

# caNanoLab 2.0 Installation Guide

Welcome to the *caNanoLab 2.0 Installation Guide*.

## To Get Support

For any general information about the application, support, or to report a bug, contact [caNanoLab-Support@ISB-CGC.org](mailto:caNanoLab-Support@ISB-CGC.org).

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## Introduction to caNanoLab

Welcome to the cancer Nanotechnology Laboratory (<https://cananolab.cancer.gov>). caNanoLab is a data sharing portal that supports the international biomedical nanotechnology research community to expedite and validate the use of nanotechnology in biomedicine. caNanoLab provides support to annotate nanomaterials with characterizations resulting from physico-chemical, *in vitro*, and *in vivo* assays and share characterizations and associated nanotechnology protocols in a secure environment.

Release 2.0 focuses on usability enhancements and technology stack changes. The usability features include: support for a publication based query to support query by DOI or PubMed; a sample information page; the ability to perform a publication sample search; the MyWorkspace feature; a sample search results user interface; and enhancements to the home page, back button, banner, color, and workflow.

## Targeted Developer

The caNanoLab application development is best suited for an experienced Java developer who has some familiarity with the following J2EE and related technologies:

### Important Background Knowledge

Unix/Linux environment, Windows XP environment or Mac OS environment (Configuring environment variables; Installing Ant, JDK, Apache Tomcat and JBoss servers)

- Ant build scripts
- J2EE web application development using the Struts framework, Servlet/JSP's, JavaScript
- J2EE middle-ware technologies such as n-tier service-oriented architecture and software design patterns
- Hibernate Java persistence framework

## General System Requirements

The following open source technologies power a caNanoLab release 2.0 web application:

## Open Source Technologies

- Java Software Development Kit (JDK) version 6.0: <http://www.oracle.com/technetwork/java/javase/downloads/jdk6-downloads-1637591.html>
- JBoss version 5.1.0: <http://sourceforge.net/projects/jboss/files/JBoss/JBoss-5.1.0.GA/>
- Jakarta Ant version 1.7.x: <http://archive.apache.org/dist/ant/binaries/>
- MySQL version 5.1.x: <http://dev.mysql.com/downloads/mysql/5.1.html>

The caNanoLab web application has been tested within NCICBIIT against JBoss servers (version 5.1.0) hosted on Windows XP and RedHat Linux systems, and against MySQL 5.1.x databases hosted on RedHat Linux systems and Windows XP systems. Prior to release 1.2.1, the caNanoLab web application had been tested against Oracle 9i databases hosted on Sun Solaris systems, and Oracle 10g XE database hosted on Windows XP.

Download each of the tools listed in the bulleted list above and follow the installation instructions provided with each respective product for your environment. Assistance from a MySQL database administrator is expected to properly configure the MySQL database. For MySQL database configuration and maintenance, it is also helpful to download the MySQL workbench (suite of GUI tools) at <http://www.mysql.com/downloads/workbench/>

## Obtaining the caNanoLab Source

### Source Code

Downloads for caNanoLab are available at [caNanoLab GitHub Repository](#). The [caNanoLab Software License](#) applies.

## Ant Build Properties

### Assumptions and Requirements

The caNanoLab source distribution [caNanoLab\\_2.0.zip](#) is downloaded. Ant is installed.

**NOTE:** In caNanoLab release 2.0, the Ant build script automatically installs the web application.

### Setting Properties

Follow these steps to set the build and deploy properties required for building and deploying the caNanoLab system.

#### Step 1. Extract caNanoLab

Extract the [caNanoLab\\_2.0.zip](#) to a location on your local system, for example, C:\caNanoLab\_2.0. This location is referred to as <CANANOLAB\_SOURCE> throughout the document. Verify that the following five folders exist in the directory <CANANOLAB\_SOURCE>:

- build
- cananolab-db
- cananolab-grid
- cananolab-webapp
- common

#### Step 2. Edit Ant Properties

Edit the Ant properties file, build.properties, at <CANANOLAB\_SOURCE>/build by specifying values for the following properties:

