PROTEXPRESS V. 1.0

Installation Guide

NATIONAL® CANCER INSTITUTE

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Contents

Introduction

This protExpress 1.0 installation Guide provides you with the instructions to install and configure protExpress 1.0 in your environment. The protExpress installation routine installs and configures an Apache Tomcat server on a preinstalled PostgreSQL server.

Procedures in this document are provided for both Linux and Windows operating systems.

Overview of protExpress

protExpress is a proteomics experiment and protocol data management tool that you can use to search and manage proteomics experiment and protocol data. You can also use protExpress to export stored experimental data to XAR format.

Overview of protExpress Installation

The process for installing protExpress includes the following tasks described in this document: [CKK: Please confirm this order and I will rearrange the order in which they appear in this document accordingly.]

Step	***Installation task***	***For more information, see***
1	Download and install required software.	*Downloading and Installing Required Software* on page 4
2	Set environment variables.	*Setting the Environment Variables* on page 1
3	Download and install the Universal Provisioning Tool (UPT).	*Downloading and Installing the UPT Files* on page 13
4	Download the protExpress 1.0 distribution files.	*Downloading protExpress Files* on page 6
5	Edit `protexpress-Install.properties`.	*About Properties* on page 12 [CKK: Isn't the procedure for this step part of the Installing protExpress topic?]
6	Install protExpress.	*Installing protExpress 1.0* on page 1
7	Configure the Apache Tomcat server.	*Configuring the Apache Tomcat* on page 19
8	Configure the PostgreSQL database server.	*Installing and Configuring PostgreSQL 8.3.x* on page 10
9	Advertise the grid service.	*Advertising the Grid Service* on page 23

Tested Environment

The protExpress 1.0 installation has been tested on Linux Red Hat Enterprise Linux AS 4 64/32-bit (for AMD chipset) and the Windows XP/2003 environments. While the installation may work in other Linux and Windows environments, it has only been tested in these environments.

protExpress 1.0 Minimum System Requirements

Current Solaris Production Environment

	DBMS	***Application Server***
Model		
CPU		
Memory		
Local Disk		
Network Link Speed		
OS		
Comments		

Table 1. High-end system using Sun Solaris OS and Ultra SPARC processors

protExpress Software and Technology Requirements

Required Software

Many of the servers and services that make up protExpress 1.0 are installed for you during this installation. However, you must manually install and configure certain tools. These tools are listed in Table 1 along with their versions, descriptions, and URL hyperlinks (for download). Using instructions found on their respective websites, install these tools in the order in which they appear below.

Required Software Name, Version, and URL	***Description***
Java 2 Platform Standard Edition 5.0 Update 10 (J2SE 5.0) `http://java.sun.com/products/archive/j2se/5.0_10/` Be sure to download the correct Java SDK for your operating environment. For example, for Linux AMD 64, you would download `jdk-1_5_0_10-linux-amd64-rpm.bin`. For Windows, you might download `jdk-1_5_0_10-windows-i586-p.exe`.	The J2SE Development Kit (JDK) supports creating J2SE applications.
Apache Ant, 1.7.0 `https://gforge.nci.nih.gov/svnroot/lsd/trunk/tools/apache-ant-1.7.0-bin.zip`	Apache Ant is a Java-based build tool.
PostgreSQL 8.3.x	PostgreSQL is an open-source database software application.

Table 2. Required software

IMPORTANT

As you install each application, record the installation directory path, and the database.server, database username and password.

Downloading and Installing Required Software

See the following sections for more information on downloading and installing required software not installed with protExpress.

Installing Java SDK

When you install the Java SDK, you will be prompted to select the installation directory. Record the path, as this directory will be used when you set the environment variables.

Installing Apache Ant

Unzip the Apache Ant distribution files using a command line unzip tool or a zip utility, such as WinZip.

After extracting the zip, you must set the environment variables, described in the following section, so that Ant is available in the system PATH.

Preliminary Procedures

Downloading protExpress Files

To download the appropriate files, follow these steps:

Step	*Action*
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

File Description	*Example Filename*
Database Dump File	`caArrayop.dmp.zip` This file contains seed data. This file does not change between releases unless a new dump is generated. We strongly recommend the use of this file to generate the database for new installs.
protExpress Source Code	`protExpress-src.1.6.zip` The source code contains the necessary source code, database scripts and configuration files for installing protExpress application at a local cancer center.

