caArray 1.6 Data Portal

Local Installation Guide

Center for Bioinformatics

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Introduction

The *caArray 1.6 Data Portal Local Installation Guide* is intended for systems administrators who want to install caArray Portal at the local level. This guide contains instructions to create and load a caArray database, and to create, deploy, and access the caArray application.

Most of the examples and screenshots included in this document are Windows specific. If you are using a different platform, then modify the information as appropriate for your system.

Overview of caArray

The caArray (http://caarray.nci.nih.gov/) software has been developed by the NCI Center for Bioinformatics (NCICB) to create an information-sharing network modeled on the World Wide Web. caArray consists of a microarray database and microarray data visualization and analysis tools. caArray is an open source project, and the source code and APIs are available in the download site at the NCICB web site, http://ncicb.nci.nih.gov/download/index.jsp. caArray is designed to make microarray data publicly available, and to develop and bring together open source tools to analyze these data.

The caArray data portal is a <u>M</u>inimal <u>I</u>nformation <u>A</u>bout A <u>M</u>icroarray <u>E</u>xperiment (MIAME) compliant data repository that allows submission of MIAME 1.1 level annotations (http://www.mged.org/Workgroups/MIAME/miame_1.1.html) and microarray data using web-based submission forms. caArray design is consistent with the cancer Biomedical Informatics Grid (caBIG) silver level compatibility guidelines to allow interoperability with other applications developed under the caBIG program distribution.

NOTE:

Existing caArray development documentation can be found on the caArray page of the NCICB web site: http://caarray.nci.nih.gov/caARRAY/documentation.

Overview of caArray Installation	caArray installation from source code has been bundled with an Ant script that builds, configures and deploys the application in a JBoss environment. The installation requires an environment to be installed before the source code can be built and /or deployed. (This is described in the *Data Migration Guide* available on the NCICB Download page, http://ncicb.nci.nih.gov/download/downloadcaarray.jsp.) The process for installing caArray includes: • *Downloading and installing required software* • *Setting environment variables* • *Downloading and extracting caArray files* • *Creating and upgrading the caArray database* • *Importing the caArray database* • *Creating and deploying caArray* • *Accessing the caArray application* • *Creating caArray user accounts*

Before You Proceed	Determine the installation scenario appropriate for your situation and proceed accordingly.
	First-time Installation — If this is a first-time installation of caArray, proceed through the pages and steps outlined in this installation guide.
	Upgrade an Existing Installation — For a version prior to 1.5.x.x, before you install v1.6, you must first complete the steps for upgrading to v1.5, described in the *caArray 1.5 Data Portal Local Installation Guide*, located in GForge: http://gforge.nci.nih.gov/frs/download.php/2034/caArray_1_5_Technical_Guide.pdf. Once you have completed the upgrade, then proceed to the1.6 upgrade utility information, • Using the caArray Portal v1.6 Update Utility, on page 23. • For a version of caArray 1.5 or later, if you want to install v1.6, go directly to the 1.6 upgrade utility information on page 23.

caArray 1.6 Minimal System Requirements

Minimal System Requirements caArray has been tested on the systems listed in Table 1, Table 2, and Table 3.

Current Solaris Production Environment

	DBMS	*Application Server*
Model	Sunfire 1280	SunFire 480R
CPU	4 x 900 MHZ (UltraSPARC III)	2 x 900 MHZ (UltraSPARC III)
Memory	8 GB	10 GB
Local Disk	36 GB (Mirrored)	36 GB (Mirrored)
Network Link Speed	Fiber	100 MB (Switched)
OS	Sun Solaris 5.8	Sun Solaris 5.8
Comments	Shared with other NCICB databases. DB: Oracle 10g	App server: JBoss 4.0.4

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

Current Linux Testing Environment

	DBMS	*Application Server*
Model	HP Proliant DL 380	HP Proliant ML 330
CPU	2 x Intel® Xeon™ 3.06 GHz	1 x Intel® Xeon™ Processor 2.80GHz
Memory	4 GB	4 GB
Local Disk	System = 2 x 72 GB (RAID 1) Data = 4 x 72 GB (RAID 1 + 0)	System = 2 x 36GB (RAID 1) Data = 2 x 146 (RAID 1)
Network Link Speed	100mb / full duplex	100mb / full duplex
OS	Red Hat Linux ES 3	Red Hat Linux ES 3
Comments	DB: Oracle 10g	App server: JBoss 4.0.4

Table 2 Mid-end system utilizing Intel® and Xeon™ processors

Current Windows Testing Environment

	DBMS	*Application Server*
Model	HP Proliant DL 380	DELL GX270
CPU	2 x Intel® Xeon™ 3.06 GHz	1 x Intel® Pentium 4™ Processor 2.80GHz
Memory	4 GB	4 GB
Local Disk	System = 2 x 72 GB (RAID 1) Data = 4 x 72 GB (RAID 1 + 0)	System = 1 x 36GB
Network Link Speed	100mb / full duplex	100mb / full duplex
OS	Red Hat Linux ES 3	Windows XP Pro
Comments	DB: Oracle 10g	App server: JBoss 4.0.4

Table 3 Low-end system utilizing Intel® Pentium4™ Processors

DATA SIZE TIP	caArray appends all experiment data of a given type to a single zip file for convenient download. If you anticipate large volumes of hybridization data (several hundred data files) per experiment, you should ensure that your operating system is configured to support files in excess of 2 GB as these zip files may potentially grow beyond this size. To make sure your file system can handle files of this size, contact your system administrator.

caArray Software and Technology Requirements

Required Software—Not Included in caArray

You must download and install the required software that is not included with the caArray (listed in Table 4 .) The software name, version, description, and URL hyperlinks (for download) are indicated in the table. Where appropriate, apply patches to the installed applications.