1. **file.repository.dir:** A directory on the system that hosts the JBoss application server for storing uploaded files, for example, C:/apps/canoanolab.  
**NOTE:** This directory should be writable by the user that starts the JBoss server, and this directory should be created prior to starting the application. Use either double-back slashes or a single forward slash / as the file separator if working on Windows platform.
2. **admin.email:** The email address that receives requests for new user accounts, for example, the [NCIAppSupport@nih.gov](mailto:NCIAppSupport@nih.gov) email for the NCICBIIT installation.
3. **ldap.authentication.enabled:** A Boolean flag to indicate whether or not to use LDAP for user authentication in caNanoLab, for example, true.  
**NOTE:** The default value is true. If you are not using LDAP for user authentication, set this value to false and leave properties 4) through 9) blank.
4. **ldap.host.url:** The URL of the LDAP server used for user authentication.
5. **ldap.searchable.base:** The location in the directory from which the LDAP search begins.
6. **ldap.userId.label:** The uid label for LDAP, for example, cn.
7. **superadmin.login.name:** The LDAP login name for the user account who is the super admin of the UPT tool. Refer to [User Provisioning Tool \(UPT\)](#) for details on setting up UPT.
8. **superadmin.first.name:** The LDAP first name for the user account who is the super admin of the UPT tool.
9. **superadmin.last.name:** The LDAP last name for the user account who is the super admin of the UPT tool.
10. **database.server:** The name of the server hosting the database, for example, localhost.
11. **database.port:** The database port number, for example, 3306.
12. **database.user:** The database user name used in the caNanoLab application, for example, cananolab\_app.
13. **database.password:** The password for the database user specified above, for example, go!234.
14. **database.system.user:** The system database user name with privileges to create a database, create tables, grant user accesses to a database, for example, root.
15. **database.system.password:** The password for the system database user specified above, for example, rootpass.
16. **jboss.server.dir:** The JBoss server directory, for example, C:/apps/jboss-5.1.0.GA/server/default.

# Database Technology

## Assumptions and Requirements

- The Ant build properties are set as described in section, [Step 2. Edit Ant Properties](#).
- A MySQL database is set up on a system (local or remote) with a system (or root) account.
- The system account matches properties 9) and properties 10) in [Step 2. Edit Ant Properties](#).

### For a Previous Installation

If you installed caNanoLab prior to release 2.0 against an MySQL database, or release 1.2, release 1.1.1, or release 1.1 against an Oracle database, and have associated production data in these schemas and you would like to continue to use the same data for caNanoLab release 2.0 in MySQL, review the following database initialization steps, and then go directly to section, [Data Migration](#).

If you have a previously installed caNanoLab application running on a JBoss server, stop the server before running the database scripts.

### For a New Installation

If you are installing the caNanoLab application for the first time or want to install a new schema for release 2.0, follow the steps below to set up the required MySQL schema objects and the seed data for release 2.0.

## Initializing the MySQL Database

Follow these steps to initialize your MySQL database system:

Step	Action
1	<p>Execute the Ant build script build.xml located at &lt;CANANOLAB_SOURCE&gt;/build with the target install:new:cananolab-db.</p> <p><i>Example:</i> Issue the following commands to execute the Ant script:</p> <pre>C:\&gt;cd C:\caNanoLab_2.0\build C:\caNanoLab_2.0\build&gt;ant install:new:cananolab-db</pre> <p>Successful execution of the Ant script creates the database schema and seed data required the caNanoLab 2.0 release.</p>
2	<p>If you are NOT using LDAP for user authentication, you can skip this step. If you are using LDAP for authentication, execute the Ant build script build.xml located at &lt;CANANOLAB_SOURCE&gt;/build with the target update:cananolab-db:ldap:upt:superadmin</p> <p><i>Example:</i> Issue the following commands to execute the Ant script:</p> <pre>C:\&gt;cd C:\caNanoLab_2.0\build C:\caNanoLab_2.0\build&gt;ant update:cananolab-db:ldap:upt:superadmin</pre> <p>Successful execution of the Ant script updates the default UPT super admin with the user name entered in the build properties file.</p>

## Verification

Once the MySQL database is created, either through a new setup or through data migration (described in the next section), verify that the following numbers of database objects are created:

Tables 72

*Example:* Issue the following query at the MySQL prompt, logging in as root:

```
mysql> select count(*) from information_schema.tables where table_schema='canano' and table_type='BASE TABLE';
```

## Data Migration

**NOTE:** If you are installing caNanoLab 2.0 for the first time or installing a new caNanoLab release 2.0 schema, you can skip this section.

This installation guide only discusses the steps for migrating from release 1.5.3, 1.5.4, or 1.5.5. in MySQL to release 2.0 in MySQL. If you have previously installed caNanoLab in MySQL prior to release 1.5.1, you need to migrate to release 1.5.1 first, one release at a time. The 1.5.5 installation guide is available at the [main caNanoLab wiki page](#), but previous installation guides are available at the [caNanoLab Archive page](#).