Table 3. protExpress download files

Setting the Environment Variables

Environment Variable	Description of Value
JAVA_HOME	Path to J2SE 5.0 installation, for example, /usr/jdk1.5.0_7
ANT_HOME	Path to Ant 1.10 installation, for example, /usr/local/apache-ant-1.7

Table 4. Required software environment variables

Apache Ant Environment Variables

NOTE

The purpose of setting operating system environment variables is so that the Java SDK and Ant build tool are available to run from anywhere in the system.

Linux

To set the environmental variables in Linux, follow these steps:

NOTE

The JAVA_HOME, ANT_HOME and PATH environment variables are set in /etc/profile. You may need to create the variables, or modify them if they already exist.

Step	Action

1.	As the root user, enter the following in the /etc/profile file. A PATH variable should already be created in this file, so be sure to define the JAVA_HOME and ANT_HOME export before the PATH export. Replace <installation_directory> with the directory where you have installed the Java SDK and Ant.
	(The location example in the Apache Ant installation is /usr/java.)
	`export JAVA_HOME=<installation_directory>/jdk1.5.0_10`
	`export ANT_HOME=<installation_directory>/apache-ant-1.7.0`
	`export PATH=$JAVA_HOME/bin:$ANT_HOME/bin:$PATH`

2.	Log out and log back in so that the system recognizes your changes.

Verifying the Environment Variables in Linux

To verify that environment variables have been set correctly, follow these steps:

Step	Action

1.	From the command line, enter:
	`echo $JAVA_HOME`
	`echo $ANT_HOME`
	Both of these commands should return the location where you installed these tools.

2.	To verify your Java SDK installation, enter `java –version` from a command prompt. You should see java version 1.5.0_10.
3.	To verify your Ant installation, enter: `ant –version` from a command prompt. You should see: `Apache Ant version 1.7.0 compiled on December 13 2006.`

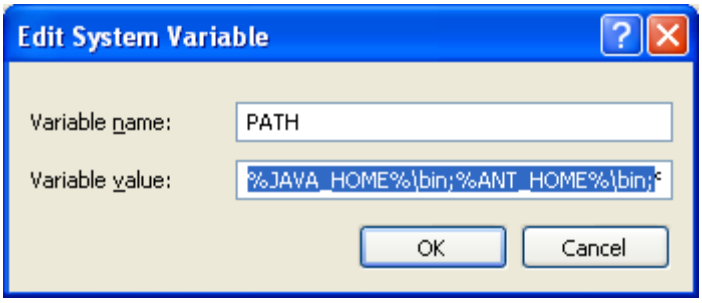
Windows

To set the environmental variables in Windows, follow these steps:

NOTE

The `JAVA_HOME`, `ANT_HOME` and `PATH` environment variables are set in the Systems Properties.

Step	Action
1.	In Windows, select Control Panel, then select the Systems application. In the Systems window, select the Advanced tab.
2.	On the Advanced tab, click the Environment Variables button; to add a new system variable, click the **New** button. a. In the Variable name text box, enter `JAVA_HOME`. b. In the Variable value text box, enter the location of your Java installation.
3.	Click the **New** button again. a. In the Variable name text box, enter `ANT_HOME`. b. In the Variable value text box, enter the location of your Ant installation.

Step	*Action*
4.	Select the PATH system environment variable, and select the **Edit** button. This opens the Edit System Variable dialog box, displayed here as an example. 
5.	In the Variable value text box, prepend the following text in front of the text that already exists in the Variable Value field. `%JAVA_HOME%\bin;%ANT_HOME%\bin;` Click **OK**.

Verifying the Environment Variables in Windows

To verify the environment variables have been set correctly, follow these steps:

Step	*Action*

1.	From the command line, enter:
	`echo %JAVA_HOME%`
	`echo %ANT_HOME%`
	Both of these commands should return the location where you installed these tools.

2.	To verify your Java SDK installation, enter `java –version` from a command prompt. You should see java version "`1.5.0_10`".
3.	To verify your Ant installation, enter `ant –version` from a command prompt. You should see: `Apache Ant version 1.7.0 compiled on December 13 2006.`

NOTE

Environment variables for UPT and protExpress will be modified and set in those sections of this document:

Installing and Configuring PostgreSQL 8.3.x

To download and install PostgreSQL 8.3.x, follow the steps outlined on the PostgreSQL website: http://www.postgresql.org/download/

A PostgreSQL 8.3.x server must be downloaded, installed, and running in order for protExpress to work successfully.