Required Software Name Version URL to Download	Description
JBoss 4.0.4+ http://www.jboss.org/products/jbossas/downloads	JBoss is an open source implementation of J2EE that relies on the Enterprise Java Beans specification for functionality.
Java 2 Platform Standard Edition 5.0 Update 6 (J2SE 5.0) J2SE 5.0 Update 6 or higher http://java.sun.com/products/archive/j2se/5.0_06/index.html (select JDK 5.0 Update 6)	The J2SE Development Kit (JDK) supports creating J2SE applications.
Apache Ant 1.6.5 http://archive.apache.org/dist/ant/binaries/	Apache Ant is a Java-based build tool.
Oracle—Enterprise Edition 10g (Release 10g is currently the only release tested by the caArray team.) http://www.oracle.com/database/product_editions.html	Oracle is a commercially-available, alternative relational database management system (RDBMS) that can be used in place of MySQL.
Affymetrix 5/26/2004 http://www.affymetrix.com/support/developer/runtime_libraries/index.affx (See *Downloading Affymetrix Libraries*, step #3 on page 17, for instructions.)	Affymetrix Runtime Libraries

Table 4 Required software and technology for a caArray local installation

NOTES:	• Each component of the software should be unzipped/installed directly into the C:\{software name}. For example: C:\JBoss. • JBoss should be unzipped into a directory that does not contain spaces anywhere in the path. This directory will be referred to as {JBOSS_HOME}.

NOTES on Installing Oracle:	NCICB does not license Oracle instances. The Oracle files that are part of the installation are the Oracle JDBC drives that are free and do not require licensing. You can place Oracle on a server different from the location of caArray (recommended), or co-locate it with the caArray application on the same server.

BEFORE YOU BEGIN	caArray has been tested with the operating systems and hardware specified on pages 3 and 5 of this guide. We cannot guarantee that caArray will work If you are using variations of these operating systems and/or hardware.

Setting the Environment Variables

NOTE	Whether you have legacy data in a version of caArray prior to 1.6, or you are doing a new installation, you must set environmental variables. This section describes the procedure.

Required Software Installed	The following environmental variables must be set as a part of the installation. See Table 5 which describes the required values. Steps for setting the environment variables follow.

Environmental Variable	Description of Value
JAVA_HOME	Path to J2SE 5.0 Update 6 installation, for example, /usr/jdk1.5.0_06
ANT_HOME	Path to Ant 1.6.5 installation, for example, /usr/local/apache-ant-1.6.5
JBOSS_HOME	Path to JBoss installation, for example, /usr/local/jboss-4.0.4.GA
PATH	Path values for {JAVA_HOME}/bin and {ANT_HOME}/bin values. For example, **Unix**: PATH=/usr/jdk1.5.0_06/bin: /usr/local/apache-ant-1.6.5/bin:… **Windows**: PATH=C:\java\jdk1.5.0_06\bin;C:\apache-ant-1.6.5\bin;….
ANT_OPTS	*-Xmx1024m*

Table 5 - Required Software Environmental Variables

To set environmental variables, complete the following steps:

NOTE	
	Windows Users: Steps 1 and 2 apply to the Windows operating system only.

Step	Action
1	(Windows system only.) To open the Environment Variables dialog box in Windows, select **My Computer > Properties** from the shortcut menu. Click the **Advanced** tab. Click the **Environment Variables** button.
2	(Windows system only.) Verify that the **PATH** statement listed in the Environment Variables dialog box under the System Variables includes the path to both the **ANT** and **JAVA** binaries. For example, they might read as follows: *…;C:\java\jdk1.5.0_06\bin;C:\apache-ant-1.6.5\bin;….* (To easily review these, copy them to a text editor.) If necessary, click the **Edit** button and enter the correct information.
3	Set the Environment Variable ANT_OPTS=-Xmx1024m. **Unix:** Enter the following in the command line: *export ANT_OPTS=-Xmx1024m.* -or- *setenv ANT_OPTS -Xmx1024m* **Windows:** a. Select **My Computer > Properties** (from the shortcut menu) **> Advanced** tab. b. Click the **Environment_Variables** button. c. In the Environment Variables dialog box, under **System Variables**, click **New**. d. In the New System Variable dialog box, enter the variables: *-- Variable name: ANT_OPTS* *-- Variable value: -Xmx1024m.* **Note:** If your DOS window is open when you set environment variables, close and reopen it to proceed with other command line scripts.

