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# AgnisQuickStart

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# Table of Contents

AGNIS Quick Start .....	2
<b>Trademark Information .....</b>	<b>2</b>
<b>1 Software Prerequisites .....</b>	<b>3</b>
1.1 Info-ZIP .....	3
1.2 <i>Java</i> .....	3
1.3 Apache Maven (optional).....	3
1.5 Database System .....	4
1.6 AGNIS Code .....	4
<b>2 Installation .....</b>	<b>4</b>
2.1 Install AGNIS Code.....	5
2.2 Set Environment Variables .....	5
<b>3 Certificates, Authentication, and Firewall Rules.....</b>	<b>6</b>
3.1 Generating a Certificate Request .....	7
3.2 Obtain Signed Certificate .....	8
3.3 Convert AGNIS certificate .pem files to .jks files .....	8
3.4 Firewall Rules .....	9
<b>4 Staging Client .....</b>	<b>9</b>
4.1 Database Options .....	9
4.2 Configure StagingClient.properties .....	10
4.3 Add JDBC Driver.....	11
4.4 Create Staging Database .....	11
4.5 Running the AGNIS Staging Client.....	12
<b>5 Further Information ... ..</b>	<b>13</b>

# **AGNIS Quick Start**

This document describes basic steps for using the freely provided AGNIS® software to connect with the AGNIS development server hosted by the National Marrow Donor Program® (NMDP®). The AGNIS development server at the NMDP enables forms data to be electronically submitted to the FormsNet3test system, and also enables retrieval of forms data published by FormsNet3.

## **Trademark Information**

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# 1 Software Prerequisites

Third-party software required by the provided AGNIS software includes Java, OpenSSL, and any unzip program capable of extracting the contents of a ZIP archive file. You may also need Apache Maven depending on how your StagingClient is configured. The software is implemented in Java, and should be capable of running under any operating system for which a Java 7.0 JDK is available. This includes UNIX-like operating systems such as Solaris or Linux, and Windows variants such as Windows XP, vista, or Windows 7.

## 1.1 Info-ZIP

Much of the software required by AGNIS is distributed as ZIP archive files. Most UNIX-like operating systems include an unzip program capable of extracting the contents of a ZIP archive file. Similarly, the Windows Explorer program included with recent Windows versions is also capable of extracting the contents of a ZIP archive file.

Users of an operating system which does not provide a built-in unzip function would need to install software such as Info-ZIP, a free set of tools for working with ZIP archives. The main Info-ZIP web site is here:

<http://www.info-zip.org/>

To install Info-ZIP tools, please refer to the web site for platform-specific installation information.

## 1.2 Java

Java SE 7, also known as Java 1.7, is required. If only running the distributed AGNIS code the JRE would be sufficient. If modifying the distributed AGNIS code you will want the JDK. Later Java releases may also work, but have not been tested. Java SE 7 is available for download here:

<http://www.oracle.com/technetwork/java/javase/downloads/index.html>

To install Java, please refer to the provider's instructions.

## 1.3 Apache Maven (optional)

If you will be editing the AGNIS source code, Apache-Maven 3.0.5 is recommended for compiling the edited code. Later Maven releases may also work, but have not been tested. Maven 3.0.5 is available here:

<http://maven.apache.org/download.cgi>

To install Apache Maven, please refer to the provider's instructions.

## 1.4 Openssl

OpenSSL is recommended for generating AGNIS user certificate request. You can download and install the latest version of OpenSSL at the following link:

<http://www.openssl.org/>

The Windows Binaries are available at [www.openssl.org/related/binaries.html](http://www.openssl.org/related/binaries.html)

To install OpenSSL, please refer to the provider's instructions.

## 1.5 Database System

The AGNIS Staging Client uses a database system for the staging database. At the time of this writing, the code is capable of interacting with MySQL, Oracle, Microsoft SQL Server, and Sybase databases. Example configurations for each are provided later in this document. For database installation and system configuration please refer to the vendor information.

## 1.6 AGNIS Code

The AGNIS code is distributed in a zip file (`agnis-client-src.zip`). It includes the `agnis-client` file, which contains generated client and service code, and the `agnis-common` file which contains source code for the binary `agnis-common.jar` Java archive (JAR) file, which is included inside `agnis-client-src.zip`. You can download the NEW AGNIS code from the link below:

<https://www.agnis.net/downloads.aspx>

Information on installing, compiling, and configuring an AGNIS client is provided later in this document.

