user accounts for i2b2 schemas



Created all the data tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



Created the stored procedures for the Crcdata tables and the triggers for the Pmdata tables



Loaded data into all the tables (*Crcdata, Hivedata, Imdata, Metadata, Pmdata and Workdata*)



i2b2 Server-common Install Chapter



Extracted all the i2b2 source code to a directory a directory of your choice (*YOUR_I2B2_SRC_DIR*)



Configured Server-common properties



Deployed edu.harvard.i2b2.server-common



Project Management (PM) Cell Install Chapter



Configured PM cell properties



Deployed edu.harvard.i2b2.pm



i2b2 Administration Module Install Chapter



Copied Admin files to your web server directory



Updated i2b2_config_data.js file with domain information and the location of the PM Cell.



Verified admin installation



i2b2 Web Client Install Chapter



i2b2 Web Client installed



Able to log into the i2b Web Client



i2b2 Workbench Install Chapter



i2b2 Workbench installed



Able to log into the i2b Workbench



Ontology Management (ONT) Cell Install Chapter



Configured Ontology cell properties



Deployed edu.harvard.i2b2.ontology



Updated Ontology cell data in Admin



Verified ontology installation



Data Repository (CRC) Cell Install Chapter



Configured both the CRC Loader and CRC property files



Deployed edu.harvard.i2b2.crc



Updated CRC cell data in Admin



Updated metadata key in the QT_BREAKDOWN_PATH table



Verified CRC installation



Workplace (WORK) Cell Install Chapter



Configured Workplace cell properties



Deployed edu.harvard.i2b2.workplace



Updated Workplace cell data in Admin



Verified workplace installation



File Repository (FR) Cell Install Chapter



Configured File Repository cell properties



Deployed edu.harvard.i2b2.fr



Updated file repository cell data in Admin



Verified file repository installation



Identity Management (IM) Cell Install Chapter



Configured IM cell properties



Deployed edu.harvard.i2b2.im



Updated IM cell data in Admin



Verified IM installation

14.2 Chapter Overview

Overview of Additional Setup Chapter

In this chapter we will be outlining the additional setup that will need to be done before your users can begin using the i2b2 in your environment. Some of the things we will be covering are Authentication methods for logging into the i2b2 and setting up projects and users in Admin.

Order of Installation

There isn't any specific order that has to be followed when initially setting up your i2b2. The only exception is we recommend you enter your users before you setup your projects. This is by no means a requirement but it will save you steps in the long run.

14.3 Managing i2b2 Hive Data

The i2b2 hive and associated web services are the infrastructure used to integrate a collection of cells. The management of your Hive data is done in the i2b2 Administration Module within **Manage Hive**. The following functions for managing the hive are available.

1. Edit hive data (*Domain ID, Help URL, Domain Name, and Environment*)
2. Add, edit, and delete hive (*global*) parameter(s)

The steps on how to use these features are defined in the sections that follow.

14.3.1 Hive Data

The **Hive Data** page captures the following general information about a hive.

Field	Description	Required
Domain Id	<ul style="list-style-type: none">• A unique id for the domain in which this hive resides.• This ID is encrypted when it is saved and stored in the database.	Yes
Help URL	<ul style="list-style-type: none">• A link to an external website that may contain additional information on using the i2b2 in your environment.• This link is only used in the i2b2 Workbench and is not available from within the i2b2 Webclient. (<i>in the workbench heading there is a button labeled i2b2; clicking on this button will launch the website entered at this field.</i>)	No
Domain Name	<ul style="list-style-type: none">• The name of the domain in which this hive resides.• This is the same name that is entered in your Web Client and Admin config files as well as the Workbench properties file.	Yes
Environment	<ul style="list-style-type: none">• The type of environment this hive resides. The options are:<ul style="list-style-type: none">• Development• Production• Test	Yes

Note

The hive is created when you are installing the i2b2 server. You cannot add or remove a hive from within i2b2 Admin; however you can

edit the hive's data.

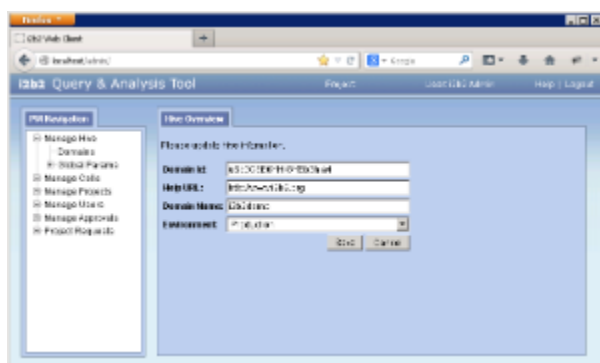
14.3.1.1 Edit Hive Data

Steps to Edit Hive Data

The following steps outline the process of editing the Hive Data in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, click on **Manage Hive**.
2. The *Hive Overview* page will display on the right.



3. Make the changes to the Hive Data and click on **Save** to save the changes.

Warning

Be very careful editing the **Domain Id** or **Domain Name**. Changes to either of these two fields will require you to edit the configuration and property files for all your cells, the i2b2 Admin, Web Client and Workbench.

14.3.2 Hive Parameters

Parameters entered on a project are known as **Hive** or **Global Parameters** and are *specific to the hive (domain)*. A hive parameter is not specific to any one cell, project or user.

14.3.2.1 Add Hive Parameters

Steps to Add a Hive (Global) Parameter

The following steps outline the process of adding a parameter to the hive from within the i2b2 Administration Module.

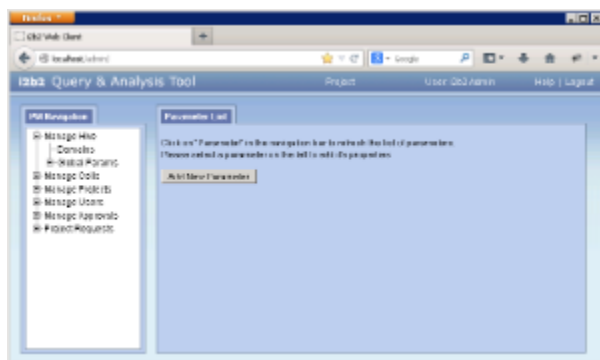
Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see

the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Hive** to display the available options.



2. Click on the **Global Params** option that appears in the Navigation panel.
3. The **Parameters List** page will display on the right side of the window pane.



4. Click on **Add New Parameter**. The *Enter Parameter* page will display.

A screenshot of a web form titled "Parameter List". The form contains a message: "Click on 'Parameter' in the navigation bar to refresh the list of parameters. Please select a parameter on the left to edit its properties." Below the message are three input fields: "Parameter Name:" with a text box, "Parameter Value:" with a text box, and "Parameter Data Type:" with a dropdown menu showing "Text". At the bottom of the form are three buttons: "Delete", "Save", and "Cancel".

5. Enter the name of the parameter, the value for the parameter and the data type for the parameter.
6. Click on **Save** to save the new parameter.
7. The *Parameters List* page will display with the new parameter.

8. In the Navigation panel click on **Global Params** to refresh the hierarchical tree and display the new parameter.

14.3.3.2 Edit Hive Parameters

Steps to Edit a Hive (Global) Parameter in i2b2

The following steps outline the process of editing a hive parameter in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Hive** to display the available options.



2. Expand the **Global Params** option.
3. A list of existing hive parameters will display in the Navigation panel.
4. In the Navigation panel, click on the **name of the parameter** you want to edit.
5. The *Edit Parameter* page will display on the right.
6. Make the changes to the parameter and click on **Save** to save the changes.

14.3.4.1 Delete Hive Parameters

Steps for Deleting a Hive (Global) Parameter

The following steps outline the process of deleting a hive parameter in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Hive** to display the available options.



2. Expand the **Global Params** option.
3. A list of existing hive parameters will display in the Navigation panel.
4. In the Navigation panel, click on the **name of the parameter** you want to delete.
5. The *Edit Parameter* page will display on the right.
6. Click on **Delete** to remove the parameter.
7. The parameter will be removed from the list of parameters on the *Parameters List* page.
8. In the Navigation panel click on **Global Params** to refresh the hierarchical tree and verify the parameter no longer appears in the list.

14.4 Managing i2b2 Cells

The i2b2 hive is comprised of a collection of cells representing unique functional units. The management of the cells is done in the i2b2 Administration Module within **Manage Cells**. The following functions for managing the cells are available.

1. Add, edit, and delete cell(s)
2. Add, edit, and delete cell parameter(s)

The steps on how to use these features are defined in one of the sections that follow.

Note

The core i2b2 cells were installed earlier in this installation guide. Within each cell installation chapter was a section on *Updating Cell Data in i2b2 Admin*. If you chose to skip this step then you will need to update the Cell URL for the core cells you installed. The URL has to be updated with the location of the cell in your environment. You will not be able to log into the i2b2 Web Client or Workbench until this is done.

Rather than go back to each chapter to update the core cells you can go to the section in this chapter titled *Edit Existing Cell*.

14.4.1 Cell Data

The **Cell Data** page captures the following general information about a cell.

Field	Description	Required

Cell Id	A unique id for the cell.	Yes
Cell Name	The name of the cell.	Yes
Cell URL	The url contains the IP or domain name for where the cell is located.	Yes
Project Path		No
Method	The method of communication. The options are: <ul style="list-style-type: none"> • REST • SOAP • OTHER 	Yes

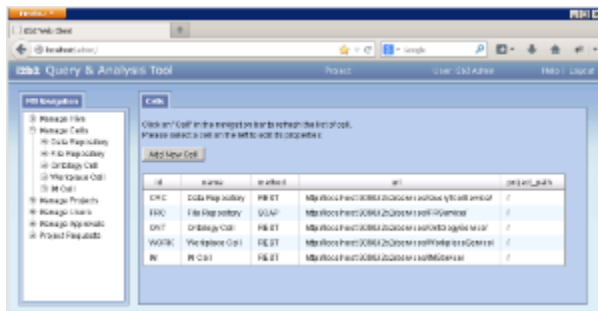
14.4.1.1 Add a New Cell

Steps to Add a New Cell

The following steps outline the process of adding a new cell in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, click on **Manage Cells**.
2. The *Manage Cells* page will display on the right.



3. In the Manage Cells page click on **Add New Cell**. The page to enter a new cell will display.

Click on "Cell" in the navigation bar to refresh the list of cell.
Please select a cell on the left to edit its properties

Cell Id:

Cell Name:

Cell URL:

Project Path:

Method:

4. Enter the information for the cell you are adding.
5. Click on **Save** to save the cell.
6. The cell will be added to the list of cells on the *Manage Cells* page.
7. In the Navigation panel click on **Manage Cells** to refresh the hierarchical tree and display the new cell.

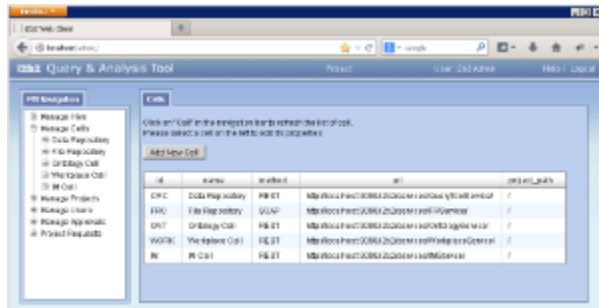
14.4.1.2 Edit Cell Data

Steps to Edit Cell Data in i2b2

The following steps outline the process of editing a cell in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. Click on **Manage Cells** located in the navigation panel on the left.
2. The *Manage Cells* page will display in the panel on the right.



4. In the left navigation panel, click on the **name of the cell** you want to edit.
5. The *Edit Cell* page will display on the right.

Cell -> "Undefined"

Please select which cell configuration screen you want to access

Cell ID:

Cell Name:

Cell URL:

Project Path:

Method:

5. Make the changes to the cell and click on **Save** to save the changes.

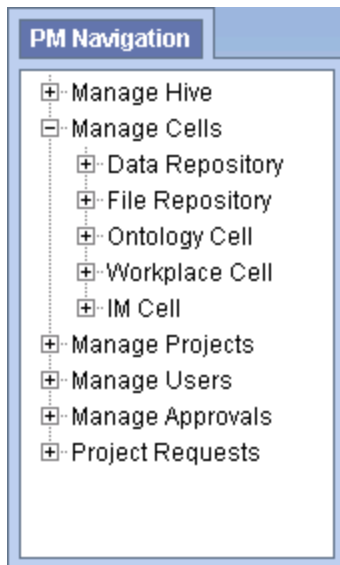
14.4.1.3 Delete a Cell

Steps to Delete Cell Data in i2b2

The following steps outline the process of deleting a cell in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. Click on **Manage Cells** located in the navigation panel on the left.
2. The *Manage Cells* page will display in the panel on the right.



2. Expand the **name of the cell** you want to add a parameter to.
3. Click on the **Params** option that displays under the cell's name.
4. The **Parameters List** page will display on the right side of the window pane.
5. Click on **Add New Parameter**. The *Enter Parameter* page will display.

6. Enter the name of the parameter, the value for the parameter and the data type for the parameter.
7. Click on **Save** to save the new parameter.
8. The *Parameters List* page will display with the new parameter.
9. In the Navigation panel click on **Params** to refresh the hierarchical tree and display the new parameter.

14.4.2.2 Edit Cell Parameters

Steps to Edit a Cell Parameter

The following steps outline the process of editing a cell parameter in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Cells** to display a list of cells.



2. Expand the **name of the cell** that has the parameter you want to edit.
3. Expand the **Params** option that displays under the cell's name.
4. A list of parameters entered for that cell will display under its name in the Navigation panel.
5. In the Navigation panel, click on the **name of the parameter** you want to edit.
6. The *Edit Parameter* page will display on the right.
7. Make the changes to the parameter and click on **Save** to save the changes.