Step	Action

4	JBoss comes with two files in the JBoss/bin directory that are used to start JBoss, `run.bat` (Windows) and `run.sh` (UNIX). Edit the JVM option for the JBoss runtime in `jboss/bin/run.bat` or `run.sh` starting with -Xmx 4096mb and incrementally increase it according to the amount of data you handle.
	
	Note: By setting the JVM (Java Virtual Machine) option to –Xmx4096m, you are increasing the heap size used by the virtual machine so large amounts of data can be used. You will have to experiment with the amount of heap you allocate, because each user may have different data requirements.
	
	Unix:
	In the `run.sh` file the section should appear as follows:
	
	`# Setup JBoss specific properties`
	`JAVA_OPTS="$JAVA_OPTS -Dprogram.name=$PROGNAME -Xms128m –Xmx4096m"`
	
	Windows:
	In the `run.bat` file, the line should appear as follows:
	
	`set JAVA_OPTS=%JAVA_OPTS% -Xms128m –Xmx4096m`

NOTES	• By default, only 64MB is allocated for JBoss runtime; that is insufficient for caArray. • If your computer is running in 32 bit mode, you cannot set the heap size at more than 4 g. If this seems to be a problem, set the –Xmx at 1024m or 3072m instead of 4096m. For example, if you have RAM of 2gb, set the –Xms at 1024m. • If your computer is running in 64 bit mode and you want to use 4 gigs, add the term –d64 in the command line as follows: `set JAVA_OPTS=%JAVA_OPTS% -d64 -Xms128m –Xmx4096m`

Preliminary Procedures

Downloading caArray Files

Complete the following steps to download the appropriate caArray files.

Step	Action
1	Create a folder for the caArray files to be downloaded, such as `C:\caarray`. We recommend you download the files into one directory.

Step	Action
2	Go to the NCICB download web site http://ncicb.nci.nih.gov/download/index.jsp.
3	Provide your email, name, and institution. Click **Enter the Download Center**.
4	Select **caArray**, agree to the caArray software license by selecting **Checking this box indicates that you agree to the above terms**, and click **Download**.
5	Select the caArray files listed in Table 6 and save them to the caArray directory you created.

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.
caArray Portal Source Code	`caARRAY-src.1.6.zip` The source code contains the necessary source code, database scripts and configuration files for installing caArray application at a local cancer center. This archive contains the specific source code to each version. In addition, the archive now includes all of the database scripts to install a new or upgrade an existing caArray database to each version. Previously, these scripts were not bundled within this source distribution archive. If you are upgrading from caArray version 1.5 or version 1.4, download only the file `caARRAY-src.1.6.zip` The archive is generated by running the ant packaging target against a specific tagged version of the codebase. The tag is the same as the one verified by QA and deployed on production environment at NCICB.

Table 6 caArray download files

Data Migration

WARNING TO ALL CaArray USERS:	If you currently have caArray version 1.3 or earlier, *and have active data in the caArray repository that you want to continue to access after upgrading to caArray 1.6*, you must refer to the independent document, *caArray Data Migration and Cleanup* guide (available on the NCICB Download page, http://ncicb.nci.nih.gov/download/downloadcaarray.jsp.) which provides instructions for migrating data to caArray 1.3.1.

Creating and Upgrading the caArray Database

WARNING TO ALL CaArray USERS:	If you currently have caArray version 1.3 or earlier, *and have active data in the caArray repository that you want to continue to access after upgrading to caArray 1.6*, you must refer to the independent document, *caArray Data Migration and Cleanup Guide* (available on the NCICB Download page, http://ncicb.nci.nih.gov/download/downloadcaarray.jsp) which provides instructions for migrating data to caArray 1.3.1.

New caArray Installation	No matter which version of caArray you are installing, you must begin by creating the 1.0 database. Then you must continue through the upgrade steps described in this section. Performing these steps only needs to be done once.

NOTE	We strongly suggest that you work with your database administrator (DBA) for all steps in this section, for both Windows and UNIX.

Creating the caArray Database

<table>
<tr>
<td>Upgrade from v1.4</td>
<td colspan="3">• If you are upgrading to caArray 1.6 from caArray 1.4, skip to Upgrade Database from Version 1.4 to 1.6 on page 15.</td>
</tr>
<tr>
<td rowspan="3">Upgrade from v1.5</td>
<td colspan="3">• If you are upgrading from caArray version 1.5 to 1.6, complete the following steps:</td>
</tr>
<tr>
<td></td>
<td>Step</td>
<td>Action</td>
</tr>
</table>

Step	Action
1	Run the following from the SQL prompt: *SQL> @update_db_from_1_5_to_1_5_0_2.sql* *SQL> @update_db_from_1_5_to_1_6.sql*
2	Update the testcaarray user*. Run the following from the SQL prompt. *SQL> @update-testcaarray-user.sql* *The testcaarray user has privileges to create experiments, protocols, etc. and to perform initial sanity checks after installation.

Setting Oracle Database Configurations

Complete the following steps to create your caArray Oracle database configurations.