## 2 Installation

This section uses examples to illustrate software installation and setup of an environment for working with the AGNIS code.

The Windows examples show entry of commands into a command prompt window. To open a command prompt window, click the Windows Start button, select Run..., type "cmd.exe", and click OK.

For brevity, the Windows commands shown depict use of the Info-ZIP unzip program to extract the contents of zip archives. Depending on the version of Windows being used, it may also be possible to extract the contents of a zip archive file by using Windows Explorer. To access the Extraction Wizard via Windows Explorer, right-click the Windows Start button, click Explore, locate the zip file, right-click on the file and select Extract All..., then follow the wizard steps to select an extraction location and extract the zip file's contents.

## 2.1 Install AGNIS Code

Unzip the **agnis-client-src.zip** and extract all the files into a new directory, e.g. AgnisStagingClient. After unzipping and extracting the file, the directory structure should be similar to the structure below:

```
C:\AGNISstagingClient\agnis-client\target\agnis-client-2.0.0-SNAPSHOT-main> ls

 stagingClient.bat
 pingClientSSL.bat
 stagingClientDEBUG.bat
 pingClient.bat
 StagingClient.properties
 certs
      ca.jks usercert.jks
 lib
      axis2-1.6.2.jar stax-api-1.0-2.jar
      ...
      log4j-1.2.17.jar
      agnis-client-2.0.0-SNAPSHOT.jar
```

## 2.2 Set Environment Variables

The AGNIS code requires the `JAVA_HOME` environment variable be set to appropriate value.

`JAVA_HOME` specifies the location where Java is installed. If editing the distributed AGNIS code you may also want to set the Apache Maven `M2_HOME` environment variable set. Modifying the `PATH` environment variable to include the Java and Maven executable is also helpful. Examples shown below.

Unix (csh):

```
~/agnis> setenv JAVA_HOME $HOME/java/jre1.7.{version}
~/agnis> setenv M2_HOME=$HOME/maven
~/agnis> setenv PATH $JAVA_HOME/bin:M2_HOME/bin:$PATH
```

Unix (sh):

```
~/agnis> JAVA_HOME=$HOME/agnis/jre1.7.{version}
~/agnis> M2_HOME=$HOME/maven
```



```
~/agnis> PATH=$JAVA_HOME/bin:M2_HOME/bin:$PATH
~/agnis> export JAVA_HOME, M2_HOME PATH
```

Windows:

```
C:\agnis> set JAVA_HOME=C:\Program Files\Java\jdk1.5.0_{version}
C:\agnis> set M2_HOME=c:\Program Files\apache-maven-{version}
C:\agnis> set PATH=%JAVA_HOME%\bin;%M2_HOME%\bin;%PATH%
```

Make careful note of the environment variable settings shown above. These same settings are also used when executing AGNIS client programs. Creating a script, .BAT file, or otherwise modifying the operating environment to automatically set these environment variables is highly recommended.

## 3 Certificates, Authentication, and Firewall Rules

AGNIS security is based on the Globus Security Infrastructure (GSI), which uses client-side X.509 certificates to authenticate users. To access secure services running on the AGNIS development server at the NMDP, the client needs to obtain a valid client-side certificate. The client also needs a copy of the AGNIS Certificate Authority (CA) certificate.

The basic procedure for obtaining an AGNIS client-side certificate, and the AGNIS CA certificate, is:

1. User generates certificate request.
2. User transmits public key component of certificate request (`usercert_request.pem` file) to AGNIS administrators.
3. AGNIS administrator manually verifies user's identity and digitally signs public key, thereby creating signed user certificate.
4. AGNIS administrator transmits signed user certificate (`usercert.pem` file) to user. AGNIS administrator also transmits CA certificate (`{ca_hash}.0` file) to user.
5. Convert AGNIS user certificate .pem files and CA certificate into .jks files.
6. User copies certificate files to appropriate locations for use with AGNIS client software which is located in the `*\certs` directory.

