Contents

Introduction

This installation guide outlines the configuration and instruction for installing the C3D Grid Service application. The C3D Grid Services provides a mechanism for acquiring study patient positions and enrolling subjects into C3D registered studies. It also provides a mechanism that accepts laboratory test result data and loads it into the appropriate study / subject / clinical planned event. It does this by leveraging the provided Oracle Clinical Data Capture API (DCAPI) data services and by direct calls to the database itself. The Registration Consumer Grid Service has been created specifically for the CCTS project that allows C3D to accept a "RegisterConsumer" message and utilize it to enroll patients.

Components

C3D and Registration Consumer Grid Services are comprised of the following components:

- C3D Grid Service
- Register Consumer Grid Service
- Oracle Clinical Data Capture APIs (DCAPI), for data capture and propagation to C3D database.
- C3D Utility Lab Loader v1.0.4, for complete LoadLab processing into C3D database.
- C3D Utility Log Utility v1.0, for C3D utility process logging
- C3D Mailer Utility v1.0, for C3D utility e-mail notification.

Prerequisites for installation - Software

Database	Oracle 9.2.0.7.0	Access to an Oracle 9.2 database is required for certain functions of the C3D Grid Se operater
Database Tools	Oracle Client 8.0.6	Sql*Plus utility needed during the installation and SQL*Net installed and configured dlls required for DCAPI Usage
Oracle Clinical	4.5.1 or higher	Including DCAPI services
C3D Utilities	C3D Lab Loader v1.0.4 or higher	https://gforge.nci.nih.gov/frs/download.php/2623/LabLoader_Full_to_v1.0.4.zip
Database Utilities	UTL_SMTP	Required for e-mail notification alerts for LoadLab Grid Service. This is typically inc with Oracle 9.2 installations.
Tomcat	v5.0	
Java	JDK v1.5 Release 10	
caGrid	1.2	

Prerequisites for installation - Hardware

- Windows : Windows XP, Windows 2003, 1G RAM

C3D Grid Service and Register Consumer Grid Service Installment

Part of CCTS install assumes this, you can remove it

It is assumed that the prerequisite steps consisting of installing JDK v.1.5.x, caGrid v1.2, along with Tomcat 5.0.28 have been completed.

Installing C3D Grid Service

Install / Deploy C3D Grid Service in Tomcat

Please reference the location in the CCTS package, not a download

Recommend WinZip and then just use the term "unzip" throughout

Recommend a specific temporary directory path

Use full paths for whatever is possible, e.g. please use full path to Tomcat based on CCTS install doc

Complete the following steps to download and install the C3D Grid Service:

1. Download the latest C3DGridService.zip from the following Gforge Page: https://gforge.nci.nih.gov/frs/?group_id=365. The current file is "C3DGridService_war_cagrid_1_2.zip".

2. Create a temporary folder and extract the contents of the C3DGridService.zip file using Windows WinZip utility. The temporary folder that is created in this step will be referred to as <<temp folder>> in the remaining steps of this section.

3. The extraction directory will contain contain the file "c3d.war" and a folder called "conf". "c3d.war" is the actual C3D Connector Service deployment file and the directory "conf" contains sample configuration files.

4. Modify the file "registerConsumer_gridservice.properties" in the extraction directory "conf/c3d". Change the database configuration parameters that the Registration Consumer Grid Service will utilize to access the C3D database. These parameters should be changed to point to the appropriate database for the environment being deployed. The configuration parameters are shown in the table below.

Property Name	Description	Sample Value
regconsds.dburl	The url for pointing the target database	jdbc:oracle:thin:@cbiodb2.nci.nih.gov:1521:OCDEV
regconsds.dbdriverClassName	The fully qualified jdbc driver name that the C3D Grid Service will utilize	oracle.jdbc.driver.OracleDriver
regconsds.dbusername	A user name for the database user	database_user
regconsds.dbpassword	The password for the database user	user_password

5. Copy the modified file "registerConsumer_gridservice.properties in Step #4 and copy it to the <CATALINA_HOME>/conf/c3d directory. If the directory does not exist, it must be created.

6. Modify the file "c3dgridservice.properties" in the extraction directory "conf/c3d". Change the database configuration parameters that the Registration Consumer Grid Service will utilize to access the C3D database. These parameters should be changed to point to the appropriate database for the environment being deployed. The configuration parameters are shown in the table below.

