i2b2 Desktop Install: Full VM Server

Windows Installation Guide

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About this Guide

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

Chapter 1. Prerequisites

Introduction

As with many client-server application installations, assuring a correct base system configuration is often the most challenging aspect of the installation. That is, one needs to be sure the OS, referenced libraries, and associated applications are all installed correctly before you can validate the newly installed i2b2 Hive and client are working correctly. A system may appear to be functioning even though some prerequisites are missing; problems may only become apparent later when certain features do not work, or work erratically. Besides issues with prerequisites, other inconsistencies that may cause system issues are:

- Similar software components running on the machine competing for the same system resources as *i2b2 components:* For example, the Hive Server runs within the Apache Tomcat application server. Application servers communicate externally via ports dedicated to that server. While no standard exist as to which ports are used, one often sees the application server listening on Port 8080 or Port 8888. The issue is that a great percentage of servers have an application server running on them, most often Apache Tomcat or JBoss, often both. When installing Tomcat onto a system that already has JBoss running on it, one may find that the desired port already utilitized by JBoss. For this reason, installing on a dedicated system eliminates any of these types of issues, unless one is very familiar with all of the other applications running on the i2b2 server.
- Installing versions of prerequisites other than the recommended versions. Usually, versions of prerequisite software that are higher (more recent) than the recommended version result in no issues, as developers of such applications usually endeavor through convention to be completely *backwards compatible*, so that those with environments that have other applications depending upon their package (read: almost every environment) will work smoothly after upgrading. This should always be the case for minor revision upgrades. A minor revision is usually indicated by a version number which uses the same integer prefix, but the portion after the decimal point is higher (*e.g.*, 5.3 is a minor upgrade from 5.2). Whenever possible, one might wish to use the highest minor revision available. If one wishes to use a higher major release, it should be ready to "roll-back" to the last working version if problems are encountered. *It is highly discouraged to use any versions lower than those recommended for any prerequisite referenced in these installation guides*.¹
- *Intermittent issues observed when other applications are running on the server.* This may be different from an application that is always running, such as Apache Tomcat (see the item above on Application Servers). Specifically, this means that issues may only be encountered when other seemingly unrelated applications are running concurrently with the i2b2 server, but not present when these applications are not running. Again, a dedicated system, at least initially, can help ameliorate these potential issues.

Whenever practical, one can assure a configuration without conflicts by dedicating a piece of hardware as the i2b2 Server, and using it exclusively for that purpose.

Required Software

If you installed the prerequisite software from the Hive Installation Guide you may skip this section; however, you might want to verify that your prerequisite software is installed and available by executing the verification command at the end of each item in this section.

VMware Server

Important

One component of VMwarecalledVMware Management Interface requires the installation of Microsoft IIS on the server. If you plan on using this Management Interface for other applications at your institution you will need to install IIS prior to installing VMware.

It is important to note that Microsoft IIS is <u>NOT</u> required for the i2b2 VMware image. If you receive the warning when installing VMware and do not plan on using the Management Interface you can ignore the message when it appears.

1. Download VMware Server 1.0.5 or higher from http://www.vmware.com/products/server/

Tip

Disable any "auto run" drives as they can cause problems on virtual machines

2. Install the VMware Server into a directory of your choice

Note

Depending on the machine configuration you may receive a warning similar to the following: VMWare Management Interface is only supported on server operating systems. You may encounter some issues when using VMWare Management Interface on this system If you do receive this warning you can continue with the install.

Chapter 2. Install

Installing the i2b2 VMware image application

1. You will be downloading the VMware image from https://www.i2b2.org/rc [https://www.i2b2.org/ software]

Important

In order to access the release candidate ("RC") section of the i2b2 website you need to have an active user account. If you do not have an account you can request one by going to the release candidate registration page (see link below) on i2b2 website. Simply follow the directions to setup a new account.

https://www.i2b2.org/RC/Register.php [https://www.i2b2.org/software/registration]

- 2. Once on the main release candidate page, click on "login" and enter your email address and password.
- 3. Click on the either the link that says "Download Page" or the "Download" located on the left hand navigation menu.
- 4. Scroll to the bottom of the download page where you will see a table listing all the files that can be downloaded.
- 5. Once you have located the file that has the description of i2b2 Virtual Image, click on the download link next to it.