## IMPORTANT

The generated certificate request includes both a public key and a private key. Typically, the public key is stored in a file named `usercert_request.pem`, and the private key is stored in a file named `userkey.pem`. As implied by its name, the public key is intended to be public knowledge. However, the private key *must* be kept secret.

Because **anyone who obtains a copy of the private key could use it to impersonate you or your organization**, the private key file (`userkey.pem`) must be kept in a safe place, only accessible by trusted personnel. If an untrusted party ever obtains a copy of your private key, please notify AGNIS administrators immediately to have the certificate revoked.

## 3.1 Generating a Certificate Request

This Section describes the process for generating an AGNIS user certificate request and using that to obtain a signed certificate

### Using OpenSSL to generate AGNIS certificate requests

This section describes a procedure for using OpenSSL to generate an X.509 certificate request compatible with the AGNIS development environment. You will need request a `agnis-dev.conf` file from the AGNIS team to generate it correctly. The same steps would also be taken to generate a X.509 certificate for the AGNIS production environment.

The following example illustrates generation of a user certificate request for the AGNIS Development environment by directly using OpenSSL and the `agnis-dev.conf` file provided by the AGNIS team.

```
C:\> openssl req -new -keyout userkey.pem -out usercert_request.pem
-config agnis-dev.conf
```

Example output below:

*Generating a 1024 bit RSA private key*

*.....++++++*

*....++++++*

*unable to write 'random state'*

*writing new private key to 'userkey.pem'*

*Enter PEM pass phrase:*

*Verifying - Enter PEM pass phrase:*

*-----*

*You are about to be asked to enter information that will be incorporated  
into your certificate request.*

*What you are about to enter is what is called a Distinguished Name or a DN.*

*There are quite a few fields but you can leave some blank*

*For some fields there will be a default value,*

*If you enter '.', the field will be left blank.*

-----

Level 0 Organization [nmdp.org]: **hit enter**

Level 0 Organizational Unit [AGNIS]: **hit enter**

Use this format (AGNIS Vendor (if applicable) CCN) []: **at this point you need to type** AGNIS Vendor CCN

The `openssl` command uses a pass phrase to encrypt the certificate's private key. It prompts for the pass phrase twice, to verify it was entered accurately.

Additional information on OpenSSL is available from the OpenSSL web site:

<http://www.openssl.org/>

If possible, set file permissions to limit access to the `userkey.pem` file, which contains your private key.

Unix:

```
~/certs > chmod 600 userkey.pem
```

## 3.2 Obtain Signed Certificate

After generating the user certificate request, email a copy of the `usercert_request.pem` file to the AGNIS administrators at `agnis@nmdp.org`. When a request is approved, the AGNIS administrator sends back two files: a `usercert.pem` file containing the signed user certificate, and a `{ca_hash}.0` file containing a copy of the CA certificate.

## 3.3 Convert AGNIS certificate .pem files to .jks files

For the new StagingClient, certificates must be presented in java key store files (.jks), rather than the previous .pem format. To convert existing .pem files into .jks files, follow these instructions. In the first step you will be prompted for the existing private passphrase and the new passphrase (I use the same passphrase on the .pem and the .p12 file). For the second step, `keytool` is part of the jdk distribution – again you will be prompted for the current and new passphrases.

Convert .pem to .p12:

```
C:\> openssl pkcs12 -export -out XXXcert.p12 -inkey XXXkey.pem -in XXXcert.pem
```

Convert .p12 to jks:

```
C:\> keytool -importkeystore -srckeystore XXXcert.p12 -destkeystore XXXcert.jks -srcstoretype PKCS12 -deststoretype JKS
```

Similarly, the CA records previously distributed as .0 files (e.g. 5f925b36.0) need to be placed into a .jks store (you may place more than one certificate into a single .jks file).