Step	Action
1	On page 4, you were instructed to download Oracle. Now install Oracle according to the optimum configurations for your system and/or environment. **Note:** Steps 1 through 3 must have Oracle DBA assistance.
2	Run the setup.exe from the unzipped Oracle folder. Remember to name the database ***caarray*** when using setup.exe.

Step	Action
3	Create general Oracle database configurations for the caArray database. On your computer, select **Start > Programs > Oracle > Application Development > SQLPlus**. Login as "System' "password" database "caarray". The initialization file `init.ora` location is `%ORACLE_HOME%\database` on Windows and is available as the default setting. The following Oracle database initialization parameters must be set in the initialization file. These files differ for Windows and Unix. a. Set `query_rewrite_enabled=true` b. Set `query_rewrite_integrity=trusted` c. Save and close the initialization parameter files. The DBA should shutdown and restart the Oracle database to allow the parameters to take effect.
4	From this point, you can continue the step-wise process (skip this step and proceed to step 5), or by using a single ant command (in this step 4), you can complete automatically all steps from this point to step 6 on page 15 . You must be in the following subdirectory.to do so. From the command line, go to directory `C:\jboss-4.0.4.GA\caarray\caarray-src.1.6\build and run the ant database:create` command. ***ant database:create*** Note: If you are using the ant command, first extract the `caArrayop.dmp.zip` file to this directory `C:\jboss-4.0.4.GA\caarray\caarray-src.1.6\database\import`.

5	Create a caArray tablespace in the Oracle database.
	
	a. Check to make sure that there is at least 20 GB of free disk space available for tablespace **caArray** for the initial database load. Plan for more space for subsequent data.
	
	b. Log on to the Oracle database (and SQLPlus in Windows) as an Oracle DBA.
	
	c. Create tablespace **caArray ,** and turn on **autoextend** on the tablespace.
	
	The following example script can be used to create tablespace for UNIX or Windows (in SQLPlus). Change the path for the data file appropriate to your Operating System and availability of storage space. For example, the circled section of the path might be changed in Windows to read:
	`C:\oracle\oradata\caarray\.....`
	
	`CREATE TABLESPACE caArray`
	
	`LOGGING`
	
	`DATAFILE '/data/oracle/oradata/caarray_01.dbf' size 1900 m,`
	`         '/data/oracle/oradata/caarray_02.dbf' size 1900 m,`
	`         '/data/oracle/oradata/caarray_03.dbf' size 1900 m,`

Step	Action

	`'/data/oracle/oradata/caarray_04.dbf' size 1900 m,`
	
	            `'/data/oracle/oradata/caarray_05.dbf' size 1900 m,`
	
	            `'/data/oracle/oradata/caarray_06.dbf' size 1900 m,`
	
	            `'/data/oracle/oradata/caarray_07.dbf' size 1900 m,`
	
	            `'/data/oracle/oradata/caarray_08.dbf' size 1900 m,`
	
	            `'/data/oracle/oradata/caarray_09.dbf' size 1900 m,`
	
	            `'/data/oracle/oradata/caarray_10.dbf' size 1900 m`
	                        `autoextend on maxsize 50000M;`
	
	Note: You may need to reduce the autoextend maxsize if there are size issues on your system.

6	Create a caArray database user.
	
	a. Log in to Oracle database as a user with DBA privileges.
	
	b. Create the database user account using **caArray** tablespace as the default tablespace. **caarrayop** is suggested as the user name. The user name and password must be consistent with what is defined throughout the system..
	
	c. Use the following script:
	
	      `create user {enter username [example: caarrayop]}`
	           `identified by {enter password}`
	           `default tablespace caArray`
	           `temporary tablespace temp`
	           `quota unlimited on caArray;`

7	Grant resource, query rewrite to the user. Following is an example of assigning rights to user "caarrayop". ***grant connect, resource, query rewrite to caarrayop;***

	TIP	When applying scripts to SQLPlus, it is helpful to save the scripts in a text editor as a .sql file. Then in SQLPlus, enter @{SQLPlus file name}. Example: `@c:\createuser.sql`

Creating the Schema and Importing the Database

Complete the following steps to create the caArray database schema and import the database.

Step	Action
1	Extract the `caArrayop.dmp.zip` file to this directory `C:\jboss-4.0.4.GA\caarray\caarray-src.1.6\database\import`.

Step	Action

2	Open the appropriate window (UNIX or Windows DOS screen) and enter the following script.
	
	• Use the user name and password as defined in step 4 in the previous section.
	
	• Identify `caarrayop.dmp` as the data file.
	