TIPS

You should consult the following links to successfully set up secure and well-performing PostgreSQL servers, in preparation for installing protExpress:

- Item One
- Item Two
- Etc.

Once installed, you must configure PostgreSQL for protExpress.

Creating and Upgrading the protExpress Database

Creating and Deploying protExpress

To install the protExpress 1.0 application and services, follow the steps in this section:

- *Downloading and Installing the UPT Files* on page 13
- Downloading protExpress 1.0 files from GForge
- Installing protExpress 1.0
- Configuring Apache Tomcat and PostgreSQL to Run as Services
- Post-Installation: Advertising the Grid Service

About Properties

An important component of protExpress installation is configuring properties.

Overview of protExpress 1.0 Properties Files

When you install protExpress 1.0, you will work with a properties file, `protexpress-install properties`, that is included in `protexpress_distribution_1_0.zip`.

See the steps described on page 13 for more information.

In several instances in this section, property variables must be modified. Note the following points about changing or entering variables.

Paths in `.properties` Files

NOTE

The paths in the `.properties` files should use forward slashes. For example, you would use `protExpress.home=C:/apps/protExpress-app`, not `protExpress.home=C:\apps\protExpress-app`. If you use backslashes, you will experience unexpected results.

Spaces in Property Values

NOTE

You should not put any spaces in the property values of *-`install.properties` files (e.g. `protexpress-install.properties`). In Windows, note that the `C:\Documents and Settings\<username> path` contains spaces and the installation will likely fail. If you are using Windows, use a path such as `C:\apps\protExpress`.

More About Property Values

NOTE

- In the `protexpress-install.properties` and the `protexpress-upgrade.properties files`, any property value marked with uppercase REPLACE_* must be manually updated with the appropriate value.
- In each `*.properties` file, any property value marked with lowercase replace_* may be optionally updated with the appropriate value.
- In many of the steps below, there is reference to a `database.system.user` for your PostgreSQL server.

Downloading and Installing the UPT Files

To download and install the UPT 3.2 files, follow these steps:

Step	***Action***
1.	The installation file for UPT 3.2 is over 30MB. From the `https://gforge.nci.nih.gov/frs/?group_id=305` directory in GForge, download the upt_distribution_[version].zip file. Remember the download location as you will be using this file to run the installation in the steps that follow. This location will later be referred to as the `<installation_directory>`. Example: `C:\UPT`.
2.	From the directory where you downloaded the `upt_distribution_[version].zip_Downloading_UPT_files` file, unzip the files, using one of these two methods: a. Open a command prompt and use it to extract this file to a temporary location. For example, you may enter a command such as `unzip -q upt_distribution_[version].zip` (you must have a ZIP tool installed). This location will be referred to as the `<installation_directory>` henceforth. b. Use WinZip or a similar utility to unzip the files.
3.	Create an `<application root>` directory that is different from the `<installation directory>`. The `<application root>` directory is the location where you are going to install UPT. Example: `C:\apps`
4.	Open the `<installation_directory>/upt/upt-install.properties` file and modify the values for your environment and save the file. At a minimum, you will need to modify the following values: • upt.home ◦ The `<application root>` directory. This is the location, created in the previous step 3, where you are going to install UPT. Example, in Windows, the `<application_root_directory>` can be

Step	Action
	C:/apps/upt. Linux users can use ${user.home}/apps/upt or any other folder to which you have write permissions. **Important:** The <application_root_directory> must be different than <installation_directory> or the installation will fail. Specifically, If the upt.home property value is the same location where the build.xml file is located, the installer will fail. For example, if upt.home = C:\UPT and build.xml is in C:\UPT, installation will fail. • database.system.user ° This value should correspond to a PostgreSQL username that has full system privileges. You should have recorded this when you installed PostgreSQL. • database.system.password ° This value must correspond to the password for the database.system.user user. You should have recorded this when you installed PostgreSQL. In some cases, this password may be blank. • database.server ° This value must correspond to the domain name of machine that hosts the PostgreSQL server. You may need to consult your system administrator for this information. • database.port ° This value must correspond to the port for the database.server. Check with your database administrator to be certain which port to use. • database.name ° Choose a name for the UPT PostgreSQL database. • database.user ° Choose a username to access database.name. This can be any valid name that you choose, but it must be different than database.system.user. • database.password ° Choose a password to access database.name for the username identified in database.user.This must be different from the database.system.password. Remember the values you have used in this properties file. You will need some of them later in the protExpress installation. **Note:** You shouldn't need to modify the other defaults values as we have chosen unique ports to reduce the risk of other applications using the same values. However, be sure to check the upt-

Step	*Action*
	`install.properties` to verify that the ports in this file are not being used by other applications, otherwise you will experience problems.
5.	From the command line, navigate to `<installation_directory>/upt` (Example: `cd C:\UPT`), and type ant. This runs the installation. You will verify UPT installation after installing protExpress.
6.	After successfully installing UPT, make a backup of `<installation_directory>/upt/upt-install.properties` in another directory for future reference.