14.4.2.3 Delete Cell Parameters

Steps to Delete a Cell Parameter

The following steps outline the process of deleting a cell parameter in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Cells** to display a list of cells.



2. Expand the **name of the cell** that has the parameter you want to delete.
3. Expand the **Params** option that displays under the cell's name.
4. A list of parameters entered for that cell will display under its name in the Navigation panel.
5. In the Navigation panel, click on the **name of the parameter** you want to delete.
6. The *Edit Parameter* page will display on the right.
7. Click on **Delete** to remove the parameter.
8. The parameter will be removed from the list of parameters on the *Parameters List* page.
9. In the Navigation panel click on **Params** to refresh the hierarchical tree and verify the parameter no longer appears in the list.

14.5 Managing i2b2 Users

Everyone who uses the i2b2 has to be setup as an i2b2 user in the i2b2 Administration Module. The management of these users is done under **Manage Users** and the following functions for managing your users are available.

1. Add, edit, and delete user(s)
2. Add, edit, and delete user parameter(s)



The steps on how to use these features are defined in one of the sections that follow.

14.5.1 User Data

The **User Data** page captures the following general information about a user.

Field	Description	Required
User Name	<ul style="list-style-type: none"> • A unique id for the user. • It is used when logging into the i2b2 Web Client, Workbench and Admin. 	Yes
User Full Name	<ul style="list-style-type: none"> • The name of the user. • This name will appear in the i2b2 Web Client and Workbench when they log in. • The name will also appear in the i2b2 Admin under Manage Users in the Navigation panel. 	Yes
User Email	At this time, this field is not implemented in the i2b2 core cells and clients.	No

User Password	<ul style="list-style-type: none"> The password the user will enter when logging into the i2b2 Web Client, Workbench and Admin. The password will be encrypted when it is saved to the i2b2 database. 	Yes
Is Admin	<ul style="list-style-type: none"> A Yes response means the user is an administrator. This means they can log into the i2b2 Admin and will have access to all the cells, projects and users. A No response means the user is not an administrator. They cannot log into the i2b2 Admin. The default setting is No 	Yes

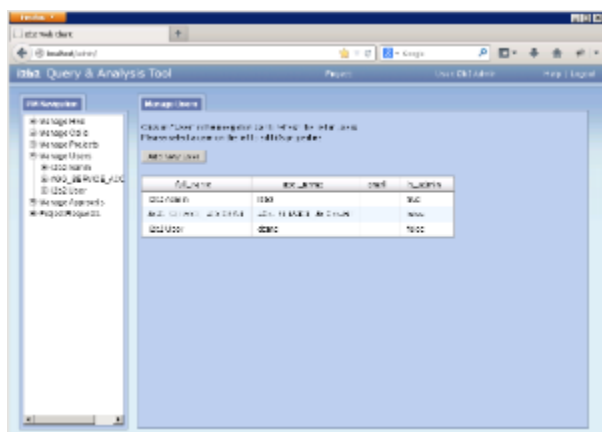
14.5.1.1 Add a New User

Steps to Add a New User

The following steps outline the process of adding a new user in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, click on **Manage Users**.
2. The *Manage Users* page will display on the right.



3. In the Manage Users page click on **Add New User**. The page to add users will display.

Click on "User" in the navigation bar to refresh the list of users.
Please select a user on the left to add its properties.

User Name:

User Full Name:

User Email:

User Password:

User Password (confirm):

Is Admin:

4. Enter the information for the user you are adding.

Warning

If **Is Admin** is set to **Yes** then the user will be able to log into i2b2 Admin Module. This means they are able to access information for ALL users, projects and cells.

5. Click on **Save** to save the user.
6. The user will be added to the list of users on the *Manage Users* page.
7. In the Navigation panel click on **Manage Users** to refresh the hierarchical tree and display the new user.

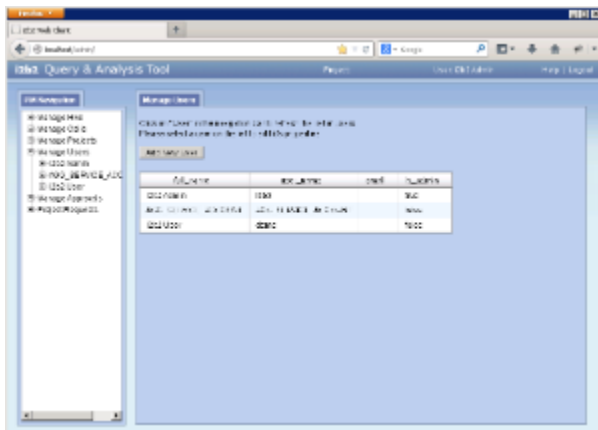
14.5.1.2 Edit Existing User

Steps to Edit a User in i2b2

The following steps outline the process of editing a user in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, click on **Manage Users**.
2. The *Manage Users* page will display on the right.



3. In the Navigation panel, click on the **name of the user** you want to edit.
4. The *Edit User* page will display on the right.

5. Make the changes to the user and click on **Save** to save the changes.

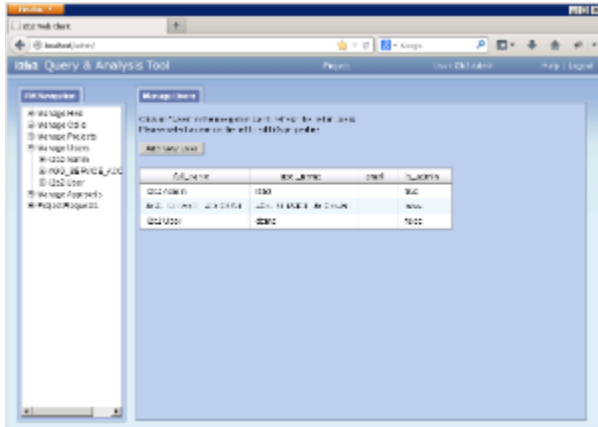
14.5.1.3 Delete an i2b2 User

Steps to Delete a User in i2b2

The following steps outline the process of deleting a user in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, click on **Manage Users**.
2. The *Manage Users* page will display on the right.



3. In the Navigation panel, click on the **name of the user** you want to delete.
4. The *Edit User* page will display on the right.

The screenshot shows the 'Edit User' dialog box. It has a title bar that says 'Edit User - "undefined"'. Below the title bar is a message: 'Please select which user configuration screen you want to access.' There are several input fields: 'User Name' (containing 'demo'), 'User Full Name' (containing 'i2b2 User'), 'User Email' (empty), 'User Password' (empty), 'User Password (verify)' (empty), and 'Is Admin' (a dropdown menu set to 'No'). At the bottom are three buttons: 'Delete', 'Save', and 'Cancel'.

5. Click on **Delete** to remove the user.
6. The user will be removed from the list of users on the *Manage Users* page.
7. In the Navigation panel click on **Manage Users** to refresh the hierarchical tree and verify the user no longer appears in the list.

14.5.2 User Parameters

Parameters entered on a user are known as **User Parameters** and are *specific to the user*. The user parameter only affects the user in which it is entered on; it does not affect other users and it is not specific to any one project.

14.5.2.1 Add User Parameters

Steps to Add a User Parameter

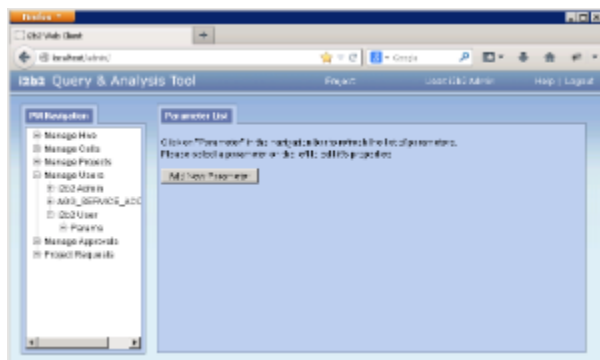
The following steps outline the process of adding a parameter to a user from within the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Users** to display a list of users.



2. Expand the **name of the user** you want to add a parameter to.
3. Click on the **Params** option that displays under the user's name.
4. The **Parameters List** page will display on the right side of the window pane.



5. Click on **Add New Parameter**. The *Enter Parameter* page will display.

6. Enter the name of the parameter, the value for the parameter and the data type for the parameter.
7. Click on **Save** to save the new parameter.
8. The *Parameters List* page will display with the new parameter.
9. In the Navigation panel click on **Params** to refresh the hierarchical tree and display the new parameter.

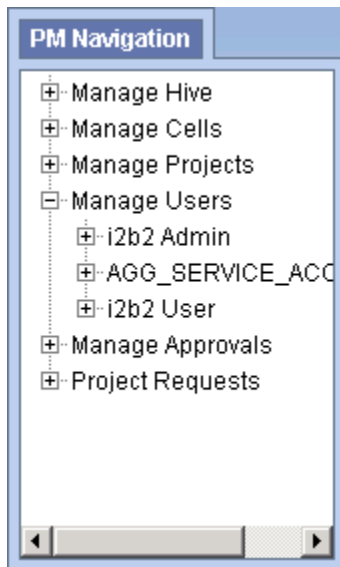
14.5.2.2 Edit User Parameters

Steps to Edit a User Parameter in i2b2

The following steps outline the process of editing a user parameter in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Users** to display a list of users.



2. Expand the **name of the user** that has the parameter you want to edit.
3. Expand the **Params** option that displays under the user's name.
4. A list of parameters entered for that user will display under their name in the Navigation panel.
5. In the Navigation panel, click on the **name of the parameter** you want to edit.
6. The *Edit Parameter* page will display on the right.
7. Make the changes to the parameter and click on **Save** to save the changes.

14.5.2.3 Delete User Parameters

Steps to Delete a User Parameter

The following steps outline the process of deleting a user parameter in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Users** to display a list of users.



2. Expand the **name of the user** that has the parameter you want to delete.
3. Expand the **Params** option that displays under the user's name.
4. A list of parameters entered for that user will display under their name in the Navigation panel.
5. In the Navigation panel, click on the **name of the parameter** you want to delete.
6. The *Edit Parameter* page will display on the right.
7. Click on **Delete** to remove the parameter.
8. The parameter will be removed from the list of parameters on the *Parameters List* page.
9. In the Navigation panel click on **Params** to refresh the hierarchical tree and verify the parameter no longer appears in the list.

14.6 Managing i2b2 Projects

After a user is setup in the i2b2 Administration Module they need to be given access to one or more projects before they can log into the i2b2 Web Client or Workbench. The management of your project data is done in the i2b2 Administration Module within **Manage Projects**. The following functions for managing the projects are available.

Project Data

1. Add, edit, and delete project(s)
2. Add, edit, and delete project parameter(s)

Project Users

1. Add and delete project user(s)
2. Add and edit project user roles
3. Add, edit, and delete project user parameter(s)

14.6.1 Project Data

The **Project Data** page captures the following general information about a project.

Field	Description	Required
Project ID	A unique identifier for the project.	Yes
Project Name	<ul style="list-style-type: none">The name of the project.Visible to users in the i2b2 Web Client and Workbench	Yes
Project Wiki	Currently not implemented in the i2b2 Web Client or Workbench.	No
Project Key	Enter the encryption key that is used during the encryption / decryption process.	No
Project Description	A brief description of the project. At this time it is only visible in the i2b2 Admin.	No
Project Path		No

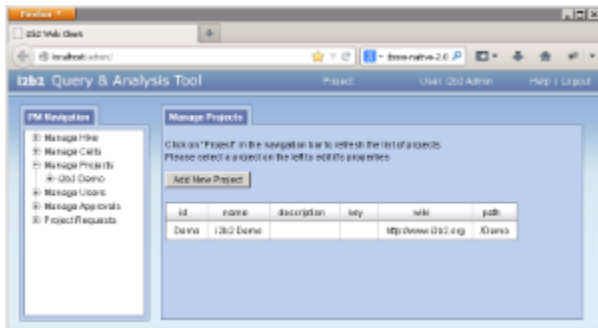
14.6.1.1 Add a New Project

Steps to Add a New Project

The following steps outline the process of adding a new project in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, click on **Manage Projects**.
2. The *Project Summary* page will display on the right.



3. On the Project Summary page click on **Add New Project**.
4. The **Project Data** page will display.

Manage Projects

Click on "Project" in the navigation bar to refresh the list of projects.
Please select a project on the left to edit its properties

Project ID:

Project Name:

Project WH:

Project Key:

Project Description:

Project Path:

Save Cancel

5. Enter the project information and click on **Save** to save the project.
6. The project will be added to the list of projects on the *Project Summary* page.
7. In the Navigation panel click on **Manage Projects** to refresh the hierarchical tree and display the new project.

14.6.1.2 Edit Project Data

Steps to Edit the Project Data in i2b2

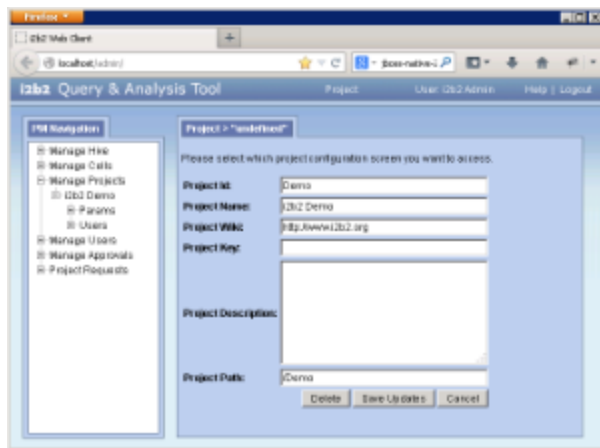
The following steps outline the process of editing a project in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Projects**.
2. A list of projects will display in the Navigation panel.