Follow these steps to complete the required data migration from release 1.5.3, 1.5.4, or 1.5.5. in MySQL to release 2.0 in MySQL:

Step	Action
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1	<p>Execute the Ant build script build.xml located at &lt;CANANOLAB_SOURCE&gt;/build with the target update:cananolab-db.</p> <p><i>Example:</i> Issue the following commands to execute the Ant script:</p> <pre>C:\&gt;cd C:\caNanoLab_2.0\build C:\caNanoLab_2.0\build&gt;ant update:cananolab-db</pre> <p>Successful execution of the Ant script updates the database schema and seed data required the caNanoLab 2.0 release.</p>
2	<p>If you are NOT using LDAP for user authentication, you can skip this step. If you are using LDAP for authentication, execute the Ant build script build.xml located at &lt;CANANOLAB_SOURCE&gt;/build with the target update:cananolab-db:ldap:upt:superadmin</p> <p><i>Example:</i> Issue the following commands to execute the Ant script:</p> <pre>C:\&gt;cd C:\caNanoLab_2.0\build C:\caNanoLab_2.0\build&gt;ant update:cananolab- db:ldap:upt:superadmin</pre> <p>Successful execution of the Ant script updates the default UPT super admin with the user name entered in the build properties file.</p>
3	<p>If you are NOT using LDAP for user authentication, you can skip this step. If you are using LDAP for authentication, and you already have user accounts in the system and you have data created by these users whose login names are not their LDAP login IDs, you need to perform the following update:</p> <ul style="list-style-type: none"> <li>Update the login_name column of the csm_user table with the LDAP login name for each user in the table: <i>Example:</i> Issue the following query at the MySQL prompt for each user, logging in as root: mysql&gt; update csm_user set login_name='' where login_name=''; ...Where the token is replaced by the real LDAP login name that corresponds to the old login name. Replace the token with the old login name.</li> <li>Update the created_by column of tables containing the column with the LDAP login name: <i>Example:</i> Issue the following query at the MySQL prompt for each table containing the created_by column, logging in as root: mysql&gt; update sample set created_by='' where created_by =''; ...Where the token is replaced by the real LDAP login name that corresponds to the old login name. Replace the token with old login name.</li> </ul> <p><b>Note:</b> if the created_by field contains the word "COPY" in it, update it with a prefix : (colon), where the token is replaced by the real LDAP login name that corresponds to the old login name who created the data. If you do not know the original login who created the data, use the LDAP login of a curator. If you need assistance on completing the data updates for this step, contact the caNanoLab technical team.</p>

After data migration, refer to the [Verification](#) section to verify that the migration is successful.

## caNanoLab Web Application

### Assumptions and Requirements

Ant is installed, and the Ant build properties are set up. The database is installed and verified. The JBoss application server is installed on a system (local or remote) and can be started at a designated port. JBoss install directory is referred to as <JBOSS\_HOME> in the document. The JBoss application server host URL is referred as <APP\_SERVER\_URL>, for example, [cananolab-dev.nci.nih.gov:19080](http://cananolab-dev.nci.nih.gov:19080).

It is assumed that the default configuration is used for deploying caNanoLab web archive files. For example, in JBoss 5.1.0, the default configuration is located at the directory <JBOSS\_HOME>/server/default. The caNanoLab web archive file will be deployed at the directory <JBOSS\_HOME>/server/default/deploy.

It is possible to configure Apache server to interface with the JBoss server and set up a virtual host for the caNanoLab application. If you need assistance, contact [caNanoLab-Support@ISB-CGC.org](mailto:caNanoLab-Support@ISB-CGC.org).

### Installation and Deployment

Follow these steps to install and deploy caNanoLab:

S t ep	Action
1	<p>Set up an environment variable JBOSS_HOME to point to the JBoss installation directory.</p> <p><b>Note:</b> Use either double backslashes // or a single forward slash / as the file separator if working on Windows platform, for example, JBOSS_HOME=C:/jboss-5.1.0.GA (C:\jboss-5.1.0.GA would fail).</p>

2 Execute the Ant build script build.xml located at <CANANOLAB\_SOURCE>/build with the target deploy:cananolab-webpp.

*Example:* Issue the following commands to execute the Ant script:

```
C:\>cd C:\caNanoLab_2.0\build C:\caNanoLab_2.0\build>ant deploy:cananolab-webpp
```