These new .jks files may replace the distributed **certs/usercert.jks** and **certs/ca.jks** files, or may be given new names and designated in the command line as:

```
java.exe -classpath ./lib/*;  
-Djavax.net.ssl.keyStore=certs/usercert.jks  
-Djavax.net.ssl.keyStorePassword=PASS  
-Djavax.net.ssl.trustStore=certs/ca.jks  
-Djavax.net.ssl.trustStorePassword=PASS  
net.agnis.client.tool.StagingClient
```

## 3.4 Firewall Rules

For the staging client to successfully connect with the AGNIS servers, you will need to be able to connect to the AGNIS URL for the Production, Development, and Testing environments. The current URLs are below:

**AGNIS Production URL:** <https://agnis.nmdp.org:18443/agnis/services/FormHandler>

**AGNIS Development URL:** <https://agnis-dev.nmdp.org:18443/agnis/services/FormHandler>

**AGNIS Testing URL:** <https://agnis-dev.nmdp.org:8443/agnis/services/FormHandler>

The AGNIS services use the non-standard port 18443 or 8443 to transmit data. The ports 18443 and 8443 may need to be opened on your institution's firewall; this port is not usually opened by default. Each center or vendor will also need to supply the AGNIS team with the IP address from where the AGNIS requests will originate from. This is usually the IP address of the external interface of the institution's router, but could be different. This IP address will need to be sent to [AGNISupport@nmdp.org](mailto:AGNISupport@nmdp.org) to be added to the firewall rules for either the AGNIS Production or Development environment.

## 4 Staging Client

The staging client is a client program capable of transmitting forms data between a local database and the AGNIS web service. It supports a subscriber mode for retrieving forms data from AGNIS, and an originator mode for submitting forms via AGNIS. For simplicity, this section only shows essential information needed to run the staging client in subscriber mode. Using the staging client in originator mode is more complex, in that it would also be necessary to populate the staging database with outbound data before running the client. For additional information on originator mode, refer to the *Staging Client User Guide* document found on the AGNIS Google Site.

The procedure for running the Staging Client is described below:

1. Set environment variables (described in section 2.2)
2. Compile the code (optional using Apache Maven).
3. Configure the StagingClient.properties file.
4. Add the Database Driver.
5. Create the Staging Database.
6. Run the StagingClient.bat

Additional local database setup and configuration steps are described below.

### 4.1 Database Options

Databases usable with AGNIS include MySQL 5.0, Oracle 10g, Microsoft SQL Server 2008, and Sybase. ASE 15. Later versions of these database software systems may also work.

Database	Download Link
----------	---------------

MySQL 5.0	<a href="http://dev.mysql.com/downloads/mysql/">http://dev.mysql.com/downloads/mysql/</a>
Oracle Express Edition	<a href="http://www.oracle.com/technology/software/products/database/xe/">http://www.oracle.com/technology/software/products/database/xe/</a>
SQL Server Express Edition	<a href="http://www.microsoft.com/express/sql/download/">http://www.microsoft.com/express/sql/download/</a>
Sybase ASE	<a href="http://www.sybase.com/ase_1500devel">http://www.sybase.com/ase_1500devel</a>

To install database software, please refer to the vendor's installation instructions.

## 4.2 Configure StagingClient.properties

Edit the `StagingClient.properties` file to configure the staging client. This file is located in the `*\AGNISstagingClient\agnis-client\target\agnis-client-2.0.0-SNAPSHOT-main` directory. This is a plain text file, and can be edited using a regular text editor such as `vi` (unix) or Notepad (Windows). The `stagingClient...` properties in this file determine basic operating parameters of the staging client.

The `jdbc...` properties define database connectivity parameters. `jdbcDriver` specifies the JDBC database driver to be used, `jdbcURL` specifies the URL for the staging database, `jdbcUser` specifies the database user name, and `jdbcPassword` specifies the database password for that user. Example below:

```

jdbcDriver=com.mysql.jdbc.Driver - The Driver that is used for your Staging
Database

jdbcPassword=root - The Password for your Staging Database

jdbcQueryTimeout=60

jdbcURL=jdbc:mysql://localhost:3306/AGNIS_TEST_CLIENT - The URL for your Staging
Database

jdbcUser=root - The username used for your Staging Database

stagingClientMode=originator - The mode your client will be using, originator or
subscriber

stagingClientOriginatorUniqueName=cibmtr_center_number:10151 - The CIBMTR Center
Number that is either assigned to your center or vendor

stagingClientPublisherUniqueName=cibmtr_center_number:10151 - The CIBMTR Center
Number that is either assigned to your center or vendor

stagingClientServiceURL=https://localhost:8443/agnis/services/FormHandler - The
URL of either the AGNIS production or external development/testing environment.

stagingClientSubscriberUniqueName=cibmtr_center_number:10151 - The CIBMTR Center
Number that is either assigned to your center or vendor

```

For subscriber mode:

`stagingClientMaximumFormQuantity` specifies the maximum number of updated forms retrieved at once.