3. In the Navigation panel, click on the **name of the project** you want to edit.
4. The **Project Data** page will open displaying the information currently entered for the project.



5. After making the desired changes click on **Save** to save the edits.

14.6.1.3 Delete a Project

Steps to Delete a Project in i2b2

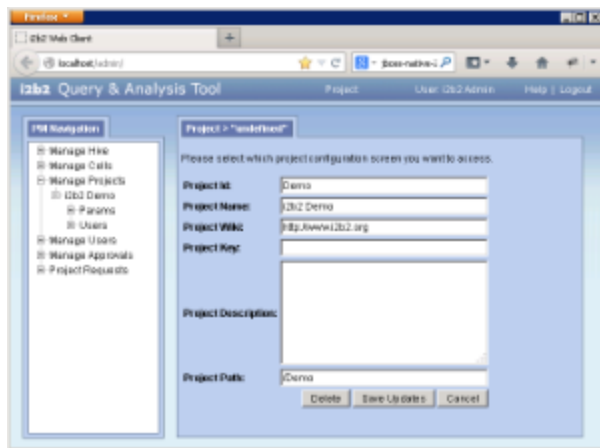
The following steps outline the process of deleting a project in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Projects**.
2. A list of projects will display in the Navigation panel.



3. In the Navigation panel, click on the **name of the project** you want to delete.
4. The **Project Data** page will open displaying the current information entered for the project.



5. Click on **Delete** to remove the project.
6. The project will be removed from the list of projects on the *Project Summary* page.
7. In the Navigation panel click on **Manage Projects** to refresh the hierarchical tree and verify the project no longer appears in the list.

14.6.2 Project Parameters

Parameters entered on a project are known as **Project Parameters** and are *specific to the project*. The project parameter only affects the project in which it is entered on; it does not affect the other projects in the hive or any one user in the project.

14.6.2.1 Add Project Parameters

Steps to Enter a Project Parameter

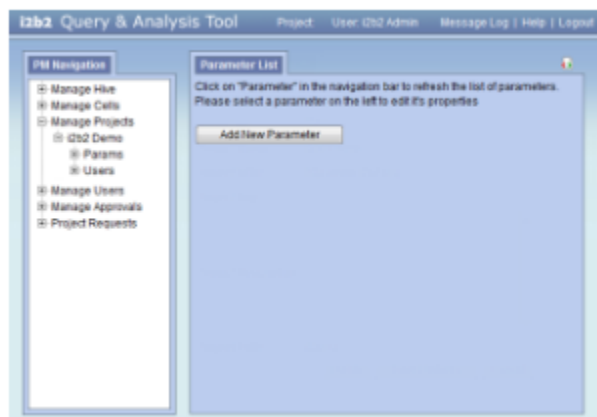
The following steps outline the process of adding a parameter to a project from within the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Projects** to display a list of projects.



2. Expand the **name of the project** you want to add a parameter to.
3. Click on the **Params** option that displays under the project's name.
4. The **Parameters Summary** page will display on the right side of the window pane.



5. Click on **Add New Parameter**. The *Project Parameters* page will display.

6. Enter the name of the parameter, the value for the parameter and the data type for the parameter.
7. Click on **Save** to save the new parameter.
8. The *Parameters Summary* page will display with the new parameter.
9. In the Navigation panel click on **Params** to refresh the hierarchical tree and display the new parameter.

14.6.2.2 Edit Project Parameters

Steps to Edit a Project Parameter

The following steps outline the process of editing a project parameter in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Projects** to display a list of projects.



2. Expand the **name of the project** that has the parameter you want to edit.
3. Expand the **Params** option that displays under the project's name.
4. A list of parameters entered for that project will display under its name.
5. In the Navigation panel, click on the **name of the parameter** you want to edit.
6. The *Project Parameters* page will open displaying the current information entered for the parameter.
7. Make the changes to the parameter and click on **Save** to save the changes.

14.6.2.3 Delete Project Parameters

Steps to Delete a Project Parameter

The following outlines the steps to delete a project parameter from within the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

1. In the Navigation panel, expand **Manage Projects** to display a list of projects.



2. Expand the **name of the project** that has the parameter you want to delete.
3. Expand the **Params** option that displays under the project's name.
4. A list of parameters entered for that project will display under its name.
5. In the Navigation panel, click on the **name of the parameter** you want to delete.
6. The *Project Parameters* page will open displaying the current information entered for the parameter.
7. Click on **Delete** to remove the parameter.
8. The parameter will be removed from the list of parameters on the *Parameter Summary* page.
9. In the Navigation panel click on **Params** to refresh the hierarchical tree and verify the parameter no longer appears in the list.

14.6.3 Project Users

As stated earlier users need to have access to at least one project before they can log into the i2b2 Web Client or Workbench. The **Project User** page simply captures the name of the user that has access to the project.

Important

Before you can add a user to a project they have to be entered into the i2b2 Admin as a **user**. Please see the section titled **Manage Users** for information on adding a user to the i2b2 Admin.

Once you have added a user to the project you will need to define their role within it. The i2b2 roles determine the level of access a user has within a project.

In addition to roles, you can also add **Project User Parameters**. Although these parameters are entered on the "user" they are specific to the user **and** the project. Whereas *User Parameters* are specific only to the user.

14.6.3.1 Add User to a Project

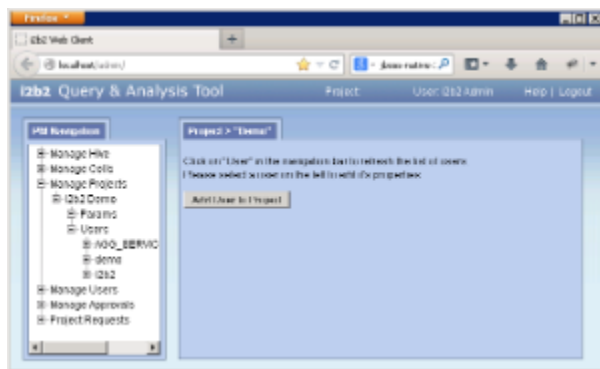
Steps to add a user to a project in i2b2

The following steps outline the process of adding a user to a project in the i2b2 Administration Module.

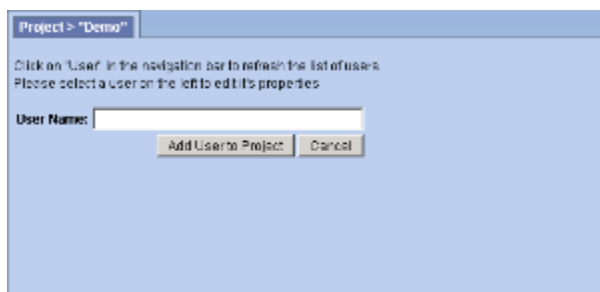
1. In the Navigation panel, expand **Manage Projects** to display a list of projects.



2. Expand the **name of the project** you want to add a user to.
3. Click on the **Users** option that displays under the project's name.
4. The **Project Users** page will display on the right side of the window pane.



5. Click on **Add User to Project**. The *Add Project User* page will display.



6. Enter the name of the user you want to add to the project.

Note

The **User Name** entered on this page is equivalent to the **User Name** in Manage Users.

7. Click on **Add User to Project** to add the user to the project.
8. The *Project Users* page will display.
9. In the Navigation panel click on **Users** to refresh the hierarchical tree and display the user you added to the project.

14.6.3.2 Remove a User from a Project

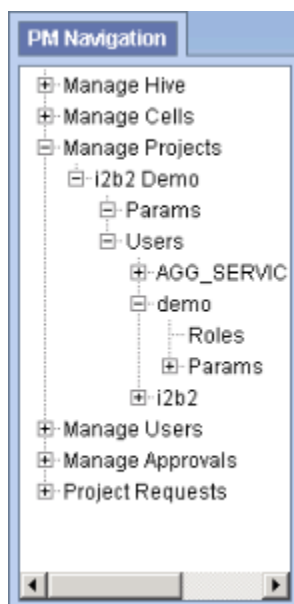
Steps to remove a user from a project

The following steps outline the process of removing a user's access to a project in the i2b2 Administration Module.

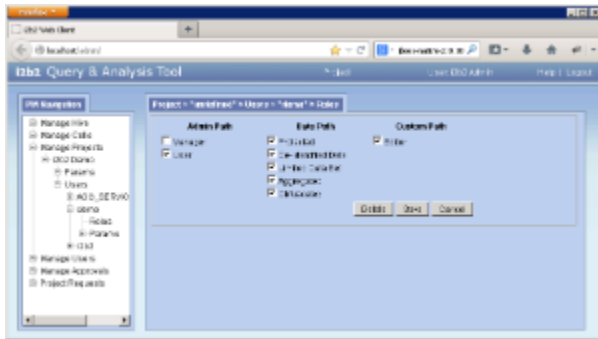
1. In the Navigation panel, expand **Manage Projects** to display a list of projects.



2. Expand the **name of the project** that has the user you want to remove.
3. Expand the **name of the user** to display a list of options.



- Click on the **Roles** option that displays under the user's name.
- The **Roles Management** page will display on the right side of the window pane.



- Click on **Delete** to remove the user from the project.
- In the Navigation panel click on **Users** to refresh the hierarchical tree and verify the user no longer appears in the list.

14.6.4 Project User Roles

Each user will have at least two roles per *user_id* and *project_id* combination. These two roles can be further defined as a **Data Protection role** and a **Hive Management role**.

The data protection role establishes the detail of data the user can see while the hive management role defines the level of functionality the user has in a project. The following tables summarize the roles in a hierarchical order of least to most access.

Data Protection Roles

Role	Access Description
DATA_OBFSC	<p>OBFSC = Obfuscated</p> <ul style="list-style-type: none"> The user can see aggregated results that are obfuscated (example: patient count). The user is limited on the number of times they can run the same query within a specified time period. If the user exceeds the maximum number of times then their account will be locked and only the Admin user can unlock it.
DATA_AGG	<p>AGG = Aggregated</p> <ul style="list-style-type: none"> The user can see aggregated results like the patient count. The results are not obfuscated and the user is not limited to the number of times they can run the same query.
DATA_LDS	<p>LDS = Limited Data Set</p> <ul style="list-style-type: none"> The user can see all fields except for those that are encrypted. An example of an encrypted field is the blob fields in the fact and dimension tables.
DATA_DEID	<p>DEID = De-identified Data</p> <ul style="list-style-type: none"> The user can see all fields including those that are encrypted. An example of an encrypted field is the blob fields in the fact and dimension tables.
DATA_PROT	<p>PROT = Protected</p> <ul style="list-style-type: none"> The user can see all data, including the identified data that resides in the Identity Management Cell.

Hive Management Roles

Role	Access Description
------	--------------------

USER	Can create queries and access them if he / she is the owner of the query.
MANAGER	Can create queries as well as access queries created by different users within the project.

Note

Additional roles can be added to the PM_PROJECT_USER_ROLES table but there will not be any recognized hierarchy to those roles.

14.6.4.1 Add User Roles for a Project

Steps to add roles to a user

The following steps outline the process of defining a user's role(s) for a project in the i2b2 Administration Module.

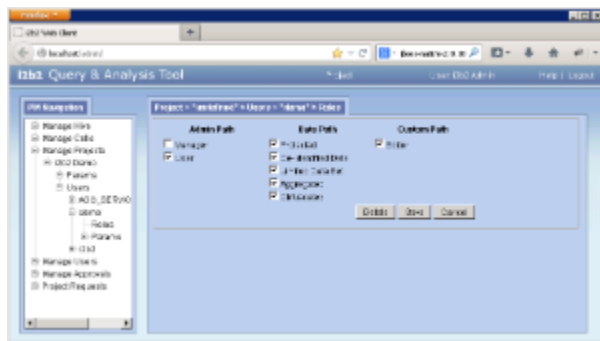
1. In the Navigation panel, expand **Manage Projects** to display a list of projects.



2. Expand the **name of the project** that has the user you want to add a role.
3. Expand the **name of the user** to display a list of options.



- Click on the **Roles** option that displays under the user's name.
- The **Roles Management** page will display on the right side of the window pane.



- Check of the roles that are appropriate for the user in that project.
- Click on **Save** to save the changes.

14.6.4.2 Edit User Roles for a Project

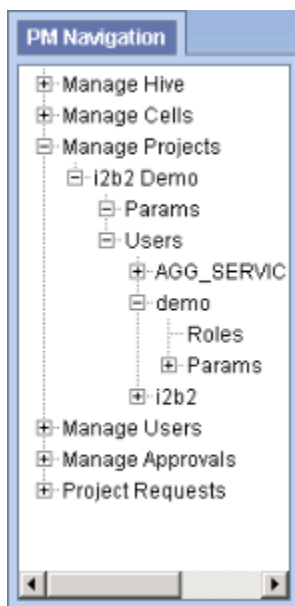
Steps to edit user roles

The following steps outline the process of editing a user's project role(s) in the i2b2 Administration Module.

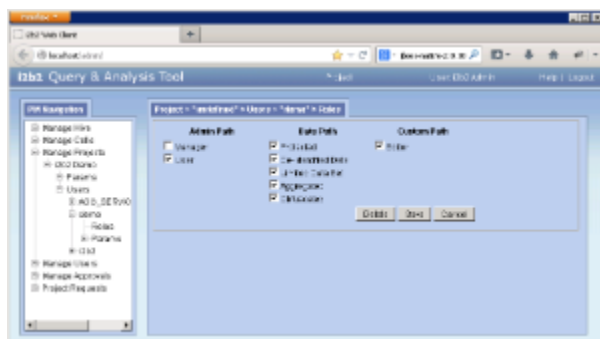
- In the Navigation panel, expand **Manage Projects** to display a list of projects.