Note

In the description you will also see the release candidate information and/or the version number.

- 6. Extract all the files from the downloaded zip file in to C:\Virtual Machines\.
- 7. A folder called i2b2_server will be created automatically when the files are extracted from the zip file to the Virtual Machine directory.

Chapter 3. Execute

Running the VMware Server Console

- 1. Click on the start menu.
- 2. Go to Programs -> VMware -> VMware Server
- 3. Click on the VMware Server Console application.
- 4. Select Local Host button.

器 VMware Server Console		_ 🗆 ×
File Edit View Host VM Power Snapshot Wine	dows Help	
Inventory × Ame	_	×
VN 🚟 VMware Se	rver Console - Connect to Host re Server Console Select the VMware host that you want to connect to. To access virtual machines on the local computer you are using, select tocal host. C Local host Remote host Host name: Password: OK Cancel	<u> </u>
		_

5. Click on the Open Existing Virtual Machine icon.

He Local host - YMware Server Console		
File Edit View Host VM Power Sr	napshot Windows Help	
Inventory × 🚹 Horr	ne	×
VMv	ware Server Console	-
Co	onnected to Local host running VMware Server 1.0.5	
sys	e VMware Server Console lets you connect to virtual machines that run on VMware Server stems. Each virtual machine is equivalent to a physical server with storage, networking, emory and devices. The VMware Server Console gives you full control over virtual chines, including keyboard, video and mouse interactivity.	
	Click this button to create a new virtual machine. You then can install and run a variety of standard operating systems in the virtual machine. Machine	
	Click this button to display a list of virtual machines available on this server and to select one to display in this panel. You then can interact with the guest operating system within this display as you would a standard PC.	
5	Click this button to connect to a different VMware Server or GSX 3 host. Changing hosts will allow you to access virtual machines on another server or on your local computer if it has VMware Server installed.	
	VMware Server 1.0.5	5 🔒 //.

6. The open Wizard Machine dialog screen appears, click the Browse button:

BLocal host - YMware Server Console	_ 🗆 🗙
File Edit View Host VM Power Snapshot Windows Help	
Inventory X	×
VMware Server Console	<u> </u>
Conne Open Virtual Machine	
The VM system: memory: To open a virtual machine that is not in the list, click Browse and select a virtual machine methor; machine configuration file from a local or network drive.	
VM name Configuration file	
New ' New ' Mac Open f Virtual 1	
DK Cancel Browse Switch Host installed. Installed.	_
	VMware Server 1.0.5 🔗 🏑

7. Browse to c:\Virtual Machines\i2b2_server and select i2b2 Server. Click on the Open button.

BLocal host - YMware Server Console	_ 🗆 X
File Edit View Host VM Power Snapshot Windows Help	
Inventory X A Home	×
Browse for a Virtual Machine	<u> </u>
Look in: 🗀 i2b2_server 🔽 🔇 🎲 📂 🖽 -	
Workschaft Die Kongeleicher Linux 2.6.x kernel vmx Pelow and click I My Bacent Documents and select a vitu My Documents My Documents Pelow My Documents My Documents Pelow My Documents File name: Other Linux 2.6.x kernel vmx Open My Network File name: Other Linux 2.6.x kernel vmx Open Files of type: VMware Configuration Files (* vmx) Cancel	
	VMware Server 1.0.5 🔗 //

- 8. At this point, you should see the VMware Console screen again.
- 9. Click on the green arrow to start the Virtual Machine.

Note

In some instances another dialog box will appear. If this happens, click on $\tt Create$ and then $\tt OK$ to create a new UUID.

i2b2_ser	ver - Virtual Machine
2	The location of this virtual machine's configuration file has changed since it was last powered on.
	If the virtual machine has been copied, you should create a new unique identifier (UUID). If it has been moved, you should keep its old identifier.
	If you are not sure, create a new identifier.
	What do you want to do?
	· Create
	О Кеер
	C Always Create
	C Always Keep
	OK Cancel