Property Name	Description	Sample Value
c3dds.db	The url for pointing the target database	jdbc:oracle:thin:@cbiodb2.nci.nih.gov:1521:OCDEV
c3dds.dbdriverClassName	The fully qualified jdbc driver name that the C3D Grid Service will utilize	oracle.jdbc.driver.OracleDriver
c3dds.dbusername	A user name for the database user	database_user
c3dds.dbpassword	The password for the database user	user_password

7. Copy the modified file "c3dgridservice.properties" in Step #6 and copy it to the <CATALINA_HOME>/conf/c3d directory.

8. Copy the file "c3d.war" from the extraction directory to the directory $CATALINA_HOME/webapps.

9. (Re)start tomcat.

Installing C3D Connector Encryptor

Reference file in CCTS package, not GForge download

Full path for C3DCrypt

1. Download the latest C3D Connector Encryptor file "c3d_crypt.zip" from the following Gforge Page: https://gforge.nci.nih.gov/frs/?group_id=365.
2. Create a folder "C3DCrypt" and extract the contents of the file "c3d_crypt.zip" using Windows WinZip utility into it.
3. Add the above to the classpath by using the following command from a DOS prompt: set classpath=.;castor-0.9.9.jar;jce-jdk13-125.jar;%classpath%
4. See "Encrypting Password" section below.

Installing C3D DCAPI dlls

Reference file in CCTS package, not GForge download

Complete the following steps to download the C3D DCAPI dlls from GForge:

1. Download the latest C3D DLL File "dcapi_dll.zip" from the following Gforge page: https://gforge.nci.nih.gov/frs/?group_id=365.
2. Create the directory "C:\DCAPI\gov\nih\nci\c3d\study" and extract the contents of the file "dcapi_dll.zip" using Windows WinZip utility. The result is the following files existing in the "C:\DCAPI\gov\nih\nci\c3d\study" directory:

- dcapi.dll
- enrollpatient.dll
- questionloader.dll

Installing Oracle Database Components

The installation guide contains two options for installation of database objects, Minimal and Complete. The Minimal installation option is for those institutions that do not have or wish to use the C3D Lab Loader Utility. The Minimal installation option provides the basic objects needed to accept LoadLab messages from the Grid and record their values into the database. The Complete installation option is for those institutions that would like to take full advantage of the C3D Lab Loader Utility to not only accept the LoadLab Grid messages, but to propagate those data values into the studies of C3D. Instructions for both options are below.

Minimal Installation

This installation contains the minimum database objects and configuration needed to allow the C3D Grid Services to work in an Oracle Database. The minimum installation does not provide integration with the C3D Lab Loader Utility.

Downloading Minimum Oracle Database Components

Full path

Complete the following steps to download the C3D Grid Service Oracle Database Components from GForge:

1. Download the latest Minimal C3D Installation package by selecting the file C3DGridService_OracleMinimumInstall.zip" from the following Gforge page: https://gforge.nci.nih.gov/frs/?group_id=365

2. Create a folder "C3DGS-DBMin" and extract the contents of the file "C3DGrisService_OracleMinimumInstall.zip" using Windows WinZip utility.

Installing Minimum Database Components

Complete the following steps to install the Oracle Database Components:

1. Start SQL*Plus using a DBA account in the database instance targeted for installation.

2. Once SQL*Plus is started, set your default directory by using the menu options "File / Open".

- Select the directory where the installation files are located (Step 2 of the previous section).
- Select the file "C3DGridService_C3DDCAPIUSERDBSecurity.sql".
- Select the "Open" button.

3. The contents of "C3DGridService_C3DDCAPIUSERDBSecurity.sql" will be brought into SQL*Plus.

4. Press return or enter "." (period) and return to display a normal SQL*Plus prompt.

5. Begin schema creation for the DCAPI user by typing the following at the SQL prompt: @C3DGridService_C3DDCAPIUSERDBSecurity.sql

6. You will be asked to enter the database users default tablespace and temporary tablespace names with the following prompts:

- "Enter value for USERS_TABLESPACE_NAME:"
- "Enter value for TEMPORARY_TABLESPACE_NAME:"

7. Enter the name of the default user tablespace and temporary tablespace

8. The script will execute

9. Once the SQL prompt reappears, begin schema creation for the LoadLab user by typing the following at the SQL prompt: @C3DGridService_C3PRDBSecurity.sql

10. You will be asked to enter the database users default tablespace and temporary tablespace names with the following prompts:

- "Enter value for USERS_TABLESPACE_NAME:"
- "Enter value for TEMPORARY_TABLESPACE_NAME:"

11. Enter the name of the default user tablespace and temporary tablespace

12. The script will execute

13. Once the SQL prompt reappears, begin object creation by reconnecting to Oracle using the newly created LoadLab owner "C3PR" by executing the following commands:

- connect C3PR@databaseName
- databaseName is the name of the instance where you are installing these objects.