2. Expand the **name of the project** that has the user whose roles you want to edit.
3. Expand the **name of the user** to display a list of options.



4. Click on the **Roles** option that displays under the user's name.
5. The **Roles Management** page will display on the right side of the window pane.



6. Check off the highest level of access this user can have for this project. This will remove any roles above it.
7. Click on **Save** to save the changes.

14.6.5 Project User Parameters

Parameters entered on a user in a project are known as **Project User Parameters** and are *specific to the user **and** the project*. The project parameter only affects the project in which it is entered on; it does not affect the other projects in the hive.

14.6.5.1 Add Project User Parameters

Steps to Enter a Project User Parameter

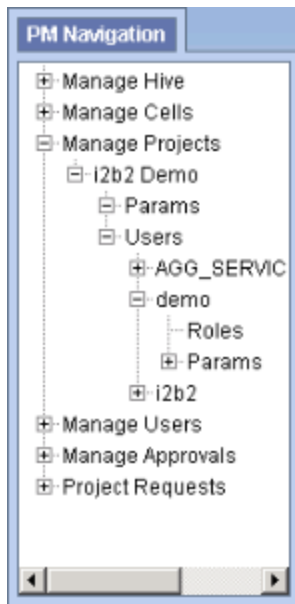
The following steps outline the process of adding a parameter to a project user from within the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

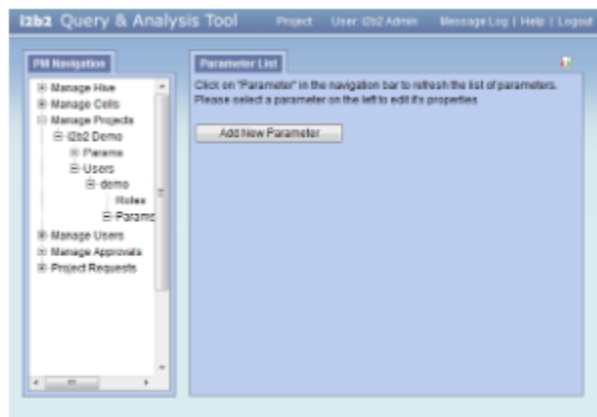
1. In the Navigation panel, expand **Manage Projects** to display a list of projects.



2. Expand the **name of the project** that has the user you want to add a parameter to.
3. Expand the **name of the user** to display a list of options.



4. Click on the **Params** option that displays under the user's name.
5. The **Parameters Summary** page will display on the right side of the window pane.



6. Click on **Add New Parameter**. The *Project Parameters* page will display.

7. Enter the name of the parameter, the value for the parameter and the data type for the parameter.
8. Click on **Save** to save the new parameter.
9. The *Parameters Summary* page will display with the new parameter.
10. In the Navigation panel click on **Params** to refresh the hierarchical tree and display the new parameter.

14.6.5.2 Edit Project User Parameters

Steps to Edit a Project User Parameter

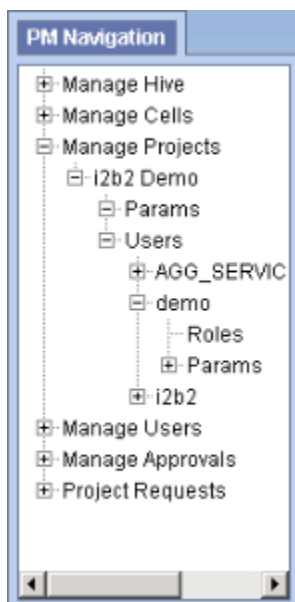
The following steps outline the process of editing a project user parameter in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

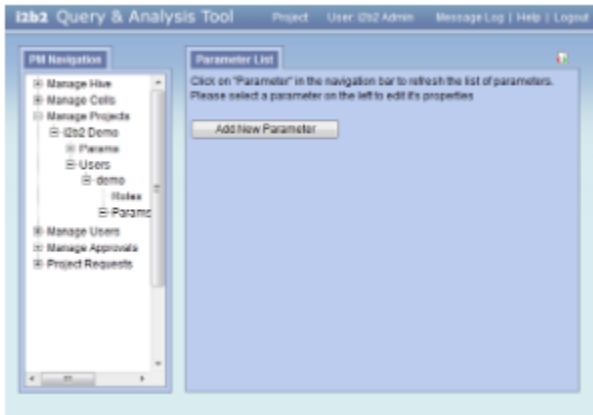
1. In the Navigation panel, expand **Manage Projects** to display a list of projects.



2. Expand the **name of the project** that has the user whose parameter you want to edit.
3. Expand the **name of the user** to display a list of options.



- Expand the **Params** option to display a list of the parameters.
- Click on the **name of the parameter** you want to edit.
- The **Parameters Summary** page will display on the right side of the window pane.



- Make the edits to the parameter and click on **Save** to save the changes.
- In the Navigation panel click on **Params** to refresh the hierarchical tree and display the new parameter.

14.6.5.3 Delete Project User Parameters

Steps to Remove a Project User Parameter

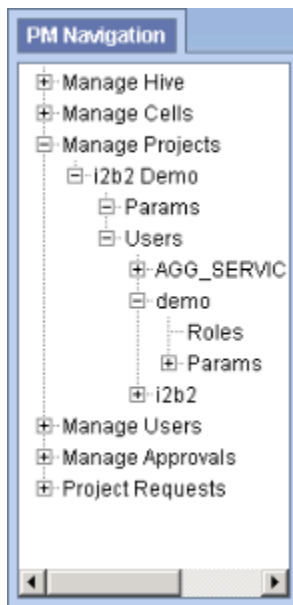
The following steps outline the process of deleting a project user parameter in the i2b2 Administration Module.

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

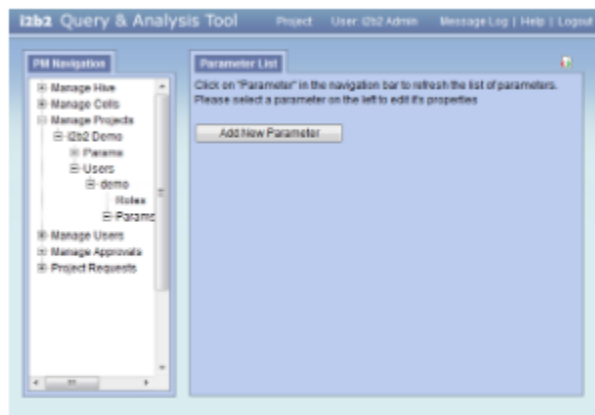
- In the Navigation panel, expand **Manage Projects** to display a list of projects.



- Expand the **name of the project** that has the user whose parameter you want to delete.
- Expand the **name of the user** to display a list of options.



4. Expand the **Params** option to display a list of the parameters.
5. Click on the **name of the parameter** you want to delete.
6. The **Parameters Summary** page will display on the right side of the window pane.



7. Click on **Delete** to remove the parameter.
8. In the Navigation panel click on **Params** to refresh the hierarchical tree and display the verify the parameter has been removed.

14.7 Authentication in i2b2

Currently there are three methods of authentication supported by the i2b2.

1. Standard i2b2 Authentication

- In this method the i2b2 users are setup in the i2b2 Admin and are stored in the PM Cell.
- The users are authenticated using the PM services.
- Users log into the i2b2 using their i2b2 user id and password.
- Other than setting up your users and projects, this method does not require any additional configuration.

2. Active Directory (AD) Services

- In this method i2b2 users are authenticated using a domain controller in a Windows type of network.

- Users log into the i2b2 using their Windows network id and password.
- Additional parameters are required in order to use this authentication method. See the section titled **Active Directory Authentication** for steps on setting up this method.

3. Lightweight Directory Access Protocol (LDAP)

- In this method i2b2 users are authenticated over an Internet Protocol (IP) network.
- Users log into the i2b2 using the same id and password they currently use to log into other applications in your network.
- Additional parameters are required in order to use this authentication method. See the section titled **LDAP Authentication** for steps on setting up this method.

Depending on which authentication method you want to use you can proceed to one of the following sections:

- Active Directory Authentication
- LDAP Authentication

14.7.1 Active Directory Authentication

There are a few parameters that need to be defined in the i2b2 Admin if you want to use **Active Directory** services as your i2b2 authentication method. The required parameters are listed in the following table.

Parameter Name	Values	Required
authentication_method	NTLM	Yes
domain	<i>Example: i2b2.org</i>	Yes
domain_controller	<i>Example: pdc.i2b2.org</i>	Yes

In the i2b2 there are different types of parameters that can be defined. The type of parameter you enter will depend on which of the following scenarios is appropriate for your environment.

Scenario 1: All users login using Active Directory services

- In this scenario all users will be required to use their domain (network) id and password to log into i2b2 Web Client, Workbench and Admin (if they have access).
- Type of Parameter: Hive parameter
 - The parameters are defined on the hive level.
 - Hive parameters are considered global parameters because they affect all users.

Scenario 2: Individual users login using Active Directory services

- In this scenario not all users are affected.
 - Only those users who have the parameters defined will be required to use their domain (network) id and password to log into i2b2 Web Client, Workbench and Admin (if they have access).
 - Users who do not have the parameters defined will login using the standard i2b2 authentication method.
- Type of Parameter: User parameter
 - The parameters are defined on the user level.
 - User parameters only affect the user in which they are entered on.

Note

For those who are not familiar with the i2b2 Admin, here is a quick note on how to navigate around the pages.

For the most part, the i2b2 Admin is comprised of two panels.

The **panel on the left** is the Navigation panel and contains a number of items that are displayed in a hierarchical tree. These items are

grouped together based on their function. (*Manage Hive, Manage Cells, Manage Projects, Manage Users*)

The information that displays in the **panel on the right** is driven by whatever item is selected in the Navigation panel. If you click on *Manage Users* the Manage Users page will display on the right. If you click on a user name in the Navigation panel the Edit User page will display.

Steps to Setup Active Directory Parameters

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

Warning

The below steps are written for adding a user parameter. If you wish to add a hive parameter you can interchange the first three steps with the following two steps:

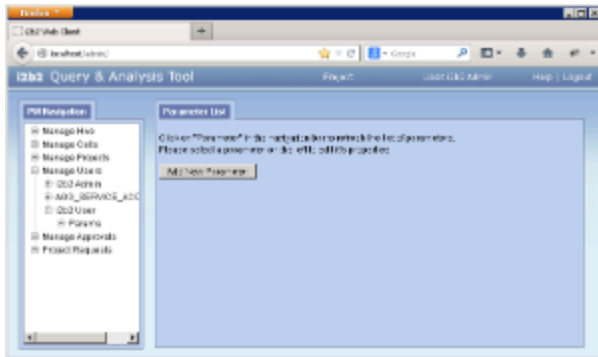
1. In the Navigation panel, expand **Manage Hive** to display a list of items.
2. Click on **Global Params**.

At this point the steps for adding a parameter are the same so can continue entering you parameters by jumping to the 4th step.

1. In the Navigation panel, expand **Manage Users** to display a list of users.



2. Expand the **name of the user** you want to configure for Active Directory Authentication.
3. Click on the **Params** option that displays under the user's name.
4. The **Parameters List** page will display on the right side of the window pane.



5. Click on **Add New Parameter**. The *Enter Parameter* page will display.

6. Enter the following parameter to define the **method of authentication**.
Parameter Name: authentication_method
Parameter Value: NTLM
Parameter Data Type: Text

7. Click on **Save** to save the new parameter.
8. The *Parameters List* page will display with the new parameter.

Note

The Navigation panel will not automatically refresh to display the new parameter. If you wish to update the list in the Navigation panel you can click on *Params* and it will refresh the hierarchical tree.

9. In the *Parameters List* page click on **Add New Parameter** to enter another parameter.
10. Enter the following parameter for the **PDC domain** of your company's NT domain.

Parameter Name: domain
Parameter Value: YOUR_PDC_DOMAIN
Parameter Data Type: Text

11. Click on **Save** to save the new parameter.
12. In the *Parameters List* page click on **Add New Parameter** to enter another parameter.
13. Enter the following parameter for the **connection URL** of your company's NT domain.

Parameter Name: domain_controller
Parameter Value: YOUR_NT_IP/HOST_DOMAIN
Parameter Data Type: Text

14. Click on **Save** to save the new parameter.
15. The *Parameters List* page will display all the new parameters you have entered.
16. In the Navigation panel click on **Params** to refresh the hierarchical tree and display the new parameters.

14.7.2 LDAP Authentication

There are a number of parameters that need to be defined in the i2b2 Admin if you want to use **LDAP** services as your i2b2 authentication method. These parameters are listed in the following table.

Parameter Name	Values	Required
authentication_method	LDAP	Yes
connection_url	<i>Example:</i> ldap://ldap.server.company.com:389	Yes
search_base	<i>Example:</i> OU=People, DC=company, DC=com	Yes
distinguished_name	"cuser", "dn:", "uid="	Yes
security_authentication	"none", "simple", "DIGEST-MD5", "CRAM-MD5", "EXTERNAL"	Yes
ssl	"true"	No
security_layer	"auth-conf", "auth-int", "auth-conf,auth-int", "auth-int,auth-conf"	No
privacy_strength	"high", "medium", "low", "high,medium", "high,low", "medium,low"	No
max_buffer	"65536"	No

In the i2b2 there are different types of parameters that can be defined. The type of parameter you enter will depend on which of the following scenarios is appropriate for your environment.