	UNIX:
	`nohup imp caarrayop/`{user **password**}`@`{database instance name}
	`file=caarrayop.dmp log=caarrayop_imp.log`
	`fromuser=caarrayqa`[**export source file**] `touser=caarrayop`[this depends
	on schema] `ignore=y &`
	
	Windows (DOS window):
	`imp caarrayop/`{user **password**}`@`{database instance name}
	`file=caarrayop.dmp log=caarrayop_imp.log`
	`fromuser=caarrayqa`[**export source file**] `touser=caarrayop`[schema name]
	`ignore=y`
	
	Example entry in Windows:
	
	`C:\caARRAY-src.1.6\database\import>imp`
	`caarrayop/jill@caarray file=caarrayop.dmp`
	`log=caarrayop_imp.log fromuser=caarrayqa`
	`touser=caarrayop ignore=y`

3	Save the log file; it can be used later for troubleshooting any errors that may occur during the import.
4	Upgrade the database to latest version. The database must be upgraded to the latest version by sequentially executing the following DDL-DML scripts in the subsequent steps Run each of the following from the SQL prompt (see caARRAY-src.1.6\database folder for .sql files)*: 1. `SQL> @update_db_from_1_0_to_1_01.sql` 2. `SQL> @update_db_from_1_01_to_1_2.sql` 3. `SQL> @update_db_from_1_2_to_1_3.sql` 4. `SQL> @update_db_from_1_3_to_1_3_1.sql` 5. `SQL> @update_db_from_1_3_1_to_1_4.sql` 6. `SQL> @update_db_from_1_4_to_1_5.sql` 7. `SQL> @update_db_from_1_5_to_1_5_0_2.sql` 8. `SQL> @update_db_from_1_5_to_1_6.sql` *Consider executing SQLPlus from the* **caARRAY-src.1.6\database** *folder directly*

Step	Action
5	Drop the following constraints, using the following script: SQL> ***@fix-tables.sql*** Table altered.
6	Update the *testcaarray* user*. Run the following from the SQL prompt: SQL> ***@update-testcaarray-user.sql*** *The *testcaarray* user has privileges to create experiments, protocols, etc. and to perform initial sanity checks after installation.

Upgrading caArray to a Version 1.6 Database

Upgrade Database from Version 1.5 to 1.6

If you are upgrading caArray version 1.5 to 1.6, complete the following steps to upgrade the caArray database:

Step	Action
1	Run the following from the SQL prompt: SQL> ***@update_db_from_1_5_to_1_5_0_2.sql*** SQL> ***@update_db_from_1_5_to_1_6.sql***
2	Update the *testcaarray* user*. Run the following from the SQL prompt: SQL> ***@update-testcaarray-user.sql*** *The *testcaarray* user has privileges to create experiments, protocols, etc. and to perform initial sanity checks after installation.

Upgrade Database from Version 1.4 to 1.6

If you are upgrading from caArray version 1.4 to 1.6 then, complete the following steps to upgrade the caArray database.

Step	Action
1	Run the following from the SQL prompt: SQL> ***@update_db_from_1_4_to_1_5.sql*** SQL> ***@update_db_from_1_5_to_1_5_0_2.sql*** SQL> ***@update_db_from_1_5_to_1_6.sql***

Step	Action
2	Update the *testcaarray* user*. Run the following from the SQL prompt: `SQL> @update-testcaarray-user.sql` *The *testcaarray* user has privileges to create experiments, protocols, etc. and to perform initial sanity checks after installation.

Upgrade Database from Version 1.3.1 to 1.6

If you are upgrading from caArray version 1.3.1 to 1.6, complete the following steps to upgrade the caArray database.

Step	Action
1	Migrate (export then import) your existing caArray 1.3.1 database on Oracle 9i to Oracle 10g. You should consult a Oracle DBA for assistance. **NOTE** caArray Portal version 1.6 has upgraded its database to Oracle 10g. Although version 1.6 will still operate on Oracle 9i, future versions will support only Oracle 10g.

2	Run the following from the SQL prompt:
	
	 `SQL> @update_db_from_1_3_1_to_1_4.sql`
	 `SQL> @update_db_from_1_4_to_1_5.sql`
	 `SQL> @update_db_from_1_5_to_1_5_0_2.sql`
	 `SQL> @update_db_from_1_5_to_1_6.sql`

3	Update the *testcaarray* user*. Run the following from the SQL prompt: `SQL> @update-testcaarray-user.sql` *The *testcaarray* user has privileges to create experiments, protocols, etc. and to perform initial sanity checks after installation.

WARNING!	If you currently have caArray version 1.3 or earlier, *and have active data in the caArray repository that you want to continue to access after upgrading to caArray 1.6*, you must refer to the independent document, *caArray 1.3.1 Data Migration and Cleanup Guide* (available on the NCICB Download page, http://ncicb.nci.nih.gov/download/downloadcaarray.jsp.) which provides instructions for upgrading to caArray 1.3.1.

Creating and Deploying caArray Portal

Complete the following steps to install and deploy caArray.

NOTE:	If you went through the migration steps described in the caArray Data Migration and Cleanup guide, proceed beginning with step 3 in this section.

Unzipping and Preparing the caArray Source

Complete the following steps to unzip and prepare the caArray Source distribution.