UPT Port Usage

NOTE

Verify that default port values defined in `upt-install.properties` files are not in use on your system by running netstat –a from the command line. The installers run pre-installation checks and fail the installation if ports the installer must use are in use. If the ports are in use prior to installation, you will need to stop any processes that are running.

Downloading the protExpress 1.0 Files

To download the protExpress 1.0 files, follow this step:

Step	*Action*
1.	From the `[placeholder]` directory in GForge, download the `protExpress_distribution_1_0.zip` file. Remember the download location as you will be using this file to run the installation in the steps that follow.

Server Components in protExpress 1.0

Apache Tomcat 5.5.20 is installed and configured as part of the protExpress 1.0 installation. You do not need to do anything further to download or install it.

Installing protExpress 1.0

To install protExpress 1.0, follow these steps:

Step	Action
1.	From the directory where you downloaded the `protExpress_distribution_1_0.zip` files (see *Downloading protExpress Files* on page 6), unzip the files, using one of these two methods: a. Open a command prompt and use it to extract this file to a temporary location. For example, you may enter a command such as `unzip -q protExpress_distribution_1_0.zip` (you must have a ZIP tool installed). This location will be referred to as the `<installation_directory>` henceforth. Once you unzip this file, it creates a directory called protExpress which is a directory below the `<installation_directory>` b. Use WinZip or a similar utility to unzip the files to a temporary location. This location will be referred to as the `<installation_directory>` henceforth. Once you unzip this file, it creates a directory called protExpress which is a directory below the `<installation_directory>`. Example `<installation directory> = C:\protExpress`
2.	**Note:** Setting the property values is an important step in the install process. [CKK: Which section should this be referring to?] Before you complete steps 2 & 3, review *More About Property Values* on page 13. Follow steps 2 and 3 meticulously. In the `protexpress_distribution_1_0.zip`, the two properties files are: `protexpress-install properties` and `protexpress-upgrade.properties`. To modify the default properties in `protexpress-install properties`, open `<installation_directory>/protExpress/protexpress-install.properties`, modify the values for your environment, and save the file. At minimum, you will need to modify the following values: • `${application.base.path}` ◦ [placeholder for more information] **Important:** `<application_base_path>` must be different than `<installation_directory>` or the installation will fail. • `database.system.user` ◦ This value should correspond to a PostgreSQL username that has full system privileges. This must correspond to that value used in Step 3 on page 10. • `database.system.password` ◦ This value must correspond to the password for the `database.system.user` used in Step 3 on page 10. • `database.server`

Step	*Action*
	◦ This value must correspond to the domain name of machine that hosts the PostgreSQL server. Talk to your database administrator to learn the server name and port. • `database.port` ◦ This value must correspond to the port for the database.server. Check with your database administrator about which port to use. • `database.name` ◦ choose a name for the protExpress PostgreSQL database. This must be different than the UPT database name (see *Downloading and Installing the UPT Files* on page 13). • `database.user` ◦ Choose a user name to access database.name. This can be any valid name that you choose, but it must be different than database.system.user. • `database.password` ◦ Choose a password to access database.name for the username identified in database.user. This must be different than the database.system.password. • `mail.smtp.host` ◦ This value must correspond to an SMTP server available in your network. This will differ in your environment. Consult your email administrator for the SMPT server and port (next value). • `mail.smtp.port` ◦ This value must correspond to the SMTP server. The default is 25, but this may be different in your environment. Consult your email administrator. • `Grid.index.url` is a new property in both property files (install and upgrade). It points to the training grid server but you can change it to point to a production grid server. Record these values. **Note:** You shouldn't need to modify the other defaults values as we have chosen unique ports to reduce the risk of other applications using the same values. However, be sure to check `protExpress-install.properties` to verify that the ports in this file are not being used by other applications.
3.	Now edit the default properties in the `protExpress-upgrade.properties` file. To do so, open both properties files, the one you just configured in step 2 (`protExpress-install.properties`) and the