Scenario 1: All users login using LDAP authentication

- In this scenario all users will be required to use their network id and password to log into i2b2 Web Client, Workbench and Admin (if they have access).
- Type of Parameter: Hive parameter
 - The parameters are defined on the hive level.
 - Hive parameters are considered global parameters because they affect all users.

Scenario 2: Individual users login using LDAP authentication

- In this scenario not all users are affected.
 - Only those users who have the parameters defined will be required to use their network id and password to log into i2b2 Web Client, Workbench and Admin (if they have access).
 - Users who do not have the parameters defined will login using the standard i2b2 authentication method.
- Type of Parameter: User parameter
 - The parameters are defined on the user level.
 - User parameters only affect the user in which they are entered on.

Note

For those who are not familiar with the i2b2 Admin, here is a quick note on how to navigate around the pages.

For the most part, the i2b2 Admin is comprised of two panels.

The **panel on the left** is the Navigation panel and contains a number of items that are displayed in a hierarchical tree. These items are grouped together based on their function. (*Manage Hive, Manage Cells, Manage Projects, Manage Users*)

The information that displays in the **panel on the right** is driven by whatever item is selected in the Navigation panel. If you click on *Manage Users* the Manage Users page will display on the right. If you click on a user name in the Navigation panel the Edit User page will display.

Steps to Setup LDAP Parameters

Assumption: The following steps assume you are already logged into the i2b2 Administration Module. If you do not know how to login please see the chapter titled *i2b2 Administration Module Install*.

Warning

The below steps are written for adding a user parameter. If you wish to add a hive parameter you can interchange the first three steps with the following two steps:

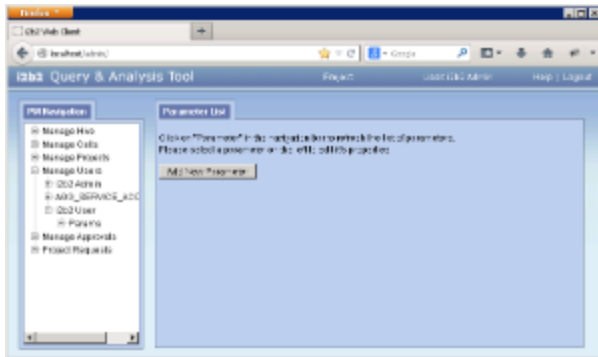
1. In the Navigation panel, expand **Manage Hive** to display a list of items.
2. Click on **Global Params**.

At this point the steps for adding a parameter are the same so can continue entering you parameters by jumping to the 4th step.

1. In the Navigation panel, expand **Manage Users** to display a list of users.



2. Expand the **name of the user** you want to configure for LDAP Authentication.
3. Click on the **Params** option that displays under the user's name.
4. The **Parameters List** page will display on the right side of the window pane.



5. Click on **Add New Parameter**. The *Enter Parameter* page will display.

6. Enter the following parameter to define the **method of authentication**.
Parameter Name: authentication_method
Parameter Value: LDAP
Parameter Data Type: Text

7. Click on **Save** to save the new parameter.
8. The *Parameters List* page will display with the new parameter.

Note

The Navigation panel will not automatically refresh to display the new parameter. If you wish to update the list in the Navigation panel you can click on *Params* and it will refresh the hierarchical tree.

9. In the *Parameters List* page click on **Add New Parameter** to enter another parameter.
10. Enter the following parameter for the **connection URL** of your company's LDAP server.

Parameter Name: connection_url
Parameter Value: <ldap://ldap.company.com:389>
Parameter Data Type: Text

Important

These tags < > are used to indicate the value within them is an example. You will need to replace it with the value that is appropriate for your environment.

11. Click on **Save** to save the new parameter.

12. In the *Parameters List* page click on **Add New Parameter** to enter another parameter.
13. Enter the following parameter.

Parameter Name: search_base
Parameter Value: <OU=People,DC=company,DC=com>
Parameter Data Type: Text

Important

These tags < > are used to indicate the value within them is an example. You will need to replace it with the value that is appropriate for your environment.

14. Click on **Save** to save the new parameter.
15. In the *Parameters List* page click on **Add New Parameter** to enter another parameter.
16. Enter the following parameter.

Parameter Name: distinguished_name
Parameter Value: <uid=>
Parameter Data Type: Text

Important

These tags < > are used to indicate the value within them is an example. You will need to replace it with the value that is appropriate for your environment.

17. Click on **Save** to save the new parameter.
18. In the *Parameters List* page click on **Add New Parameter** to enter another parameter.
19. Enter the following parameter.

Parameter Name: security_authentication
Parameter Value: <simple>
Parameter Data Type: Text

Important

These tags < > are used to indicate the value within them is an example. You will need to replace it with the value that is appropriate for your environment.

20. Click on **Save** to save the new parameter.
21. The *Parameters List* page will display all the new parameters you have entered.

Important

For DIGEST-MD5, add the optional settings for the security layer, privacy strength, or max buffer. If these values are not set, the default values will be used.

22. Once you have finished entering all the parameters you can click on **Params** in the Navigation panel.
23. The hierarchical tree will refresh and display the new parameters.

14.8 Optional Parameters

Optional Parameters

As stated in previous sections there are a number of different types of parameters that can be defined in the i2b2 Administration module. Depending where they are defined will determine how the i2b2 behaves. Here is a recap of the different types of parameters.

Type of Parameter	Description
Hive Parameters	<ul style="list-style-type: none">Affects the entire hive.Is not specific to a cell, user or project.
Cell Parameters	<ul style="list-style-type: none">Specific to the cell in which it is defined.Does not affect other cells in the hive.Is not specific to a user or project.
User Parameters	<ul style="list-style-type: none">Specific to the user in which it is defined.Does not affect other users.Is not specific to any one project.
Project Parameters	<ul style="list-style-type: none">Specific to the project in which it is defined.Does not affect other projects.Will affect all users who have access to the project.
Project User Parameters	<ul style="list-style-type: none">Specific to the user and the project in which it is defined.Does not affect other users within the project.Does not affect other projects the user has access to.

The sections that follow will contain information about additional parameters that can be entered into the i2b2 Administration Module.

14.8.1 Unit Conversion for Numerical Observations

Unit Conversion for Numerical Observations

In the OBSERVATION_FACT table the UNIT_CD column stores the unit value for your numerical observations. An example of a value in UNIT_CD would be **mg** for milligram or **gm** for gram.

Although i2b2 recommends the units be normalized to a single unit we also recognize this is not always possible. In this instance, you may wish to have the units converted automatically when running a query in which a value constraint is defined. To turn this feature on you would add the following parameter to the **Project** you want it applied.

Type of Parameter: Project Parameter

Parameter Name: CRC_ENABLE_UNITCD_CONVERSION

Value	Description
ON	Enables unit conversion
OFF	Disables unit conversion (<i>default setting</i>)

Note

The parameter does not change the data stored in the database. It is simply applied when the query is run.

For steps on how to add a project parameter please see the section titled *Add Project Parameters* located in this chapter.

14.8.2 Enable Process Timing

Enable Query Processing Steps and Timing

In the i2b2 Web Client when you run a query the length of time it takes to run the query will display in *Query Status*. A **project parameter** can be added that will expand the timing information that is displayed.

Type of Parameter: Project Parameter

Parameter Name: PM_ENABLE_PROCESS_TIMING

Value	Description
INFO	Basic process timing information will be returned.
DEBUG	Detailed process timing information will be returned.

For steps on how to add a project parameter please see the section titled *Add Project Parameters* located in this chapter.

14.9 Next Steps

Steps Completed

The following steps were completed during this chapter on the initial setup of i2b2 in the Administration Module.



Initial Setup of i2b2 in Admin



Hive Data Management



Edit Hive Data



Add, Edit and Delete Hive Parameters



Cell Data Management



Add, Edit and Delete Cell Data



Add, Edit and Delete Cell Parameters



User Data Management



Add, Edit and Delete User Data



Add, Edit and Delete User Parameters



Project Data Management



Add, Edit and Delete Project Data



Add, Edit and Delete Project Parameters



Add and Remove Users to/from a Project




Add and Edit User Role(s)



Add, Edit and Delete Project User Parameters



Authentication in i2b2

- ☒ Active Directory Authentication
- ☒ LDAP Authentication
-  Optional Parameters
 - ☒ Unit Conversion for Numerical Observations
 - ☒ Enable Process Timing

Next Steps

At this point you and your users are ready to begin using the i2b2.

Chapter 15. Troubleshooting Installation Errors

Application Name is Missing

ERROR MESSAGES
<i>applicationName is missing from properties file</i>

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received when attempting to log into the i2b2 Workbench	The applicationName property in the i2b2Workbench.properties file may be missing or not defined correctly.	Revisit the <i>i2b2Workbench.properties</i> file and verify the following: <ul style="list-style-type: none"> A property called applicationName is listed. A value for this property has been entered. The property name is spelled correctly (no spaces in the name).

EXAMPLE (*applicationName* property):
 applicationName=i2b2

Installation Guide Resources:

The following resources address configuring the i2b2Workbench.properties file and how to access it on either a Macintosh or Windows machine.

Resource For...	Chapter	Section

Configuring the PM Cell in the i2b2Workbench.properties file	i2b2 Workbench Install	Define Hive Location
Accessing the i2b2Workbench.properties file on a Mac	i2b2 Workbench Install	Access Properties File on a Macintosh
Accessing the i2b2Workbench.properties file on Windows	i2b2 Workbench Install	Access Properties File on Windows

CRC Cell is Unavailable

ERROR MESSAGES
<i>CRC Cell is Unavailable</i>

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received while logged into the i2b2 Web Client or Workbench	<p>The possible causes for this error message may be one of the following:</p> <ul style="list-style-type: none"> The CRC Cell may not be deployed The CRC Cell may be down; the services are not running The CRC Cell may not be configured correctly in i2b2 Admin 	<ul style="list-style-type: none"> Verify the CRC Cell was deployed by looking in the deployments folder located in <i>YOUR_JBOSS_DIR</i> <ul style="list-style-type: none"> If the cell was deployed you will see a file called <code>crc-ds.xml.deployed</code> If it was not deployed you won't see the above file and will need to deploy the crc cell. Check your web services to see if <i>QueryToolService</i> is listed as active. If it is not then you need to restart JBoss. Verify the CRC Cell is configured correctly in i2b2 Admin. <ul style="list-style-type: none"> The Cell Id should be CRC The Cell URL should be the IP or domain name where the cell is located.

Installation Guide Resources:

The following resources address configuring deploying and configuring cells as well as checking web services.

Resource For...	Chapter	Section
Deploying the CRC Cell	Data Repository (CRC) Cell Install	Deployment
Checking Web Services	Data Repository (CRC) Cell Install	Verify CRC Installation
Stop Services	Data Repository (CRC) Cell Install	Stop Services
Start Services	Data Repository (CRC) Cell Install	Start Services
Configuring CRC Cell Data in i2b2 Admin	Data Repository (CRC) Cell Install	Update CRC Cell Data in i2b2 Admin
Managing i2b2 Cells in i2b2 Admin	Initial Setup of i2b2 in Admin	Managing i2b2 Cells

Database Error

ERROR MESSAGE

Database Error

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received the message in one of the following views: <ul style="list-style-type: none"> Query Tool Previous Queries 	The CRC cell may be having a problem connecting to the i2b2 database due to one of the following reasons: <ul style="list-style-type: none"> The data in CRC_DB_LOOKUP table may be incorrect. The datasources may not be configured correctly in the CRC configuration files. 	<ul style="list-style-type: none"> In the CRC_DB_LOOKUP table, verify the correct information for your datasource is entered in the C_DB_DATASOURCE column. Revisit the following CRC configuration files to verify your datasources are defined correctly: <ul style="list-style-type: none"> CRCLoaderApplicationContext.xml edu.harvard.i2b2.crc.loader.properties crc.properties (<i>Data Source Lookup</i>) crc-ds.xml
Received the message in one of the following views: <ul style="list-style-type: none"> Navigation Terms Find Terms Edit Terms 	The Ontology cell may be having a problem connecting to the i2b2 database due to one of the following reasons: <ul style="list-style-type: none"> The data in one of the following tables may be incorrect: <ul style="list-style-type: none"> ONT_DB_LOOKUP TABLE_ACCESS The datasources may not be configured correctly in the Ontology configuration files. 	<ul style="list-style-type: none"> In the ONT_DB_LOOKUP table, verify the correct information for your datasource is entered in the C_DB_DATASOURCE column. In the TABLE_ACCESS table, verify the correct information is entered in the C_TABLE_NAME and C_FULLNAME columns. <ul style="list-style-type: none"> The C_TABLE_NAME is the name of your metadata table that contains your ontology. In i2b2demo this is I2B2. The data in C_FULLNAME should match the C_FULLNAME column in the corresponding metadata table. Revisit the following Ontology configuration files to verify your datasources are defined correctly. <ul style="list-style-type: none"> ontology.properties (<i>Bootstrap METADATA schema name</i>) ont-ds.xml
Received the message in one of the following views: <ul style="list-style-type: none"> Workplace 	The Workplace cell may be having a problem connecting to the i2b2 database due to one of the following reasons: <ul style="list-style-type: none"> The data in WORK_DB_LOOKUP table may be incorrect. The datasources may not be configured correctly in the Workplace configuration files. 	<ul style="list-style-type: none"> In the WORK_DB_LOOKUP table, verify the correct information for your datasource is entered in the C_DB_DATASOURCE column. Revisit the following Workplace configuration files to verify your datasources are defined correctly. <ul style="list-style-type: none"> workplace.properties (<i>METADATA schema name</i>) work-ds.xml

Installation Guide Resources:

The following resources address configuring the i2b2Workbench.properties file and how to access it on either a Macintosh or Windows machine.