Chapter 4. Configure

Determine the IP address

1. Login using the following username and password:

Login details

User name demo	
----------------	--

Password demouser

🚰 Local host - ¥Mware Server Console	
File Edit View Host VM Power Snapshot Windows Help	
Inventory X A Home Bi2b2_server	×
Di 2b2_server	
Username:	
demo	
이 가슴 것 같아. 이 돈에 가지 않는 것 같아. 가지 않는 것 같아.	
	Sun Apr 13, 8:20 PM
🔁 Language 🛛 🖓 Session 🔏 Restart 🗶 Shut Down	localhost.localdomain
A You do not have Whiware Tools installed.	VMware Server 1.0.5 🚔 🔛 🔤 🖉

2. Select Applications from the menus bar. Once the drop down menu appears select Accessories, and then Terminal. A terminal window will appear:

🚟 Local host - ¥Mware Server Con	asole		_ 🗆 ×
File Edit View Host VM P	rower Snapshot Windows Help		
🗖 💵 🕨 🌀 🔯 🕼			
Inventory ×	Home Bi2b2_server		×
12b2_server	Applications Places System 😔		🍵 8:23 PM 🚷
	📚 Accessories	🔹 🛵 Archive Manager	
	Graphics	Calculator	F
	8) Internet	> 💩 Character Map	Eclipse Installers
	Oracle Database 10g Express Edition	Dictionary	258955 8855
	Sound & Video	Take Screenshot	
	System Tools	Terminal	Documentation
		Use the command line	
	👸 Add/Remove Software	ose die command line	
		R	~
			Licenses
	Trash		
		i2b	2/
		deskt	
		ueski	
🔥 You do not have VMware Tools instal	led.		VMware Server 1.0.5 🙆 🕒 🗖 🜆 🂋

3. Enter the command /sbin/ifconfig eth0. The IP address value located at "inet addr:"

Important

Make note of this address as it will be used later in the setup

🗱 Local host - YMware Server Console				
File Edit View Host VM P	wer Snapshot Wi	ndows Help		
] 🗖 💵 下 🇐 🗋 🚳				
Inventory ×	🔒 Home 📑 i2b2	server	×	
	A Hone 2 12b2	server ; Places System 🔗	8:23 PM ()	
		R	lo Items in Trash	
	🛷 🔳 demo@	localhost:~		
A You do not have VMware Tools instal	d.	Wiware Server 1.0.5		

Change the registered Cells IP

1. Using a web browser goto http://192.168.133.128:7070/gridsphere where *192.168.133.128* is the IP address received above. Log in with

Login details

User name demo Password demouser

2. Select the Global Hive Data tab. Click on one of the cells such as Data Repository and select Edit Cell Info button:

🥹i2b2 Group Management Portal - Mozilla Firefox		
<u>File Edit View History Bookmarks Tools H</u> elp		() ()
 	28:7070/gridsphere/gridsphere?cid=77	C Google
🌮 Getting Started 🔂 Latest Headlines		
welcome Administration Global Hive Data de		Logout 🔺 Welcome, Demo User
Registered Cell Environment Data Global Variables		
Manage Cells	Registered Cell	
Register new cells or modify existing ones: Data Repository Data Repository PFT cell Edit Cell Info Remove Selected	Step 1: Fill in required Cell Information ID: CRC Name: Data Repository Base URL: http://192.168.133.12f Web Service Method: REST Step 2: (optional)Add cell variables Cell Variables: New Variable Remove	X
Done		○ ///

3. Using the IP address you noted in previous section and used in step one of this section update the IP in the Base URL.

Save the changes and repeat this process for all the remaining cells.

Configure the client

1. Install the i2b2 workbench (client based). The i2b2 Workbench Users Guide can be used as a reference for the installation process.

The web based client can be accessed by going to: http://192.168.133.128:7070/webclient where 192.168.133.128 is the IP address received earlier.

2. In your target's i2b2workbench directory, edit the file i2b2workbench.properties in the line that begins with i2b2.1, change the webservices.i2b2.org, to the IP above followed by a :7070. In addition change PM to axis2. For example:

I2b2.1=Demo,REST,http://192.168.133.128:7070/axis2/rest/PMService/

3. Launch C:\i2b2workbenchv13009\client\Windows\i2b2workbench.exe

Chapter 5. Troubleshooting

Error message received after upgrading VM Image to version 1.3

SYMPTOMS

When logging on to the i2b2 workbench after upgrading the VM Image to version 1.3, you may receive one or both of the following error messages:

Ontology service is not available

Workplace service is not available

<u>CAUSE</u>

This behavior can occur if the IP address from the VMware image is not defined correctly in the gridsphere.