Step	Action
1	In the JBoss home directory ({JBOSS_HOME}), create a caarray directory. The directory structure will be: {JBOSS_HOME}/caarray. For example, in Windows, C:\jboss\caarray\.
2	Unzip the caARRAY-src.1.6.zip file into {JBOSS_HOME}/caarray directory. The zip file extraction will create the sub-directory, caARRAY-src.1.6 ({CAARRAY_SRC_HOME}). An example resulting directory structure: {JBOSS_HOME} └──caarray └──caARRAY-src.1.6 Most of the required JAR files needed to build and run the application are located in {CAARRAY_SRC_HOME}/lib folder.
3	Download Affymetrix Runtime Libraries. a. Go to the following website: http://www.affymetrix.com/support/developer/runtime_libraries/index.affx b. Click **I accept** to accept the license agreement. c. After doing so, in the Affymetrix Developers Network page, click the link to download the Pure Java Runtime Libraries. This link will require you to login. If you do not already have an Affymetrix login, complete the free registration to create one. The file GDACFilesPure.ZIP should start to download automatically. If not, use the link provided on the page to manually download the file. d. Unzip the GDACFilesPure.ZIP contents to the {JBOSS_HOME}/caarray/ {CAARRAY_SRC_HOME}/lib folder. The zip file contains a single JAR only (GDACFiles.jar).

Step	Action
4	Extract the `caArrayop.dmp.zip` file to this directory `C:\jboss-4.0.4.GA\caarray\caarray-src.1.6\database\import`.

Configuring JBOSS

Complete the following steps to configure JBOSS.

Step	Action

1	Open the `login-config.xml` file on the `{JBOSS_HOME}/server/{JBOSS_SERVER_NAME}/conf` directory. Add the line below. (The **application-policy** node must reside inside the **policy** node in the xml file):
	
	`<application-policy name = "caarray">`
	`    <authentication>`
	`        <login-module`
	`code="gov.nih.nci.caarray.services.security.CaArrayLoginModule"`
	`            flag = "required">`
	`        </login-module>`
	`    </authentication>`
	`</application-policy>`
	
	Typically, the `{JBOSS_SERVER_NAME}` is represented as `default`.

2	Open the `jboss-service.xml` file in the `{JBOSS_HOME}/server/{JBOSS_SERVER_NAME}/conf` directory. In the mbean tag for XidFactory, ensure that the attribute name="Pad" is **NOT** commented. It should look like the following example:
	
	`<mbean code="org.jboss.tm.XidFactory"`
	`    name="jboss:service=XidFactory">`
	`    <attribute name="Pad">true</attribute>`
	`</mbean>`

Step	Action
3	If you want the local deployment to have a different logging level than the default settings, then update your JBoss Log4J configuration file at: `{JBOSS_HOME}/server/{JBOSS_SERVER_NAME}/conf/log4j.xml` An example caArray Log4J configuration file for JBoss is included within the source distribution. See `{JBOSS_HOME}/caarray/{CAARRAY_SRC_HOME}/conf/jboss/log4j.xml`. To change the Log4j logging levels, we recommend you add/update/remove Log4j <category> entries for different package/framework/subsystem logging control. Possible log level values are: DEBUG, WARN, INFO, ERROR and so forth. See http://logging.apache.org/log4j/docs/api/index.html for more information.

Configuring System Properties

Introduction

The caArray build-and-deployment script generates necessary property files for the caArray application.

To set these properties, open and modify the `default.properties` file located in the `{JBOSS_HOME}\caarray\{CAARRAY_SRC_HOME}\build` directory.

- Save a copy of the `default.properties` file as `local.properties`.

- You must set variables as described below in the `local.properties` file.

- Build and deploy caArray.

Complete the following steps to set properties for your caArray deployment:

Step	Action
1	Set environment variables. On pages 6-8, you were instructed to set environment variables for JBOSS_HOME, JAVA_HOME, and ANT_HOME. If you have not done so, set those variables now.
2	Set JBOSS server name. Set the `jboss.server.name` variable to indicate the name of your particular JBoss server. This is the name of the server on which caarray will be deployed. In most cases, the default JBoss server name is "default."

Step	Action
3	Set the following mail properties: | Description	Property
---	---
The smtp mail server accessible by your deployment	`smtp.server.hostname`
caArray curator	`curator.email.address`
caArray administrator	`caarray-admin.email.address`
Upon registration for caArray, email address to which caArray registration information is to be sent.	`caarray-registration.email.address`	
4	Set the caArray file storage destination. Set the `file.storage.destination` variable to indicate the local directory in which caArray data and experiment design files (uploaded by the system) are stored. (Note that caArray creates a containing directory, `caarrayftp`, within the directory specified.) Both Unix and Windows users should use forward slashes, for example, "`c:/caarray/files`" or "`/caarray/files`". Do **not** use a trailing forward slash.
5	Set the caArray deployment URL property, `caarray.deployment.url`. caArray deployment URL is the full universal resource locator for the deployed caArray application, for example, http://localhost:8080/caarray or http://www.myPublicUrl.edu/caarray or http://www.mycaarray.myPublicUrl.org. Do use http://. Do **not** use a trailing forward slash. **Note:** If the application is configured to run under HTTPS/SSL mode, then the URL's will be, for example, https://localhost:443/caarray or https://www.myPublicUrl.edu/caarray.
6	Set database properties. Set the db.hostname, `db.port`, `db.sid`, `db.username`, and `db.password` properties for your database configuration. (Note that the `db.username` and `db.password` are "caarrayop" and "`password`," which are set during the Step 4 on page 14.)
7	Indicate authentication mechanism, set the authentication.mechanism property Assumed default authentication mechanism is database or db; if you will be using LDAP for authentication, set the authentication.mechanism property to `ldap`.
8	Set LDAP properties. ***OPTIONAL.*** If you will be using ldap for authentication, set your `ldap.host`, `ldap.port`, `ldap.searchbase`, `ldap.mgr.dn`, and `ldap.mgr.pw` properties here.