Resource For...	Chapter	Section
Configuring the datasources for the CRC Loader (<i>CRCLoaderApplicationContext.xml</i> and <i>edu.harvard.i2b2.crc.loader.properties</i>)	Data Repository (CRC) Cell Install	Data Source Properties for the CRC Loader
Setting the location of the CRC_DB_LOOKUP table	Data Repository (CRC) Cell Install	Data Source Lookup Properties
CRC Datasource Configuration	Data Repository (CRC) Cell Install	Data Source Configuration
Setting the location of the ONT_DB_LOOKUP table	Ontology Management (ONT) Cell Install	Set Metadata Schema Name
Ontology Datasource Configuration	Ontology Management (ONT) Cell Install	Data Source Configuration
Setting the location of the WORK_DB_LOOKUP table	Workplace (WORK) Cell Install	Set Metadata Schema Name
Workplace Datasource Configuration	Workplace (WORK) Cell Install	Data Source Configuration

Message Version is Missing

ERROR MESSAGES
<i>Project Management Cell is unavailable</i> <i>Project Management Cell is unavailable for login</i>

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received when attempting to log into the i2b2 Workbench	The messageversion property in the i2b2Workbench.properties file may be missing or not defined correctly.	Revisit the <i>i2b2Workbench.properties</i> file and verify the following: <ul style="list-style-type: none">• A property called messageversion is listed.• The property name is spelled correctly (no spaces in the name).• A value for this property has been entered and is correct.

Installation Guide Resources:

The following resources address configuring the i2b2Workbench.properties file and how to access it on either a Macintosh or Windows machine.

Resource For...	Chapter	Section
Configuring the PM Cell in the i2b2Workbench.properties file	i2b2 Workbench Install	Define Hive Location
Accessing the i2b2Workbench.properties file on a Mac	i2b2 Workbench Install	Access Properties File on a Macintosh
Accessing the i2b2Workbench.properties file on Windows	i2b2 Workbench Install	Access Properties File on Windows

Ontology Cell is Unavailable

ERROR MESSAGES
<i>Ontology Cell is Unavailable</i>

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received while logged into the i2b2 Web Client or Workbench	<p>The possible causes for this error message may be one of the following:</p> <ul style="list-style-type: none"> The Ontology Cell may not be deployed The Ontology Cell may be down; the services are not running The Ontology Cell may not be configured correctly in i2b2 Admin 	<ul style="list-style-type: none"> Verify the Ontology Cell was deployed by looking in the deployments folder located in <i>YOUR_JBOSS_DIR</i> <ul style="list-style-type: none"> If the cell was deployed you will see a file called ont-ds.xml.deployed If it was not deployed you won't see the above file and will need to deploy the ontology cell. Check your web services to see if <i>OntologyService</i> is listed as active. If it is not then you need to restart JBoss. Verify the Ontology Cell is configured correctly in i2b2 Admin. <ul style="list-style-type: none"> The Cell Id should be ONT The Cell URL should be the IP or domain name where the cell is located.

Installation Guide Resources:

The following resources address configuring deploying and configuring cells as well as checking web services.

Resource For...	Chapter	Section
Deploying the Ontology Cell	Ontology Management (ONT) Cell Install	Deployment
Checking Web Services	Ontology Management (ONT) Cell Install	Verify Ontology Installation
Stop Services	Ontology Management (ONT) Cell Install	Stop Services
Start Services	Ontology Management (ONT) Cell Install	Start Services
Configuring Ontology Cell Data in i2b2 Admin	Ontology Management (ONT) Cell Install	Update ONT Cell Data in i2b2 Admin
Managing i2b2 Cells in i2b2 Admin	Initial Setup of i2b2 in Admin	Managing i2b2 Cells

Password Doesn't Match or Username Doesn't Exist

ERROR MESSAGES
<i>Supplied password does not match user password or Username does not exist</i>

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received when attempting to log into the i2b2 Web Client or Workbench	<ul style="list-style-type: none"> The user may not be entered into the i2b2 Administration Module. The user may be entering the wrong username and/or password. The user may have their <i>Caps Lock</i> on when entering their username and password. 	<ul style="list-style-type: none"> Log into i2b2 Admin and verify the user is setup. Verify they are entering the correct username. Since you are not able to see passwords you can enter a new password for the user after confirming their identity. Verify the user is not typing with the <i>Caps Lock</i> on.

Installation Guide Resources:

The following resources address managing users in the i2b2 Administration Module. This includes adding a new user and editing an existing one.

Resource For...	Chapter	Section
Logging into i2b2 Admin	i2b2 Administration Module Install	Verify Admin Installation
Managing Users in i2b2 Admin	Initial Setup of i2b2 in Admin	Managing i2b2 Users
Adding a New User	Initial Setup of i2b2 in Admin	Add a New User
Editing an Existing User	Initial Setup of i2b2 in Admin	Edit Existing User

PM Cell's getVersion Operation is Not Responding

ERROR MESSAGES
<i>PM Cell's getVersion operation is not responding</i>

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received when attempting to log into the i2b2 Workbench	The URL for the location of the PM Cell may be missing or not entered correctly into the i2b2Workbench.properties file.	Revisit the <i>i2b2Workbench.properties</i> file and verify the following: <ul style="list-style-type: none">• The target location for the PM has been entered.• The URL is entered correctly

Important

If the URL for the PM target location is valid; check that it supports the getVersion operation. If it doesn't then the PM cell does not support messaging version 1.1 and should not be used with this version of the i2b2 Workbench.

Installation Guide Resources:

The following resources address configuring the i2b2Workbench.properties file and how to access it on either a Macintosh or Windows machine.

Resource For...	Chapter	Section
Configuring the PM Cell in the i2b2Workbench.properties file	i2b2 Workbench Install	Define Hive Location
Accessing the i2b2Workbench.properties file on a Mac	i2b2 Workbench Install	Access Properties File on a Macintosh
Accessing the i2b2Workbench.properties file on Windows	i2b2 Workbench Install	Access Properties File on Windows

PM Cell is Unavailable

ERROR MESSAGES
<i>Project Management Cell is unavailable</i> <i>Project Management Cell is unavailable for login</i>

Possible Problems and Solutions:

The process of troubleshooting the above error message will depend on when you are receiving it. The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received when attempting to log into the Web Client and Workbench	The PM Cell may not be running	Check your web services to see if <i>PMService</i> is listed as active. If it is not then you need to restart JBoss
Received when attempting to log into the Workbench but did not receive the message when logging into the Web Client	The location of the PM Cell may not be correctly defined in the i2b2Workbench.properties file.	Revisit the <i>i2b2Workbench.properties</i> file and verify the URL for the PM Cell is entered correctly.

Installation Guide Resources:

The following resources address how to check web services, stop and start services, configuring the i2b2Workbench.properties file and how to access it on either a Macintosh or Windows machine.

Resource For...	Chapter	Section
Checking Web Services	Project Management (PM) Cell Install	Verify PM Installation
Stop Services	Project Management (PM) Cell Install	Stop Services
Start Services	Project Management (PM) Cell Install	Start Services
Configuring the PM Cell in the i2b2Workbench.properties file	i2b2 Workbench Install	Define Hive Location
Accessing the i2b2Workbench.properties file on a Mac	i2b2 Workbench Install	Access Properties File on a Macintosh
Accessing the i2b2Workbench.properties file on Windows	i2b2 Workbench Install	Access Properties File on Windows

PM Service is Not Responding

ERROR MESSAGE
<i>PM Service is not Responding</i>

Possible Problems and Solutions:

The process of troubleshooting the above error message will depend on when you are receiving it. The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received when attempting to log into the Web Client and Workbench	PM Cell may be down	Check web services to see if <i>PMService</i> is listed as active.
Received when attempting to log into the Workbench but did not receive the message when logging into the Web Client	The location of the PM Cell is not defined correctly in the <i>i2b2Workbench.properties</i> file.	Revisit the <i>i2b2Workbench.properties</i> file and verify the URL for the PM Cell is entered correctly.
Received the message in one of the following views: <ul style="list-style-type: none"> Query Tool Previous Queries Timeline 	The PM Cell is not configured correctly in the properties file for the CRC Cell or CRC Loader	Revisit the <i>crc.properties</i> and <i>edu.harvard.i2b2.crc.loader.properties</i> files and verify the URL for the PM Cell is entered correctly.
Received the message in one of the following views: <ul style="list-style-type: none"> Navigation Terms Find Terms Edit Terms 	The PM Cell is not configured correctly in the properties file for the Ontology Cell	Revisit the <i>ontology.properties</i> file and verify the URL for the PM Cell is entered correctly.
Received the message in one of the following views: <ul style="list-style-type: none"> Workplace 	The PM Cell is not configured correctly in the properties file for the Workplace Cell	Revisit the <i>workplace.properties</i> file and verify the URL for the PM Cell is entered correctly.

Installation Guide Resources:

Note

Multiple chapters and sections are listed for the *Checking Web Services*, *Stop Services*, and *Start Services* resources. You only need to refer to one of them as the process of checking web services is the same regardless of which cell you are checking. The same is true for Stopping and Starting the JBoss services.

Resource For...	Chapter	Section
Checking Web Services	Project Management (PM) Cell Install Data Repository (CRC) Cell Install Ontology Management (ONT) Cell Install Workplace (WORK) Cell Install	Verify PM Installation Verify CRC Installation Verify Ontology Installation Verify Workplace Installation
Stop Services	Project Management (PM) Cell Install Data Repository (CRC) Cell Install Ontology Management (ONT) Cell Install Workplace (WORK) Cell Install	Stop Services (<i>PM Chapter</i>) Stop Services (<i>CRC Chapter</i>) Stop Services (<i>Ontology Chapter</i>) Stop Services (<i>Workplace Chapter</i>)
Start Services	Project Management (PM) Cell Install Data Repository (CRC) Cell Install Ontology Management (ONT) Cell Install Workplace (WORK) Cell Install	Start Services (<i>PM Chapter</i>) Start Services (<i>CRC Chapter</i>) Start Services (<i>Ontology Chapter</i>) Start Services (<i>Workplace Chapter</i>)
Configuring the PM Cell in the <i>i2b2Workbench.properties</i> file	<i>i2b2 Workbench</i> Install	Define Hive Location
Accessing the <i>i2b2Workbench.properties</i> file on a Mac	<i>i2b2 Workbench</i> Install	Access Properties File on a Macintosh
Accessing the <i>i2b2Workbench.properties</i> file on Windows	<i>i2b2 Workbench</i> Install	Access Properties File on Windows
Configuring the PM Cell in the CRC and CRC Loader configuration files	Data Repository (CRC) Cell Install	CRC Properties: Configure PM Cell Properties CRC Loader Properties: Configure PM Cell Properties
Configuring the PM Cell in the Ontology configuration files	Ontology Management (ONT) Cell Install	Ontology Properties: Configure PM Cell Properties

Configuring the PM Cell in the Workplace configuration files	Workplace (WORK) Cell Install	Workplace Properties: Configure PM Cell Properties
--------------------------------------------------------------	-------------------------------	----------------------------------------------------

Remote Server is Unavailable

ERROR MESSAGE
<i>Remote server is unavailable</i>

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received the message in one of the following views: <ul style="list-style-type: none"> Query Tool Previous Queries Timeline 	The services for the CRC Cell may not be running.	Check your web services to see if <i>QueryToolService</i> is listed as active. If it is not then you need to restart JBoss.
Received the message in one of the following views: <ul style="list-style-type: none"> Navigation Terms Find Terms Edit Terms 	The services for the Ontology Cell may not be running.	Check your web services to see if <i>OntologyService</i> is listed as active. If it is not then you need to restart JBoss.
Received the message in one of the following views: <ul style="list-style-type: none"> Workplace 	The services for the Workplace Cell may not be running.	Check your web services to see if <i>WorkplaceService</i> is listed as active. If it is not then you need to restart JBoss.

Installation Guide Resources:

The following resources address how to verify your web services are running as well as the process for stopping and starting them.

Note

Multiple chapters and sections are listed for the *Checking Web Services*, *Stop Services*, and *Start Services* resources. You only need to refer to one of them as the process of checking web services is the same regardless of which cell you are checking. The same is true for Stopping and Starting the JBoss services.

Resource For...	Chapter	Section
Checking Web Services	Data Repository (CRC) Cell Install Ontology Management (ONT) Cell Install Workplace (WORK) Cell Install	Verify CRC Installation Verify Ontology Installation Verify Workplace Installation
Stop Services	Data Repository (CRC) Cell Install Ontology Management (ONT) Cell Install Workplace (WORK) Cell Install	Stop Services (<i>CRC Chapter</i>) Stop Services (<i>Ontology Chapter</i>) Stop Services (<i>Workplace Chapter</i>)

Start Services	Data Repository (CRC) Cell Install Ontology Management (ONT) Cell Install Workplace (WORK) Cell Install	Start Services (<i>CRC Chapter</i>) Start Services (<i>Ontology Chapter</i>) Start Services (<i>Workplace Chapter</i>)
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Target Location and Application Name Do Not Match

ERROR MESSAGES
<i>No PM Target locations were provided that have prefix of "appName"</i>

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received when attempting to log into the i2b2 Workbench	In the i2b2Workbench.properties file the name entered for the applicationName property and the target identifiers may not match	Revisit the <i>i2b2Workbench.properties</i> file and verify the applicationName property matches the prefix of the target identifier(s).

Name and Prefix Match Example:

applicationName=**i2b2**
i2b2.1=YourSite,REST,<http://services.i2b2.org/i2b2/rest/PMService/>

Note

In this instance, the name and target identifier are not case sensitive.