`stagingClientMode` specifies the mode.

`stagingClientServiceURL` specifies the URL of the AGNIS service,

`stagingClientSubscriberProcessNamePrefix` specifies text used when inserting new `INFORMATION_PROCESS` records into the staging database, and the

`stagingClientOriginatorUniqueName` and `stagingClientSubscriberUniqueName` specify the AGNIS originator and subscriber name associated with the retrieval request.

Other configuration properties in the `StagingClient.properties` file can be left unmodified.

## 4.3 Add JDBC Driver

The staging client uses Java Database Connectivity (JDBC) or jTDS drivers to connect with the staging database. The JDBC driver for a specific database, such as MySQL or Oracle, normally is available from the database vendor, and comes packaged in a single JAR file. You will want to make sure you are using the correct versions of the JDBC or jTDS drivers that are compiled against the version of Java you are currently running.

To make the JDBC driver available for use by the staging client, copy the JAR file containing the JDBC or jTDS driver to the `lib` subdirectory. Examples below:

MySQL:

```
C:\AGNISstagingClient\agnis-client\target\agnis-client-2.0.0-SNAPSHOT-main\lib> copy
\mysql\mysql-connector-java-5.1.10-bin.jar lib
```

Oracle:

```
C:\AGNISstagingClient\agnis-client\target\agnis-client-2.0.0-SNAPSHOT-main\lib> copy
\oracle\ojdbc14.jar lib
```

(Microsoft) SQL Server, using jTDS driver:

```
C:\AGNISstagingClient\agnis-client\target\agnis-client-2.0.0-SNAPSHOT-main\lib> copy
\jtds\jtds-1.2.2.jar lib
```

Sybase, using jTDS driver:

```
C:\AGNISstagingClient\agnis-client\target\agnis-client-2.0.0-SNAPSHOT-main\lib> copy
\jtds\jtds-1.2.2.jar lib
```

## 4.4 Create Staging Database

A separate Data Dictionary document describes the AGNIS repository and staging database schema. Please refer to that document for details regarding database table definitions.

The db subdirectory contains scripts for creating the staging database tables under various databases. Usage examples:

### MySQL:

```
C:\AGNISstagingClient\agnis-common\src\main\resources> cd db

C:\AGNISstagingClient\agnis-common\src\main\resources\db> mysql -u root -p
-h hostname -P 3306 mysql> create database AGNIS_FORMS;
mysql> use AGNIS_FORMS;
mysql> source AGNIS_FORMS-createdb-mysql.sql;
...
```

### Oracle (after using administrative tools to create AGNIS\_FORMS user):

```
C:\AGNISstagingClient\agnis-common\src\main\resources> cd db

C:\AGNISstagingClient\agnis-common\src\main\resources\db> sqlplus /nolog SQL>
connect AGNIS_FORMS

Enter password:
Connected.

SQL> start AGNIS_FORMS-createdb-oracle.sql
...
```

### (Microsoft) SQL Server:

```
C:\AGNISstagingClient\agnis-common\src\main\resources> cd db

C:\AGNISstagingClient\agnis-common\src\main\resources\db> sqlcmd -U username -S
servername

1> CREATE DATABASE AGNIS_FORMS
2> go
1> exit

C:\agnis\grid-service\FormHandler\db> sqlcmd -U username -S servername -d AGNIS_
FORMS -i AGNIS_FORMS-createdb-mssql.sql
```

### Sybase:

```
C:\AGNISstagingClient\agnis-common\src\main\resources> cd db

C:\AGNISstagingClient\agnis-common\src\main\resources\db> isql -U username -S
servername

1> CREATE DATABASE AGNIS_FORMS ON DEFAULT = 10
2> go
1> exit
```



A separate Data Dictionary document describes the AGNIS repository and staging database schema. Please refer to that document for details regarding database table definitions.