Successful execution of the Ant script generates the following artifacts that include two deployable web archive war files, configuration files and libraries for running the web application in the JBoss environment, and also places these artifacts in the appropriate directories under <JBOSS\_HOME>:

```
<CANANOLAB_SOURCE>/target/dist/exploded/canolab- webapp/caNanoLab.war
<CANANOLAB_SOURCE>/target/dist/exploded/common/Applica tionSecurityConfig.xml
<CANANOLAB_SOURCE>/target/dist/exploded/common/csmupt. csm.new.hibernate.cfg.xml
<CANANOLAB_SOURCE>/target/dist/exploded/common/csmupt4 23.csm.new.hibernate.cfg.xml
<CANANOLAB_SOURCE>/target/dist/exploded/common/login- config.xml
<CANANOLAB_SOURCE>/target/dist/exploded/common/mysql- connector-java-5.0.7.jar
<CANANOLAB_SOURCE>/target/dist/exploded/common/upt- ds.xml
<CANANOLAB_SOURCE>/target/dist/exploded/common/propert ies-service.xml
<CANANOLAB_SOURCE>/target/dist/exploded/common/upt- ds.xml
<CANANOLAB_SOURCE>/target/dist/exploded/common/uptEAR. ear
```

3 We recommend increasing the JBoss JVM heap size to 1G bytes and permanent generation (permgen) memory space to 256M bytes by updating the file

<JBOSS\_HOME>/bin/run.conf with the following JAVA\_OPTS:

```
JAVA_OPTS="-Xms512m -Xmx1024m -XX:PermSize=128m - XX:MaxPermSize=256m -Dsun.rmi.dgc.client.
gcInterval=3600000 - Dsun.rmi.dgc.server.gcInterval=3600000"
```

This configuration file is read when JBoss server starts.

- 4 When deploying the caNanoLab application in a production environment, we also recommend updating the default logging behavior of the JBoss server by turning off the unnecessary loggings thus reducing file system requirements for server log files.

Locate the file <JBOSS\_HOME>/server/default/conf/log4j.xml and add to the beginning of the section Limit categories the following text:

```
<!-- ===== -->
<!-- Limit categories -->
<!-- ===== -->

<!-- edited for caNanoLab -->
<category name="org.hibernate">
<priority value="WARN"/>
</category>
<category name="org.springframework">
<priority value="WARN"/>
</category>
<category name="org.globus">
<priority value="WARN"/>
</category>
<category name="gov.nih.nci">
<priority value="ERROR"/>
</category>
<category name="org.displaytag">
<priority value="ERROR"/>
</category>
<category name="org.directwebremoting">
<priority value="ERROR"/>
</category>
<category name="net.sf.ehcache">
<priority value="INFO"/>
</category>
<category name="com.mchange.v2">
<priority value="INFO"/>
</category>
<category name="org.jboss">
<priority value="INFO"/>
</category>
<category name="CSM">
<priority value="ERROR"/>
</category>
<category name="Authorization">
<priority value="ERROR"/>
</category>
<!--end of edit for caNanoLab -->
```

## Verification

Once the deployment artifacts are deployed and the JBoss application server is correctly configured, you can now start the JBoss application server, which in turn starts the caNanoLab application.

Open the URL [http://<APP\\_SERVER\\_URL>/caNanoLab/](http://<APP_SERVER_URL>/caNanoLab/) , for example, <http://localhost:8080/caNanoLab> ). The Welcome/Login page displays.

## User Provisioning Tool (UPT)

### Creating User Accounts

Before a user can log in to the caNanoLab application to submit and search data, you must first create a user account through the UPT web interface. The caNanoLab application makes use of the NCICBIT's User Provisioning Tool (UPT), a separate web application, for user account management. The concepts of users, groups, roles, protection groups are defined according to the CSM/UPT principles. Refer to the [CSM documentation](#) for details on these concepts and the use of the UPT tool.

Since release 1.5.2, as a part of the database seed data, two default user groups are created: Public and Curator. The group Public is assigned role R (read-only) public protocols, samples, and publications. The group Curator is assigned role CURD (create, update, read and delete) to all protocols, samples, and publications in the system. When a user first logs into caNanoLab, the user is automatically added to the Public group and can view all public data. The user needs to be added to the Curator group in the UPT tool in order to have Curator access.

**NOTE:** Since release 1.5.2, a user must be assigned as a caNanoLab administrator to view the ADMINISTRATION menu item in the application to log into the UPT tool or update site preferences, such as the site logo. A user must be assigned as a caNanoLab administrator AND assigned to the Curator group to be able to execute the transfer ownership function.

## UPT Example

The following steps illustrate an example use of the UPT tool to create a new user, assign the user to be a caNanoLab administrator, and assign the user to the Curator group.