Step	Action
	<installation_directory_2>/protExpress/protExpress-upgrade.properties file. **Note:** Where there are duplicate attributes, the values must be the same in both files. a. Copy each entry you modified in step 2 in the protExpress-install properties file and paste it in the corresponding location in the protExpress-upgrade.properties file, replacing the default text, as appropriate. **Note:** The upgrade.properties file does not have as many attributes, so you may not need to transfer all values you set in step 2. Record these values. **Note:** You shouldn't need to modify the other defaults values as we have chosen unique ports to reduce the risk of other applications using the same values. However, be sure to check protExpress-install.properties to verify that the ports in this file are not being used by other applications.
4.	From the command line, navigate to <installation_directory>/protExpress (Example: cd C:\protExpress), and type ant. This initiates the installation process. The anticipated duration is anywhere 1-15 minutes depending on your system's speed, power and memory. The installer creates a protExpress database on your PostgreSQL server and starts and configures the Apache Tomcat server.
5.	a. To verify UPT installation, go to: http://<jboss.server.hostname>:<jboss.server.port>/upt. (Refer to upt-install.properties for the correct values. See note below.) b. To verify protExpress installation, open your web browser to http://<jboss.server.hostname>:<jboss.server.port>/protexpress. (Refer to the protexpress-install.properties for the correct values. See note below.) Enter caarrayadmin as the user and caArray2! as the password. **Note:** jboss.server.hostname and jboss.server.port are values in the <installation_directory>/protexpress/protexpress-install.properties and the <installation_directory>/upt/upt-install.properties files. The default administrator name is superadmin and the password is changeme.
6.	After successfully installing protExpress, make a backup of <installation_directory>/protexpress/protexpress-

Step	*Action*
	`install.properties` and `protexpress-upgrade.properties` files in a different directory for future reference.

protExpress Port Usage

NOTE

Verify that default port values defined in `protexpress-install.properties` files are not in use on your system by running `netstat –a` from the command line. If the ports are in use prior to installation, you will likely experience problems with your installation.

Configuring the Apache Tomcat Server

[placeholder]

Configuring Apache Tomcat and PostgreSQL to Run as Services

NOTE

- [placeholder]

Running Apache Tomcat as a Service

To run Apache Tomcat as a service, follow these steps:

Step	*Action*
1.	
2.	

Running PostgreSQL as a Service

NOTE

It is assumed that your PostgreSQL server was installed as a service. If it was not, follow these recommendations for installing this server as a service.

To run PostgreSQL as a service, follow these steps:

Step	*Action*
1.	

Step	***Action***
2.	Windows When installing PostgreSQL server on Windows, choose the option to run PostgreSQL as a Windows service.

Post-Installation Tasks

Updating Help Desk Contact Information in SQL

The Help Desk information provided by default in the protExpress database must be changed for your environment.

Step	*Action*

1.	Connect to your PostgreSQL server and the protExpress database and run the following script (replacing email_address with a return email address that is accessible at your location).
	`update config_parameter set raw_value = '[email_address]' where param = 'REG_EMAIL_TO';`
	`update config_parameter set raw_value = '[email_address]' where param = 'EMAIL_FROM';`
	[placeholder for other configuration parameters from DB to be listed here]

Using UPT to Add protExpress Users

UPT is used to provision users in the protExpress application. Each application installs with its own CSM schema that has sample/default users and a role/permissions structure. To add additional users you need to provision protExpress in the UPT. Then you can assign users to protExpress. Below is the general flow.

NOTE

`${some.thing}` identifies a value to lookup in the `protexpress-install.properties` file you used to build the protExpress application.

[need to revisit the db name/version]

For additional information on using UPT
https://gforge.nci.nih.gov/frs/download.php/2634/UPT_User_Guide.pdf

To use the UPT, follow these steps:

Step	*Action*
1.	Install UPT. See *Downloading and Installing the UPT Files* on page 13.
2.	Launch a browser and access UPT via `http://<jboss.server.hostname>:<jboss.server.port>/upt` (from `upt-install.properties`).