Installation Guide Resources:

The following resources address configuring the i2b2Workbench.properties file and how to access it on either a Macintosh or Windows machine.

Resource For...	Chapter	Section
Configuring the PM Cell in the i2b2Workbench.properties file	i2b2 Workbench Install	Define Hive Location
Accessing the i2b2Workbench.properties file on a Mac	i2b2 Workbench Install	Access Properties File on a Macintosh
Accessing the i2b2Workbench.properties file on Windows	i2b2 Workbench Install	Access Properties File on Windows

Target Location Missing or Not Specified Correctly

ERROR MESSAGES

***"Your site" target location label does not appear or no target locations appear.
PM Target location not specified properly***

Note

The two target locations ("Your site" and PM) referenced in these error messages are synonymous.

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received when attempting to log into the i2b2 Workbench	The target location may be missing or not be defined correctly in the i2b2Workbench.properties file.	Revisit the <i>i2b2Workbench.properties</i> file and verify the following: <ul style="list-style-type: none">• The target location parameters have the proper number of elements.• The target location parameters do not have duplicate numbers.

Target Location Example:

i2b2.1=i2b2demo,REST,<http://services.i2b2.org/i2b2/services/PMService/>

i2b2.2=i2b2demo,REST,<http://localhost:9090/i2b2/services/PMService/>

i2b2.3=*YourDomain*,REST,<http://YourJBossHost:YourJBossPort/i2b2/services/PMService/>

Installation Guide Resources:

The following resources address configuring the i2b2Workbench.properties file and how to access it on either a Macintosh or Windows machine.

Resource For...	Chapter	Section
Configuring the PM Cell in the i2b2Workbench.properties file	i2b2 Workbench Install	Define Hive Location
Accessing the i2b2Workbench.properties file on a Mac	i2b2 Workbench Install	Access Properties File on a Macintosh
Accessing the i2b2Workbench.properties file on Windows	i2b2 Workbench Install	Access Properties File on Windows

Web Client is Not Running

ERROR MESSAGES

Web client is not running

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received when attempting to log into the i2b2 Web Client	Your web server may not be running.	Check that your web server (httpd or iis) is running.

Workplace Cell is Unavailable

ERROR MESSAGES
<i>Workplace Cell is Unavailable</i>

Possible Problems and Solutions:

The following table is designed to assist you with troubleshooting this error.

When The Error Message Was Received	Possible Problem(s)	Possible Solution(s)
Received while logged into the i2b2 Web Client or Workbench	<p>The possible causes for this error message may be one of the following:</p> <ul style="list-style-type: none">• The Workplace Cell may not be deployed• The Workplace Cell may be down; the services are not running• The Workplace Cell may not be configured correctly in i2b2 Admin	<ul style="list-style-type: none">• Verify the Workplace Cell was deployed by looking in the deployments folder located in <i>YOUR_JBOSS_DIR</i><ul style="list-style-type: none">• If the cell was deployed you will see a file called work-ds.xml.deployed• If it was not deployed you won't see the above file and will need to deploy the workplace cell.• Check your web services to see if <i>WorkplaceService</i> is listed as active. If it is not then you need to restart JBoss.• Verify the Workplace Cell is configured correctly in i2b2 Admin.<ul style="list-style-type: none">• The Cell Id should be WORK• The Cell URL should be the IP or domain name where the cell is located.

Installation Guide Resources:

The following resources address configuring deploying and configuring cells as well as checking web services.

Resource For...	Chapter	Section
Deploying the Workplace Cell	Workplace (WORK) Cell Install	Deployment
Checking Web Services	Workplace (WORK) Cell Install	Verify Workplace Installation
Stop Services	Workplace (WORK) Cell Install	Stop Services
Start Services	Workplace (WORK) Cell Install	Start Services
Configuring Workplace Cell Data in i2b2 Admin	Workplace (WORK) Cell Install	Update CRC Cell Data in i2b2 Admin
Managing i2b2 Cells in i2b2 Admin	Initial Setup of i2b2 in Admin	Managing i2b2 Cells

Licenses

The i2b2 source code is licensed under the i2b2 Software License 2.1. This includes but is not limited to all code in the edu.harvard.i2b2.* package namespace.

The i2b2 Web Client uses three open source JavaScript Libraries:

1. Yahoo! User Interface (YUI)
2. Prototype
3. Firebug

The code and respective license agreements for the above libraries can be found in the js-ext directory.

Appendices

Appedix A - Install Worksheet



One of the benefits of the i2b2 software is its flexibility in that it is completely customizable to meet the needs of your institution. This flexibility means there are a number of configurable settings that need to be modified with your site specific information. This worksheet is designed to assist you with keeping track of the various directories, ports, hosts and database settings that are specific to your environment. These variables are referenced in the i2b2 Installation document and the values will be needed when configuring your i2b2 database(s) and software for installation.

Tip

You may want to use this worksheet in conjunction with *Appendix B - i2b2 Installation Checklist*.

Location of Software Directories

During the installation you will be downloading and extracting software that will be used during the installation process. The following table will help you keep track of where this software is located in your environment.

Software	Reference in i2b2 Document	Root Directory Path
JAVA (JDK)	YOUR_JAVA_HOME_DIR	
JBoss 7	YOUR_JBOSS_HOME_DIR	
Apache Ant	YOUR_ANT_HOME_DIR	
i2b2 Database Scripts	YOUR_I2B2_DATA_DIR	
i2b2 Source Code	YOUR_I2B2_SRC_DIR	
i2b2 Web Client Directory (Source Code)	YOUR_I2B2_WC_DIR	
i2b2 Workbench	YOUR_I2B2_WB_DIR	

Example Locations

The following table contains the location examples provided in the installation documentation.

Software	Reference in i2b2 Document	Root Directory Path (Linux)	Root Directory Path (Windows)
JAVA (JDK)	YOUR_JAVA_HOME_DIR	/opt/java/jdk1.7.0_51/	C:\Program Files\Java\jdk1.7.0_51\
JBoss 7	YOUR_JBOSS_HOME_DIR	/opt/jboss-as-7.1.1.Final/	C:\opt\jboss-as-7.1.1.Final\
Apache Ant	YOUR_ANT_HOME_DIR	/opt/apache-ant-1.8.4/	C:\opt\apache-at-1.8.4\
i2b2 Database Scripts	YOUR_I2B2_DATA_DIR	/opt/data/	C:\opt\data\
i2b2 Source Code	YOUR_I2B2_SRC_DIR	/opt/i2b2/	C:\opt\i2b2\
i2b2 Web Client Directory (Source Code)	YOUR_I2B2_WC_DIR	/opt/webclient/	C:\opt\webclient\
i2b2 Workbench	YOUR_I2B2_WB_DIR	/applications/	C:\Program Files\

JBoss Port Settings

The following table can be used to keep track of the ports in your environment.

Name	JBoss Default Port	i2b2 Default Port	Your Port
ajp	8008	9009	
http	8080	9090	

Host and Domain Settings

The following table can be used to keep track of your host and domain information for the i2b2 Administration Module and Web Client.

Client	IP Address / Hostname	Domain	i2b2 Host (name)

i2b2 Pre-configured (Default) Host and Domain Settings

Client	IP Address / Hostname	Domain	i2b2 Host (name)
i2b2 Admin	127.0.0.1	i2b2demo	i2b2demo
i2b2 Web Client	services.i2b2.org 127.0.0.1	i2b2demo i2b2demo	HarvardDemo i2b2demo (1.7)

Cell Locations

The i2b2 cells can be installed on different machines in your environment. The location of the cells are needed when configuring the different property files as well as setting up your cells in i2b2 Admin. You can use the following table to keep track of where these cells are installed in your network.

Name	Cell ID	Default Cell Location (Hostname:Port)	Your Cell Location (Hostname:Port)
Data Repository Cell	CRC	localhost:9090	
File Repository Cell	FRC	localhost:9090	
Identity Management Cell	IM	localhost:9090	
Ontology Management Cell	ONT	localhost:9090	
Project Management Cell	PM	localhost:9090	
Workplace Cell	WORK	localhost:9090	

Database Drivers

Incorrect driver information in a configuration file is often the source of database connection errors. The following table is a guide for you to reference when setting your database properties and configuring you data sources.

Type of Database	JDBC (URL)	Driver-Class	Driver
Oracle	oracle:thin	oracle.jdbc.driver.OracleDriver	ojdbc6.jar
PostgreSQL	postgresql	org.postgresql.Driver	postgresql-9.2-1002.jdbc4.jar
SQL Server	sqlserver	com.microsoft.sqlserver.jdbc.SQLServerDriver	sqljdbc4.jar

Database Location / Configuration / Users

Each cell has a set of tables that are created and loaded with data during the Data Installation chapter. The location of these tables, the name of the database / schema as well as the user information is captured when configuring each cell for installation. The following table will help you keep track of the database / schema names, their locations and the database user for each grouping of i2b2 Data Tables.

Note

i2b2 is fairly flexible in that it does not require all your data tables to reside in the same location. For instance, you may want to install the PM data tables in a different location than those for the Ontology Cell. If this is the case then the following table can help you keep track of the different tables are installed.

i2b2 Data Tables	Database / Schema Name	Database Location (Host:Port)	Database Username	Database Password	Project
Crcdata					
Hivedata					
Imdata					
Metadata					
Pmdata					
Workdata					

i2b2 Demo Data Default Configuration

The following table outlines the default configurations that are delivered with the i2b2 software. It is configured for the i2b2 demo domain as a local host.

i2b2 Data Tables	Database / Schema Name	Database Location (Host:Port)	Database Username	Database Password	Project
Crcdata	i2b2demodata	localhost:1521	i2b2demodata	demouser	demo
Hivedata	i2b2hive	localhost:1521	i2b2hive	demouser	
Imdata	i2b2imdata	localhost:1521	i2b2imdata	demouser	demo
Metadata	i2b2metadata	localhost:1521	i2b2metadata	demouser	demo
Pmdata	i2b2pm	localhost:1521	i2b2pm	demouser	
Workdata	i2b2workdata	localhost:1521	i2b2workdata	demouser	demo

Appendix B - i2b2 Installation Checklist



This checklist is designed to assist you in the installation of the i2b2 Server and Clients. It is organized to coincide with the installation chapters. The items appear in the checklist in the order in which they need to occur during the installation.

Note

This checklist is not a replacement for the i2b2 Installation Guide. The guide itself contains detailed information, important notes and warnings as well as helpful tips.

Installation Overview

Environment:	Demo / Test / Production / Other	Version of i2b2:	
Domain ID:		Domain Name:	
Setup Date:		Setup By:	

Installation Order and Resources

Installation Order	Checklist Name	Install Guide Resource
1. System and Software Requirements	Requirements Checklist	Chapter 2. Requirements
2. Data Installation	Data Checklist	Chapter 3. Data Installation
3. Deploying the server-common	Server-Common Checklist	Chapter 4. i2b2 Server-Common Install
4. PM Cell Installation	PM Checklist	Chapter 5. Project Management (PM) Cell Install
5. i2b2 Admin Installation	i2b2 Admin Checklist	Chapter 6. i2b2 Administration Module Install
6. i2b2 Web Client Installation	i2b2 Web Client Checklist	Chapter 7. i2b2 Web Client Install

7. i2b2 Workbench Installation	i2b2 Workbench Checklist	Chapter 8. i2b2 Workbench Install
8. ONT Cell Installation	ONT Checklist	Chapter 9. Ontology Management (ONT) Cell Install
9. CRC Cell Installation	CRC Checklist	Chapter 10. Data Repository (CRC) Cell Install
10. WORK Cell Installation	WORK Checklist	Chapter 11. Workplace (WORK) Cell Install
11. FR Cell Installation	FR Checklist	Chapter 12. File Repository (FR) Cell Install
12. IM Cell Installation	IM Checklist	Chapter 13. Identity Management (IM) Cell Install
13. Setting up i2b2	Initial i2b2 Setup Checklist	Chapter 14. Initial Setup of i2b2 in Admin

Things To Keep In Mind

For the most part the installation of the different i2b2 Core Cells involves steps that are very similar. For instance, they all have a build.properties file where you will need to set the *jboss.home* and *axis2.war.name* properties for the cell you will be deploying.

Based on feedback provided by our users, a common area for confusion and errors seems to be around the configuration of the data sources for each cell. Here are some things to keep in mind that will hopefully eliminate or at least minimize any confusion around defining your datasources.

1. The PM, ONT, CRC, WORK, and IM cells each have a ds.xml file that needs to be updated before deploying the cell. (*pm-ds.xml*, *ont-ds.xml*, *crc-ds.xml*, *work-ds.xml*, and *im-ds.xml*)
2. At least two **datasources** have to be defined in the ds.xml files for the ONT, CRC, WORK, and IM Cells.
 - The **BootstrapDS** datasource points to the DB_LOOKUP tables that are part of the Hivedata tables.
 - The **DemoDS** datasource points to the tables for the cell you are configuring.

3. The PM Cell has only one datasource (*PMBootstrapDS*) defined and it points to the location of the **Pmdata** tables.

Note

Depending on how you have setup your database environment the Pmdata tables may or may not be in the same location as your Hivedata tables.

4. The **<connection-url>** for every **<datasource>** defined in each ds.xml file needs to be updated with information that is specific to your environment.
 - Update the **<connection-url>** with the correct JDBC information for your type of database.
 - The address in the URL needs to point to either the location of your hivedata tables (*BootstrapDS*) or the tables for your cell (*DemoDS*).
5. The **<driver-class>** and **<driver>** for each **<datasource>** needs to be defined correctly for the type of database you are connecting to.