S tep	Action
1	<p>Launch the UPT tool at <a href="http://&lt;APP_SERVER_URL&gt;/uptlogin">http://&lt;APP_SERVER_URL&gt;/uptlogin</a> and log in as the super admin. If you are NOT using LDAP for user authentication, the default user account/password for super admin is <b>superadmin/superadmin</b> .</p> <p>Enter <b>csmupt</b> as the application name when prompted at the UPT log in. If you are using LDAP for user authentication, use the LDAP login name and password of the user assigned as the super admin as specified in the <a href="#">Ant build properties file</a>.</p> <p><b>Note:</b> The user <b>superadmin</b> with initial password <b>superadmin</b> was created as a part of the database setup. Only <b>superadmin</b> can assign users to be caNanoLab administrators.</p>
2	<p>If you are using LDAP for user authentication, skip this step. If you are not using LDAP for authentication, follow this step to reset the password for <b>superadmin</b> :</p> <ul style="list-style-type: none"><li>• Select <b>User &gt; Select an Existing User</b>.</li><li>• Click on <b>Search</b> and select <b>superadmin</b>, and click on <b>View Details</b>.</li><li>• Update the <b>User Password</b> field and <b>Confirm Password</b> field.</li><li>• Click on <b>Update</b> to commit the change.</li></ul>
3	<p>Log in as the super admin, and follow these steps to create a new user and assign it to be a caNanoLab administrator:</p> <ul style="list-style-type: none"><li>• Select <b>User &gt; Create a New User</b>.</li><li>• Create a new user account named <b>admin</b> with an initial password.</li><li>• Select <b>Application &gt; Select an Existing Application</b>, and click <b>Search</b>. Select <b>caNanoLab</b> from the application list.</li><li>• Click <b>View Details</b>, then <b>Associated Admins</b>.</li><li>• Assign this user to be an administrator for the caNanoLab application.</li><li>• Click <b>Update Association</b> to commit the change.</li></ul> <p><b>Note:</b> If you are using LDAP for user authentication, any user login names created in the UPT tool must be a valid LDAP log in name.</p>
4	<p>Before the newly-created user can log into the UPT application, logged in as the super admin, follow these steps to update the required database connection information for the <b>csmupt</b> and <b>caNanoLab</b> applications under the <b>Application</b> tab:</p> <p>Select <b>Application &gt; Select an Existing Application</b>, and click <b>Search</b>. Select <b>csmupt</b> from the application list.</p> <p>Click <b>View Details</b>, then update the following fields:</p> <ul style="list-style-type: none"><li>• <b>Application Database URL</b>, for example, <code>jdbc://mysql://localhost:3306/canano</code></li><li>• <b>Application Database User Name</b>, for example, <code>cananolab_app</code></li><li>• <b>Application Database Password</b>, for example, <code>go!234</code></li><li>• <b>Application Database Confirm Password</b>, for example, <code>go!234</code></li><li>• <b>Application Database Dialect</b>, for example, <code>org.hibernate.dialect.MySQLDialect</code></li><li>• <b>Application Database Driver</b>, for example, <code>com.mysql.jdbc.Driver</code></li></ul> <p><b>Note:</b> Refer to <a href="#">Edit Ant Properties</a> for the appropriate values for these fields. Values for <b>Application Database Dialect</b> and <b>Application Database Driver</b> must be exactly entered as shown above.</p> <p>Repeat the steps to update the database connection information for the caNanoLab application.</p>
5	<p>Log out of the UPT tool and log back in as <b>admin</b>. Use <b>caNanoLab</b> as the application name when prompted at the UPT log in.</p>
6	<p>Select <b>User &gt; Select an Existing User</b>, and click <b>Search</b>. Select <b>admin</b> from the User list.</p> <p>Click <b>View Details</b>, then <b>Associated Groups</b>.</p> <p>Select <b>Curator</b> from the pre-defined group list and assign it to the user. Click <b>Update Associations</b> to commit the change.</p>

Follow similar steps to create other application user accounts as appropriate.

**NOTES:** Since release 1.5.2, if you are not using LDAP for user authentication, **superadmin** or caNanoLab administrators maintain the passwords for user accounts. The UPT tool does not allow users to manage their own passwords.

Publicly-available data can be browsed through **Browse caNanoLab** links on the home page without logins.

At each new data submission, the user who creates the data and the Curator group are automatically assigned role CURD to the newly-created data.

For more information about how to use the UPT tool for managing user accounts, contact [caNanoLab-Support@ISB-CGC.org](mailto:caNanoLab-Support@ISB-CGC.org) and request that the caNanoLab technical team gives you a demonstration of the UPT tool in the context of the caNanoLab application.

## Contacting Application Support

For any general information about the application, support, or to report a bug, contact [caNanoLab-Support@ISB-CGC.org](mailto:caNanoLab-Support@ISB-CGC.org).