14. You will be prompted to enter a password. This user has an installation password. Enter the following value for password: c3d#123

Note: This value can be changed after installation.

15. Once the SQL prompt reappears, begin object creation for LoadLab by typing the following at the SQL prompt: @C3DGridService_C3PRDBObjects.sql

16. Once the SQL prompt reappears, you are done.

Complete Installation

This installation contains all of the database objects and configuration controls needed to allow the C3D Grid Services to work with an Oracle Database. Also included are the necessary configurations and objects to fully integrate the C3D LoadLab service with the C3D Lab Loader Utility. This installation assumes that a clean install is needed. The database objects that are required for this installation will be dropped and recreated.

Downloading Complete Oracle Database Components

Reference paths in CCTS package, not URLs

Full paths for directories

Complete the following steps to download the C3D Grid Service Oracle Database Components from GForge:

1. Download the latest Complete C3D Installation package by selecting the file "C3DGridService_OracleCompleteInstall.zip" from the following Gforge page: https://gforge.nci.nih.gov/frs/?group_id=365

2. Create a folder "C3DGS-DBComp" and extract the contents of the file "C3DGridService_OracleCompleteInstall.zip" using Windows WinZip utility.

Installing Complete Database Components

Full path to directory below in "select the directory"

Complete the following steps to install the Oracle Database Components:

1. Have the Oracle Clinical Site Administrator create the following Oracle Clinical Accounts. These accounts must then be given "Superuser" privileges for Oracle Clinical, and their corresponding underlying Oracle account must have Object Creation privileges. The Oracle Clinical Site Administrator must then provide the passwords for these newly created accounts to continue with the installation.

- C3DDCAPIUSER
- C3PR

2. Once the accounts are created and the passwords are available, log in to SQL*Plus using the newly created C3PR user id.

3. Once SQL*Plus is started, set your default directory by using the menu options "File / Open"

1. Select the directory where the installation files are located (Step 2 of the previous section).
2. Select the file "C3DGridService_C3PRDBObjects.sql".
3. Select the "Open" button.

4. The contents of "C3DGridService_C3PRDBObjects.sql" will be brought into SQL*Plus.

5. Press return or enter "." (period) and return to display a normal SQL*Plus prompt.

6. Once the SQL prompt reappears, begin object creation for LoadLab by typing the following at the SQL prompt: @C3DGridService_C3PRDBObjects.sql

7. Once the SQL prompt reappears, the log file "install_c3probjects.lst" should be checked for errors. The file will reside in the "C3DGS-DBComp" directory.

8. After checking the log file above for errors, begin C3D Connector database object creation by reconnecting to Oracle using the userid for the C3D Lab Loader owner. If you do not know the owner of the C3D Lab Loader , the following simple query can be used to determine ownership:

select owner from all_objects where object_name = 'NCI_LABS' and object_type = 'TABLE';

Note: `Connect to the database using the C3D Lab Loader owner id.`

9. Once connected, begin the installation of the C3D Mailer Utility. Check for the existence of the utility by typing the following at the SQL prompt:

- @Check_C3D_MAIL.sql

If the results reports that ALL of the C3D Mailer objects exists, skip to step 12, otherwise, continue with step 10. If the results show that only some of the objects exist, further investigation will be required prior to continuing with the installation.

Note: `The results of the above command will be stored in the file "check_c3d_m`

10. Continue installation of the C3D Mailer Utility by creating the database objects by typing the following at the SQL prompt:

- @Install_C3D_MAIL.sql

11. Once the SQL prompt reappears, the log file "install_c3d_mail.lst" should be checked for errors.

12. After checking the file for errors, continue object creation by typing the following at the SQL prompt:

- @Install_AutoLoader.sql

13. Once the SQL prompt reappears, type the following commands to finalize installation: *GRANT DELETE, INSERT, SELECT, UPDATE ON NCI_LABS_MANUAL_LOAD_HOLD TO C3PR;*

14. And finally, once the SQL prompt reappears, reconnect to the database using the newly created C3PR and enter the following commands

RENAME NCI_LABS_MANUAL_LOAD_HOLD_TEST TO NCI_LABS_MANUAL_LOAD_HOLD;

CREATE SYNONYM NCI_LABS_MANUAL_LOAD_HOLD_TEST FOR **OWNER** .NCI_LABS_MANUAL_LOAD_HOLD;

where **OWNER** is the C3D Lab Loader Owner id.