Step	Action
9	Specify caAMEL settings. ***OPTIONAL.*** If you plan to use caAMEL with caArray to handle the uploading, validating, and importing of MAGE-ML data into caArray, set your `caamel.url` and `caamel.caarray.serverkey.name` properties here. You must download caAMEL from the NCICB download page, http://ncicb.nci.nih.gov/download/downloadcaarray.jsp and install it according to the instructions.
10	Save this document in the same directory as `local.properties`.

Building and Deploying caArray

Complete the following steps for building and deploying caArray:

Step	Action
1	From the command prompt screen, change the directory to `{JBOSS_HOME}/caarray/{CAARRAY_SRC_HOME}/build` and type: ***ant deploy:jboss*** *Optional:* Anything described after this and step 2 does the same thing as ***ant deploy:jboss.*** This generates the appropriate EJB files and compiles and generates `caarray.ear` in the `{JBOSS_HOME}/caarray/{CAARRAY_SRC_HOME}/build/deploy/unexploded` directory. Note that you can use various Ant targets, including the following: ***ant deploy:jboss*** creates properties files, builds, and deploys (moves EAR file) directly to JBoss ***ant -p*** shows a list of Ant targets with descriptions for building, testing, inspecting and deploying caArray.
2	After the build is complete, copy the `{JBOSS_HOME}/caarray/{CAARRAY_SRC_HOME}/build/deploy/unexploded/caArray.ear` file to the `{JBOSS_HOME}/server/{JBOSS_SERVER_NAME}/deploy` directory (Note that if you used the `deploy:jboss` target, the `caArray.ear` file is already deployed into JBOSS.)
3	Restart the JBoss application server.

At this point, the caArray application should be accessible via the testcaarray login created above. Log in to caArray using this login and perform basic sanity tests – the database is initially empty so the search results should return nothing.

Enabling/Disabling Public Searches

caArray allows for searching and viewing public data in the local portal without logging in to the system. Complete one of the following steps to enable (1a) or disable (1b) this optional feature.

WARNING	Step 1a is essential for public searches, especially if you must run the MAGE-OM smoke test. If you do not complete 1a, you will probably get an error message.

Step	Action
1a	**Enable Public Searches** Using Ant execute the following command from the `{JBOSS_HOME}/caArray/{CAARRAY_SRC_HOME}/build` directory. `ant database:enable-public-searches` (This assumes the `db.hostname`, `db.port`, `db.sid`, `db.username`, and `db.password` properties for your database configuration have been properly specified).
1b	**Disable Public Searches** Using Ant execute the following command from the `{JBOSS_HOME}/caArray/{CAARRAY_SRC_HOME}/build` directory. `ant database:enable-public-searches` (This assumes the `db.hostname`, `db.port`, `db.sid`, `db.username`, and `db.password` properties for your database configuration have been properly specified)

Upgrading an Existing Installation

Using the caArray Portal v1.6 Update Utility

This section describes the steps necessary to download and update an existing caArray Portal v1.5.x.x instance to v1.6 using the provided update utility.

Prerequisites	You should have either prior knowledge of installing caArray Portal 1.5 within your enterprise or have access to the system hosting and running your organization's caArray Portal instance. The 1.6 update utility can only be implemented after version 1.5 is installed on your system.

Complete these steps to download the update utility:

Step	Action
1	Download the caArray Portal v1.6 Update Utility, named `caarray-1.6-update-installer.jar` from the caArray Portal and API file release section: https://gforge.nci.nih.gov/frs/?group_id=82. To download, right click on the file and Select the **Save Target As…** option. The File Download window will display and then the Save As window will display with a File name. If the file name ends with `.zip`, rename the file extension to `.jar`.
2	In the Save As dialog box, navigate to the directory to which the installer will be downloaded. Click **Save** button to save the file to your target machine directory. The download takes several seconds to complete (~17.5 MB file). The length of time is dependent on the target machine's Internet environment, so be patient..
3	To verify the file downloaded successfully, navigate to the target directory and look for the file.

Launching the Update Utility

To launch the update utility, complete the following steps:

Step	Action
1	From your target directory, double-click the **caarray-1.6-update-installer.jar** jar file to launch the installer.
2	Wait a few seconds for the installer to start. If it does not start within a minute using this method, then start it from the command line. There will be no visible acknowledgement that the executable is running until the caArray Portal splash screen displays.

To execute from the command line on a MS-Windows operating system:

Step	Action
1	Open a command prompt window.
2	In the command prompt window, change the default directory to point to the target directory in which you downloaded the **caarray-1.6-update-installer.jar** file.
3	Type "*java –jar caarray-1.6-update-installer.jar"* on the command line. When the caArray Portal splash screen displays, the executable will begin file extraction automatically.
4	When the extraction is complete, the caArray Portal Update Utility Welcome screen will display. Use the Back and Next buttons to navigate through the installation process.
5	Follow the prompts on each window to complete the installation process.