Important

Depending on your environment, the default of **localhost** may not be appropriate for you. Some systems require the I.P. address instead of the alias name.

6. The **<username>** and **<password>** for each **<datasource>** needs to match the database users you setup during the data installation. The following table shows the usernames and passwords for the i2b2 demo environment.

Data Package	Cell Owner	Database / Schema Name	User Name	Password
Crcdata	Data Repository (CRC)	i2b2demodata	i2b2demodata	demouser
Hivedata	Project Management (PM)	i2b2hive	i2b2hive	demouser
Imdata	Identity Management (IM)	i2b2imdata	i2b2imdata	demouser
Metadata	Ontology Management (ONT)	i2b2metadata	i2b2metadata	demouser

Pmdata	Project Management (PM)	i2b2pm	i2b2pm	demouser
Workdata	Workplace (WORK)	i2b2workdata	i2b2workdata	demouser

Tip

Obviously the passwords and possibly the usernames will be different for those databases that contain your real patient data. The **Installation Worksheet (Appendix A)** can be used to document and organize the settings for your environment. The worksheet is particularly useful if you are setting up multiple environments and need to keep track of the settings for each environment.

7. Multiple projects with different data sources.

- Need to add an additional <datasource> section for each project data source.
- In addition to updating the connection-url, drivers and database user information you also need to update both the **jndi-name** and **pool-name** to reflect the name of the other projects.

Important

Any changes made to a cell's ds.xml file **after** it has been deployed will require you to re-deploy the cell in order for the changes to take effect.

In addition to the ds.xml files, several cells have additional "data configurations" defined in their property files. These additional data configurations are typically defining the schema / database name and location of your Hivedata tables so the cells can lookup relevant information.

Installation Checklists


Requirements Checklist

Step	File Name or Comment	Completed
Database Requirements		
Installed a Database Management System supported by i2b2	Oracle / PostgreSQL / SQLServer	
Browser Requirements		
Installed a web browser supported by i2b2	Firefox / Internet Explorer / Safari	
i2b2 Server Requirements		
Installed Java JDK 7.0 on your i2b2 Server		
Installed JBoss 7.1.1 Application Server on your i2b2 Server		
Set JBoss logging level to INFO		
Documented JBoss port; if other than 9090 then install scripts have to be updated		
Setup JBoss to run as either a Linux or Windows service		
Installed Apache Ant 1.8.2 on your i2b2 Server		
Installed Apache Axis2 1.6.2 on your i2b2 Server		
Set your system environment variables on your i2b2 Server		
Web Server Requirements		
Installed cURL on your web server	Only required for Linux Machines	
Installed IIS on your web server	Only required for Windows Machines	

Installed Php: Hypertext Preprocessor on your web server	Required for both Linux and Windows Machines	<input type="checkbox"/>
i2b2 Software Requirements	Downloaded zip files from i2b2.org	
i2b2 data installation scripts		
i2b2 core source code		
i2b2 Web Client code		
i2b2 Workbench application for Macintosh or Windows		
i2b2 VMWare image of the i2b2 Core Server	Optional	

Data Checklist

Step	File Name or Comment	Completed
Extracted the i2b2 data package to a directory of your choice	<i>YOUR_I2B2_DATA_DIR</i>	
Created database user accounts for all the i2b2 schemas		
Crcdata		
Set the database properties	db.properties	
Created the Crcdata tables		
Created the stored procedures		
Loaded the data into the Crcdata tables	Type of data loaded: <i>i2b2 demo data or your local data</i>	
Hivedata		
Set the database properties	db.properties	
Created the Hivedata tables		
Loaded the data into the Hivedata tables	Type of data loaded: <i>i2b2 demo data or your local data</i>	
Imdata	Optional Cell	
Set the database properties	db.properties	
Created the Imdata tables		
Loaded the data into the Imdata tables	Type of data loaded: <i>i2b2 demo data or your local data</i>	
Metadata		
Set the database properties	db.properties	
Created the Metadata tables		
Loaded the data into the Metadata tables	Type of data loaded: <i>i2b2 demo data or your local data</i>	
Pmdata		
Set the database properties	db.properties	
Created the Pmdata tables		
Created the PM triggers		
Loaded the data into the Pmdata tables	Type of data loaded: <i>i2b2 demo data or your local data</i>	
Workdata		
Set the database properties	db.properties	
Created the Workdata tables		

Loaded the data into the Workdata tables	Type of data loaded: <i>i2b2 demo data or your local data</i>	
------------------------------------------	-------------------------------------------------------------------------	-------------------------------------------------------------------------------------

Server-Common Checklist

Step	File Name or Comment	Completed
Extracted the i2b2 source code to a directory of your choice	<i>YOUR_I2B2_SRC_DIR</i>	
Configured the build properties	build.properties	
Deployed edu.harvard.i2b2.server-common		

PM Checklist

Step	File Name or Comment	Completed
Configured the PM build properties	build.properties	
Configured the datasources for the PM Cell	pm-ds.xml	
Deployed edu.harvard.i2b2.pm		
Verified the installation of the PM Cell		

i2b2 Admin Checklist

Warning

The Admin Module and the Web Client each have their own folder that contains the necessary files to run the respective application. Both the admin and webclient folders contain files with similar names which can be a source of confusion. Therefore it is important to make sure you are editing the files in the **admin folder** and **not** the ones that reside in the webclient folder.

In addition to the above, you also want to make sure you are editing the admin files in your **webserver directory** and **not** the ones that reside in *YOUR_I2B2_SRC_DIR*.

Step	File Name or Comment	Completed
Copied Admin files to your web server directory		
<i>Configured the Domain information for your Admin Module</i>	<i>See note at end of this table</i>	
Commented out or removed the pre-configured domain of <i>i2b2demo</i>	<i>See note at end of this table</i>	
Added the domain information for your environment	<i>i.e. test and production</i>	
Verified the installation of the i2b2 Admin		

Note

The i2b2 Admin is pre-configured with the following domain information:
The **domain** is **i2b2demo**

The **URL** points to the **local PM** in your i2b2 demo environment

If you comment out or remove this domain then i2b2 will not work in your demo environment.

i2b2 Web Client Checklist

Warning

The Admin Module and the Web Client each have their own folder that contains the necessary files to run the respective application. Both the admin and webclient folders contain files with similar names which can be a source of confusion. Therefore it is important to make sure you are editing the files in the **webclient folder** and **not** the ones that reside in the admin folder.

In addition to the above, you also want to make sure you are editing the web client files in your **webserver directory** and **not** the ones that reside in YOUR_I2B2_WC_DIR.

Step	File Name or Comment	Completed
Extracted the i2b2 Web Client code to a directory of your choice	YOUR_I2B2_WC_DIR	
Copied Web Client files to your web server directory		
Configured the Proxy information for your environment		
Using the default PHP proxy file that is included with the i2b2 Software		
Update security configurations in the PHP proxy		
Verified the correct proxy is defined in the Web Client's config file (<i>i2b2_config_data.js</i>)		
Not using the default PHP proxy file that is included with the i2b2 Software		
Write your own proxy file		
Update the urlProxy in the Web Client's config file to reflect the correct proxy (<i>i2b2_config_data.js</i>)		
Configured the Domain information for your Web Client	See note at end of this table	
Commented out, or removed the default domain of <i>HarvardDemo</i>	Optional	
Added the i2b2demo domain for your i2b2 demo environment		
Added the domain information for your environment	<i>i.e. test and production</i>	
Verified the installation of the i2b2 Web Client		

Note

The i2b2 Web Client is pre-configured with the following domain information:


The **domain** is **HarvardDemo**

The **URL** points to the **public i2b2** in your i2b2.org site

If you comment out or remove this domain then i2b2 Web Client will not be able to connect to the public i2b2 site.

i2b2 Workbench Checklist

Step	File Name or Comment	Completed
Extracted the i2b2 Workbench files to a directory of your choice	YOUR_I2B2_WB_DIR	


Configured the Workbench properties with the location of your hive	i2b2workbench.properties	
Verified the installation of the i2b2 Workbench		

ONT Checklist

Step	File Name or <i>Comment</i>	Completed
Configured the Ontology build properties	build.properties	
Configured the Ontology application directory properties	ontology_application_directory.properties	
<i>Configured the following Ontology properties</i>	ontology.properties	
Set the Metadata Schema Name	<i>Location of the Hivedata tables</i>	
Set the Project Management Cell Integration Properties	<i>Settings to locate and communicate with the PM Cell</i>	
Set the File Management Cell Properties	<i>Settings to locate and communicate with the FRC Cell</i>	
Set the CRC Cell Properties	<i>Settings to locate and communicate with the CRC Cell</i>	
Set the Ontology Service Account Properties		
Set the metadata delimiter property <div><div></div>\$body</div>		
Configured the data sources for the Ontology Cell	ont-ds.xml	
Deployed edu.harvard.i2b2.ontology		
Updated the ONT Cell Data in the i2b Admin Module		
Verified the installation of the Ontology Cell		

CRC Checklist

Step	File Name or <i>Comment</i>	Completed
Configured the CRC build properties	build.properties	
Configured the CRC application directory properties	crc_application_directory.properties	
<i>Configured the following CRC Loader properties</i>	edu.harvard.i2b2.crc.loader.properties	
Set the File Management Cell Properties	<i>Settings to locate and communicate with the FRC cell</i>	
Set the Project Management Cell Properties	<i>Settings to locate and communicate with the PM Cell</i>	
Configured the datasource lookups for the CRC Loader	CRCLoaderApplicationContext.xml edu.harvard.i2b2.crc.loader.properties	
<i>Configured the following CRC properties</i>	crc.properties	
Set the Project Management Cell Properties	<i>Settings to locate and communicate with the PM Cell</i>	
Set the CRC Datasource Lookup Properties	<i>Location of your hivedata tables and the type of database</i>	
Set the Ontology Cell Properties	<i>Settings to locate and communicate with the ONT Cell</i>	
Set the CRC Service Account Properties		
Set the PDO paging properties	<i>Optional performance property</i>	
Set the Analysis plug-in: Queue properties	<i>Optional performance property</i>	

Set the Setfinder query: Timeout properties	<i>Optional performance property</i>	
Set the Setfinder query: Lockout properties	<i>Optional performance property</i>	
Set the Setfinder query: Temp table properties	<i>Optional performance property</i>	
Configured the data sources for the CRC Cell	crc-ds.xml	
Deployed edu.harvard.i2b2.crc		
Updated the CRC Cell Data in the i2b Admin Module		
Updated the metadata key in the CRC Tables	<i>QT_BREAKDOWN_PATH table</i>	
Verified the installation of the CRC Cell		

WORK Checklist

Step	File Name or <i>Comment</i>	Completed
Configured the Workplace build properties	build.properties	
Configured the Workplace application directory properties	workplace_application_directory.properties	
<i>Configured the following Workplace properties</i>	workplace.properties	
Set the Metadata Schema Name	Location of the Hivedata tables	
Set the Project Management Cell Integration Properties	<i>Settings to locate and communicate with the PM Cell</i>	
Configured the data sources for the Workplace Cell	work-ds.xml	
Deployed edu.harvard.i2b2.workplace		
Updated the WORK Cell Data in the i2b Admin Module		
Verified the installation of the Workplace Cell		

FR Checklist

Step	File Name or <i>Comment</i>	Completed
Configured the File Repository build properties	build.properties	
Configured the File Repository application directory properties	fr_application_directory.properties	
<i>Configured the following File Repository properties</i>	edu.harvard.i2b2.fr.properties	
Set the Project Management Cell Integration Properties	<i>Settings to locate and communicate with the PM Cell</i>	
Deployed edu.harvard.i2b2.fr		
Updated the FRC Cell Data in the i2b Admin Module		

IM Checklist

Step	File Name or <i>Comment</i>	Completed
Configured the IM build properties	build.properties	
Configured the IM application directory properties	im_application_directory.properties	

Configured the following IM properties	ontology.properties	
Set the Metadata Schema Name	Location of the Hivedata tables	
Set the Project Management Cell Properties	Settings to locate and communicate with the PM Cell	
Set the Patient in Project Property		
Set the EMPI Service Properties	Optional 3rd party EMPI Service	
Configured the data sources for the IM Cell	im-ds.xml	
Deployed edu.harvard.i2b2.im		
Updated the IM Cell Data in the i2b Admin Module		

Initial i2b2 Setup Checklist

Step	File Name or Comment	Completed
Hive Data Management		
Updated the Help URL for your environment	Optional	
Verified Domain Name is entered correctly in i2b2 Admin		
Defined the type of environment		
Cell Data Management		
Verified the information for each of your cells is entered correctly; particularly the cell id and cell uri		
Defined any <i>cell specific</i> parameters		
User Management		
Entered at least one i2b2 user in i2b2 Admin		
Defined any <i>user specific</i> parameters		
Project Management		
Entered at least one project in i2b2 Admin		
Defined any <i>project specific</i> parameters	<i>i.e. Unit Conversion for Numerical Observations or Enable Process Timing</i>	
At least one user given access to the project and defined their level of access		
Defined any <i>project-user</i> parameters		
Setup i2b2 Authentication Method of Active Directory	Optional	
Added parameter for authentication method		
Added parameter for PDC Domain of your NT domain		
Added parameter for the connection URL of your NT domain		
Setup i2b2 Authentication Method of LDAP	Optional	
Added parameter for authentication method		
Added parameter for the connection URL of your LDAP server		
Added parameter for search base		
Added parameter for distinguished name		
Added parameter for security authentication		
Added parameter for ssl		
Added parameter for security layer		
Added parameter for privacy strength		

Added parameter for max buffer