Post Installation Steps

C3D Mail Notification Configuration

During complete database component installation, the table C3D_MAIL_CTL was created. This object controls the destination of e-mail notifications. The value contained in the TO_ADDRESS column where ALERT_TYPE is 'MAILSERVER', must be changed to the smtp mail server for your institution. I.e. for the NCICB, this value would be 'MAILFWD.NIH.GOV'. Also, the values stored in the column TO_ADDRESS where ALERT_TYPE is 'FAILURE', 'SUCCESS' or 'WARNING' must be updated in the table with a valid e-mail address otherwise the alert notification system will not work correctly.

Password Encryption

During installation of the Complete Installation of Oracle Database Components, two database schema owners were created. The passwords for these accounts must be known by the Grid Service and are there for stored both inside the database, and within a properties parameter file. To provide extract security for these passwords, they must be encrypted. An encryption utility was included in the install (section "C3D Connector Encryptor Installation").

1. The encryptor is executed from the command prompt. Use the following command to encrypt a password: java StringEncrypter password_to_be_encrypted
2. The command will output the encrypted form of the text provided.

Registration Service Password Encryption

To push data to C3D, the C3D Grid Service must be able to log into the database instance of C3D. The userids for connecting to C3D were created in section "Installing Complete Database Components". For the Grid Service to connect, the password must be known by it. This is accomplished by using of a gridservice properties file. To ensure that the password is not human readable, it must be encrypted. Use the following steps to encrypt and record the passwords used by the Grid Services to connect to C3D.

1. Encrypt the password for the user C3PR as described in the "Password Encryption" section above.
2. In the <registration consumer impl temp folder> directory, modify the /src/ registerConsumer_gridservice.properties file to change the database configuration parameters for the

connecting schema. These values were previously discussed in section "Installing RegistrationConsumer Grid Service".
3. Change the value for the property regconsds.dbusername to "C3PR". This is the userid that is used as the primary connection id.
4. Change the value for the property regconsds.dbpassword to the encrypted value that is output from the encryption utility discussed in section "Password Encryption".

LoadLab Service Password Encryption

To push Lab Result data to C3D, the C3D Grid Service must be able to log into the database instance of C3D.

1. Use the encrypted password from the previous section.
2. In the <registration consumer impl temp folder> directory, modify the /src/ c3dgridservice.properties file to change the database configuration parameters for the connecting schema.
3. Change the value for the property regconsds.dbusername to "C3PR". This is the userid that is used as the primary connection id.
4. Change the value for the property regconsds.dbpassword to the encrypted value that is output from the encryption utility discussed in section "Password Encryption".

DCAPI Password Encryption

To leverage the C3D DCAPI functions, an Oracle Clinical account is required. This account pushes Lab Result data to C3D. The Connector must be able to log into to the database instance of C3D with it.

1. Encrypt the password for the user C3DDCAPIUSER as described in section "Password Encryption".
2. Using SQL*Plus, connect to the database as the C3PR user.
3. Enter a record into the table DCAPI_USER_CREDENTIALS. The following properties are entered into the table fields as follows:

- UNAME - C3DDCAPIUSER (This is the username that has access to C3D, and is used to register patients in studies)
- PWORD - encrypted_password (This is the value of the encrypted password from step 2 of section "Password Encryption")
- STATUS - ACTIVE (any other status will cause patient registration to fail)
- C3D_TNS_ENTRY - This is the database SQL*Net connection string.

Trouble Shooting

Installation Issues

Remove this section if it is empty

Configuration Issues

Problems:

Nothing for "see here". Anyway, this is defined in the main install guide, so you can just reference that

Error initializing: The version of Java found at ... is not correct.

This error message will be displayed if the installer could not locate the correct version of Java. You can point it to the correct version by setting the JAVA_HOME environment variable to point to the Java 1.5 JDK. See here for directions on setting environment variables.

Does SyncGTS need a database? I don't think so. What does this refer to?

Could not connect to database.

Several of the caGrid services require a database. During the configuration of these services, the installer will need to interact with the database (i.e. to validate the connection, create/destroy the database, pre-populate the database, etc.) If you are seeing a message like this, check that 1) the database services is running; 2) you have specified the correct connection and user account information; and 3) the user account has privileges to create and drop database, and query/insert/update/delete data.