To execute from the command line on a *local* Unix operating system (X windows available):

Step	Action
1	Open a terminal window (shell prompt).
2	In the terminal window, change the default directory to point to the target directory in which you downloaded the **caarray-1.6-update-installer.jar** file.
3	Type "*java –jar caarray-1.6-update-installer.jar"* on the command line When the caArray Portal splash screen displays, the executable will begin file extraction automatically.
4	When the extraction is complete, the caArray Portal Update Utility Welcome screen will display. Use the Back and Next buttons to navigate through the installation process
5	Follow the prompts on each window to complete the installation process.

When an X windows environment is not available, to execute from the command line on a *remote* Unix operating system, follow these steps:

Step	Action
1	Open a terminal window (shell prompt) and connect to the remote system.
2	In the terminal window, change the default directory to point to the target directory in which you downloaded the `caarray-1.6-update-installer.jar` file. a. If the file was not downloaded to the remote server, copy the file to the remote system.
3	Type ***java –jar caarray-1.6-update-installer.jar*** on the command line. The utility operates in text-only mode. During this mode, on-screen instructions are displayed though the following are useful tips: • Hit ENTER to advance the screen. • Hit ENTER to accept the default value shown on the screen (e.g. `[default: Y]` or `[default:false])`. • Specify the full path to the 'caarray.ear' file and hit ENTER. • Type ***Yes*** to confirm your installation on the confirmation screen.
4	Follow the prompts in each window to complete the installation process.

Post Installation Steps

After the update utility completes, you are encouraged to schedule a restart of your caArray Portal server instance (restart JBoss)

Known Issues

Scenario: Double-clicking on the **caarray-1.6-update-installer.jar** opens the file with WinZip or some other associated program other than "java".

Solution: Change the file type association and try again or try to launch the installer using the command line and typing ***java –jar <DownloadedFileName.jar>*** (replace with actual filename).

Launching caArray

Accessing the caArray Application

Perform the following steps to access the caArray application:

Step	Action
1	Run `{JBOSS_HOME}/bin/run.sh` (UNIX) or `{JBOSS_HOME}/bin/run.bat` (Windows) to start JBoss.

Step	Action
2	Open a web browser and type following URL to access the caArray web application: http://{SERVERNAME:8080}/caarray or https://{SERVERNAME:443}/caarray. Login to the application using the following credentials*: LOGIN ID: *testcaarray* PASSWORD: *testcaarray* *If your local installation does not support the 'testcaarray' user then, login using valid credentials. If you need to create an account, see the following section, Creating User Accounts.
3	If you can not access the caArray web application, perform the following: a. Enter http://{SERVERNAME:8080}/caarray/ to make sure JBoss is running. b. Check the log files at `{JBOSS_HOME}/server/{JBOSS_SERVER_NAME}/logs/server.log` and `{JBOSS_HOME}/server/{JBOSS_SERVER_NAME}/logs/caarray.log` for any error messages.

| NOTE | After the user accounts have been created (following section), to launch caArray,
• Oracle must be running (It runs as a service when you launch Windows.)
• You must start JBoss. To do so, run the `run.bat` file (Windows) or `run.sh` (UNIX) (as described in step 1 in this section).
• Login using the user name and password defined in the following section. |

Creating User Accounts

| NOTE: | The seed provided with the database dump has the necessary information about user roles and public consortia. |

Perform the following steps to create caArray Adminstrator user for the management of users.

Step	Action
1	Using Ant execute the following command from the `{JBOSS_HOME}/caArray/{CAARRAY_SRC_HOME}/build` directory. `ant database:create-caarrayadmin-user` (This assumes the `db.hostname`, `db.port`, `db.sid`, `db.username`, and `db.password` properties for your database configuration have been properly specified)
2	Open a web browser and type following URL to access the caArray web application: http://{SERVERNAME:8080}/caarray or https://{SERVERNAME:443}/caarray. Login to the application using the following credentials: LOGIN ID: caarrayadmin PASSWORD: caarrayadmin
3	Change the caarrayadmin user's password. a. Navigate to the User Management portion of the application, and click on SEARCH USERS link in the left navigation menu. b. On the Search Users page, input *caarrayadmin* into the **Login Name** field and click **Search**. c. In the search results, click on the entry for the caArray Administrator to navigate to the User Details page to modify the user's password. d. On the User Details page, click the **Modify** button. e. On the Modify User page, input the new secure password for your caArray Portal instance, f. Click **Save** when complete. <table><tr><td>**NOTE** </td><td>Be sure to document the caArray Administrator's new password and store it in a safe place.</td></tr></table>
4	Logout. In the future, use the caArray Administrator account, to create or manage user accounts.

Contacting Application Support

NCICB   http://ncicb.nci.nih.gov/NCICB/support
Application   Telephone: 301-451-4384
Support   Toll free: 888-478-4423