Step	***Action***
3.	Login to UPT, using the following profile: o Login ID=superadmin o Password=changeme o Application Name=csmupt
4.	Select the User tab at the top of the page, and click **Create a New User**.
5.	Enter Login Name, User First Name, User Last Name, User Password, User Password Confirm. Click **Add**.
6.	On the Application tab at the top of the screen, click **Create a New Application**.
7.	Enter the following parameters: • Application Name=`protExpress` • Application Description=`<Application Description>` • Application Declarative Flag=`Yes` • Application Active Flag=`Yes` • Application Database URL=`jdbc:mysql://${database.server}:${database.port}/${protexpress.database.name}` • Application Database User Name=`${ protexpress.database.user}` • Application Database User Password=`${protexpress.database.password}` • application Database Confirm Password=`${ protexpress.database.password}` • Application Database Dialect=`org.hibernate.dialect.MySQLDialect` • Application Database Driver=`${com.mysql.jdbc.Driver}`
8.	Click on **Add > Associated Admins**. then click **Assign Admi**n.
9.	Highlight the user you want to be admin of the application, and click **Assign Admin**.
10.	Log out of UPT.

Step	Action
11.	Login to UPT at `http://<jboss.server.hostname>:<jboss.server.port>/upt` (from `upt-install.properties`). Use the following login profile: • Login ID=<User created above> • Password=<Password for User created above> • Application Name=protExpress
12.	Add users to protExpress like you did above.
13.	Click **Logout**.

Advertising the Grid Service

[placeholder]

To advertise your protExpress grid service, complete the following steps, then restart the JBoss 4.0.4 server instance. You can check if your grid service is advertised correctly at http://cagrid-portal.nci.nih.gov/web/guest/home.

Step	Action

1.	**web.xml**
	The web.xml file contains the port and protocol your grid service will be advertised as. Change this file if your service is on a port other than the default port of 18080 and/or the default protocol of http
	`<init-param>`
	`<param-name>defaultProtcol</param-name>`
	`<param-value>http</param-value>`
	`</init-param>`
	`<init-param>`
	`<param-name>defaultPort</param-name>`
	`<param-value>18080</param-value>`
	`</init-param>`
	File Locations:
	`${protexpress.home}/jboss-4.0.4.GA/server/default/deploy/wsrf.war/WEB-INF`

Step	Action

2.	**server-config.wsdd**
	Make sure your container is publishing the right host name. Your service must register with a publicly accessible address or DNS-resolvable host name, so the Index Service (and other clients) can connect to it. Add the following lines to this file if you want your service to have a specific name or if your service is trying to register a private IP address which is not allowed. You should see errors in your JBoss 4.0.4 log if you are trying to register a private IP address.
	`<parameter name="logicalHost" value="somehost.cagrid.org"/>`
	`<parameter name="publishHostName" value="true"/>`
	File Location:
	`${protexpress.home}/jboss-4.0.4.GA/server/default/deploy/wsrf.war/WEB-INF/etc/globus_wsrf_core`

3.	This file contains the service's contact information. The two sections to update are at the top and bottom of the file.
	Top of file under `<ns2:pointOfContactCollection>`:
	`<ns3:PointOfContact affiliation="" email="" firstName="" lastName="" phoneNumber="" role="" xmlns:ns3="gme://caGrid.caBIG/1.0/gov.nih.nci.cagrid.metadata.common"/>`
	Bottom of file under `<ns1:hostingResearchCenter>`:
	`<ns14:PointOfContact affiliation="" email="" firstName=" " lastName=" " phoneNumber="" role=" "/>`
	File Location:
	`${protexpress.home}/jboss-4.0.4.GA/server/default/deploy/wsrf.war/WEB-INF/etc/caGrid_protExpressSvc`

4.	**`serviceMetadata.xml`**
	`protExpressSvc_registration.xml`
	This file has the URL to the Index Server where you can see if your service is advertised. Ensure this file contains the following index server:
	`<wsa:Address>http://cagrid-index.nci.nih.gov:8080/wsrf/services/DefaultIndexService</wsa:Address>`
	File Location:
	`${protexpress.home}/jboss-4.0.4.GA/server/default/deploy/wsrf.war/WEB-INF/etc/cagrid_protExpressSvc/`

Step	***Action***
5.	After making these changes, restart the JBoss 4.0.4 server (this hosts the grid service).
	For more troubleshooting information : http://www.cagrid.org/mwiki/index.php?title=CaGrid:How-To:TroubleshootIndexService

Contacting Application Support

http://ncicb.nci.nih.gov/NCICB/support

Telephone: 301-451-4384

Toll free: 888-478-4423

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