RESOLUTION

Check the IP address in the gridsphere

1. Go to the gridsphere and log in with the following:

Log in details

User name demo Password demouser

Note

Steps on how to access the gridsphere can be found in chapter 4, the section titled "*Change the registered Cells IP*".

- 2. Click on the Global Hive Data tab.
- 3. Click on the Ontology cell.
- 4. Click on the Edit Cell Info button.
- 5. Verify the IP address in the field labeled "Base URL:", is the same one defined in the i2b2workbench.properties file.

Note

This IP address is the one from the VMware image.

- 6. If necessary, update the IP address.
- 7. Save the information.

- 8. Repeat the same steps for the Workplace cell.
- 9. Log back on to the i2b2 Workbench.

Cannot log on to the i2b2 workbench after upgrading VM Image to version 1.3

SYMPTOMS

When attempting to log on to the i2b2 workbench after upgrading the VM Image to version 1.3, you may receive an error message stating the i2b2 Workbench is not compatible with this version:

<u>CAUSE</u>

This behavior can occur as a result of one or many of the following causes:

- 1. The i2b2 property file does not have the correct port or IP address defined.
- 2. JBoss is not running
- 3. Tomcat is not running

RESOLUTION

Method 1: Check information in property file

- 1. Go to the target directory where you installed the i2b2 Workbench.
- 2. Open the file i2b2workbench.properties.
- 3. Verify that the demo location is defined. The following line should appear:

I2b2.1=Demo,REST,http://webservices:7070/axis2/rest/PMService/

Important

If "webservices" still appears in the line, you need to edit this to the IP address for the location of the VMware i2b2 server. Information on how to find this address can be found in Chapter 4 of this manual.

- 4. If the above line is missing, add it to the file. Make sure you replace "webservices" with your IP address, from the VMWare image.
- 5. In addition to verifying the demo location, check to make sure the port is defined correctly. The port that appears after the IP address should be 7070.
- 6. Save the file.

7. Go back to the i2b2 workbench and verify you can now sign on.

Method 2: Stop and Start JBoss

1. Go to the VMware Server Console and log in with the following:

Log in details

User name demo Password demouser

2. Select Applications from the menus bar. Once the drop down menu appears select Accessories, and then Terminal. A terminal window will appear:



- 3. Stop JBoss by entering the following command: /opt/jboss-4.2.2.GA/bin/shutdown.sh -S
- 4. Start JBoss by entering the following command: /opt/jboss-4.2.2.GA/bin/run.sh -b 0.0.0.0 &
- 5. Go back to the i2b2 workbench and verify you can now sign on.

Method 3: Stop and Start Tomcat

1. Go to the VMware Server Console and log in with the following:

Log in details

User name demo

Password demouser

2. Select Applications from the menus bar. Once the drop down menu appears select Accessories, and then Terminal. A terminal window will appear:

🚟 Local host - ¥Mware Server Con	sole		_ 🗆 🗙
File Edit View Host VM P	ower Snapshot Windows Help		
🗖 💵 🕟 🌀 🔯 🕼			
Inventory X	A Home Bi2b2_server		×
12b2_server	Applications Places System 😔		寶 8:23 PM 🕔
	Secessories	🔹 🦾 Archive Manager	
	b Graphics	 Calculator 	F
	🖏 Internet	🔹 🍪 Character Map	Eclipse Installers
	Gracle Database 10g Express Edition	Dictionary	~
	🕼 Sound & Video	• 💼 Take Screenshot	
	🛃 System Tools	• Terminal	Documentation
	👸 Add/Remove Software	Use the command line	
		Ŀ\$	
	U Trash		Licenses
		i2b	2
		desk	top
A You do not have VMware Tools instal	ed.		WMware Server 1.0.5 🖀 💁 🖬 🖉

- 3. Stop Tomcat by entering the following command: /opt/apache-tomcat-5.5.26/bin/catalina.sh stop
- 4. Start Tomcat by entering the following command: /opt/apache-tomcat-5.5.26/bin/catalina.sh start
- 5. Go back to the i2b2 workbench and verify you can now sign on.

Chapter 6. License Module

The i2b2 source code is licensed under the i2b2 Software License 2.0. This includes but is not limited to all code in the edu.harvard.mgh.i2b2.* package namespace.