The db subdirectory contains scripts for creating the staging database tables under various databases. Usage examples:

#### MySQL:

```
C:\AGNISstagingClient\agnis-common\src\main\resources> cd db

C:\AGNISstagingClient\agnis-common\src\main\resources\db> mysql -u root -p
-h hostname -P 3306 mysql> create database AGNIS_FORMS;
mysql> use AGNIS_FORMS;
mysql> source AGNIS_FORMS-createdb-mysql.sql;
...
```

#### Oracle (after using administrative tools to create AGNIS\_FORMS user):

```
C:\AGNISstagingClient\agnis-common\src\main\resources> cd db

C:\AGNISstagingClient\agnis-common\src\main\resources\db> sqlplus /nolog SQL>
connect AGNIS_FORMS

Enter password:
Connected.

SQL> start AGNIS_FORMS-createdb-oracle.sql
...
```

#### (Microsoft) SQL Server:

```
C:\AGNISstagingClient\agnis-common\src\main\resources> cd db

C:\AGNISstagingClient\agnis-common\src\main\resources\db> sqlcmd -U username -S
servername

1> CREATE DATABASE AGNIS_FORMS
2> go
1> exit

C:\agnis\grid-service\FormHandler\db> sqlcmd -U username -S servername -d AGNIS_
FORMS -i AGNIS_FORMS-createdb-mssql.sql
...
```

#### Sybase:

```
C:\AGNISstagingClient\agnis-common\src\main\resources> cd db

C:\AGNISstagingClient\agnis-common\src\main\resources\db> isql -U username -S
servername

1> CREATE DATABASE AGNIS_FORMS ON DEFAULT = 10
2> go
1> exit
```

```
C:\agnis\grid-service\FormHandler\db> isql -U username -S servername -D AGNIS_FO
RMS -i AGNIS_FORMS-createdb-sybase.sql
```

## 4.5 Running the AGNIS Staging Client

The batch files within the agnis-client-src.zip file were created to test AGNIS client connectivity and run the AGNIS staging client. These batch files are located in the \*\AGNISstagingClient\agnis-client\target\agnis-client-2.0.0-SNAPSHOT-main directory. These batch files can be run from a command prompt and are listed below:

```
pingClient.bat
```

```
pingClientSSL.bat
```

```
stagingClient.bat
```

```
stagingClientDEBUG.bat
```

You will need to edit these files to correspond with your ca.jks and usercert.jks files and their passwords. See the example below of the pingClientSSL.bat:

```
@echo off
```

```
echo starting ping client...
```

```
java.exe -classpath ./lib/*; -Djavax.net.ssl.keyStore=certs/usercert.jks -
Djavax.net.ssl.keyStorePassword=deadhead -Djavax.net.ssl.trustStore=certs/ca.jks -
Djavax.net.ssl.trustStorePassword=deadhead net.agnis.client.tool.PingClient
```

If you changed the name of usercert.jks and ca.jks files you will need to replace the usercert and ca with the new file names. Also, you will need to replace the highlighted keyStorePassword and trustStorePassword = deadhead with the passwords you used for your keyStorePassword and trustStorePassword.

To test your AGNIS Staging Client connectivity execute the pingClientSSL.bat.

To run the AGNIS Staging Client execute the stagingClient.bat. (Note that this batch file assumes the certificate and ca jks files are stored in INSTALL/certs and named usercert.jks and ca.jks respectively – if your jks files are stored and/or named differently, please make appropriate changes to the stagingClient.bat file.)

If you run into any issues trying to run the AGNIS Staging Client you can execute the stagingClientDebug.bat for more information on what could be causing the problem.

## 5 Further Information

AGNIS Web Site - <http://www.agnis.net/>

caDSR -

[http://ncicb.nci.nih.gov/NCICB/infrastructure/cacore\\_overview/cadsr](http://ncicb.nci.nih.gov/NCICB/infrastructure/cacore_overview/cadsr)

caDSR CDE Browser - <http://cdebrowser.nci.nih.gov/CDEBrowser/>

caDSR Form Builder - <http://cdebrowser.nci.nih.gov/CDEBrowser/formSearchAction.do>

Eclipse - <http://www.eclipse.org/>

Java - <http://java.sun.com/>

Apache Maven - <http://maven.apache.org>

OpenSSL - <http://www.openssl.org/>