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# Banner Student API
Installation Guide

Release 9.5
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## Revision History

| Publication Date | Summary |
|---|---|
| March 2016 | New version that supports Banner Student API 9.5 software. |

# Contents

# Introduction

This installation guide details the steps that are required to install Banner Student API 9.5. Before you install any components of the system, you should review this chapter thoroughly so you have a better understanding of what you are installing and where you will install it.

## Known database upgrade issues

Before you install Banner Student API 9.5, refer to the article number 000035722, for Banner DB Upgrade 9.4 issues (banner-db-upgrade-90400u), on the Ellucian Support Center (http://www.ellucian.com/Solutions/Ellucian-Client-Support/) for any database upgrade issues that were reported after the release was posted.

## API issues

Refer to the knowledge article number 000035640 for any known issues with the RESTful APIs in Banner Student API.

## Hardware requirements

The application has the following CPU and memory requirements:

| | |
|---|---|
| Recommended: | Quad core CPU with 4 to 8 GB of memory for the application server |
| Minimum: | Quad core CPU with 4 GB of memory for the application server |

## Software requirements

The application has the following software requirements.

- "Oracle Database" on page 8
- "Application server" on page 8

- “Middle Tier (application server) platforms” on page 8
- “Ellucian software” on page 9

## Oracle Database

This upgrade is recommended to be applied with Oracle Database Release 11.2.0.4.

## Application server

The application is supported on the following application servers:

- Oracle Fusion Middleware 11gR1, 11gR2, and 12c using WebLogic 10.3.3, 10.3.4, 10.3.5, 10.3.6, and 12.1.3
- Apache Tomcat 7 and 8

## Middle Tier (application server) platforms

The application is supported on the following application server and operating system combinations:

| Tomcat (64 bit) | WebLogic (64 bit) |
|---|---|
| Red Hat Linux 5.3 | Red Hat Linux 5.3 |
| Windows Server 2008 | Windows Server 2008 |
| Solaris 10 | Solaris 10 |
| AIX 6.1 (JDK 1.6.0 SR10 or later) | AIX 6.1 (JDK 1.6.0 SR10 or later) |
| HP-UX | HP-UX 11iV3 (11.31) |

**Note:** Banner 9.x applications were tested on WebLogic using both the Classic Domain template and the Basic Domain template.

For WebLogic server environments, JPA 2.0 support must be enabled. WebLogic server does not enable JPA by default. To enable JPA, use the steps in the appropriate Oracle documentation:

WebLogic 10.3.3:
http://docs.oracle.com/cd/E14571_01/web.1111/e13720/using_toplink.htm#i1221315

WebLogic 10.3.4:
http://docs.oracle.com/cd/E17904_01/web.1111/e13720/using_toplink.htm#i1221315

WebLogic 10.3.5:
http://docs.oracle.com/cd/E21764_01/web.1111/e13720/using_toplink.htm#EJBAD1309

WebLogic 10.3.6:
http://docs.oracle.com/cd/E23943_01/web.1111/e13720/using_toplink.htm#autoId2

Weblogic 12.1.3
https://docs.oracle.com/middleware/1213/wls/EJBAD/using_toplink.htm#EJBAD1288

### Ellucian software

Depending on the products that are licensed at your institution, the following product upgrades must be applied:

- Banner DB Upgrade 9.4
- (Optional) EMS v1.0.1
- (Optional) Banner Event Publisher (BEP) 1.2.3 or 2.0
- (Optional) INTCOMP 8.0.2.6

**Note:** EMS v1.0.1 and BEP 1.2.3 or 2.0 are needed for clients using HEDM APIs asynchronously and INTCOMP 8.0.2.6 is needed for ILP clients using grade-entries API.
To access the grade-entries API that is used to submit mid-term and final grade for a student, you must install the INTCOMP 8.0.2.6 patch (pcr-000124801_int8000206).

## Java dependencies

Java 7 (64-bit version) must be installed on the application server before you install the application. The application supports Java 7 JDK and JRE in run time.

The JDK bin directory must be defined in the PATH system property.

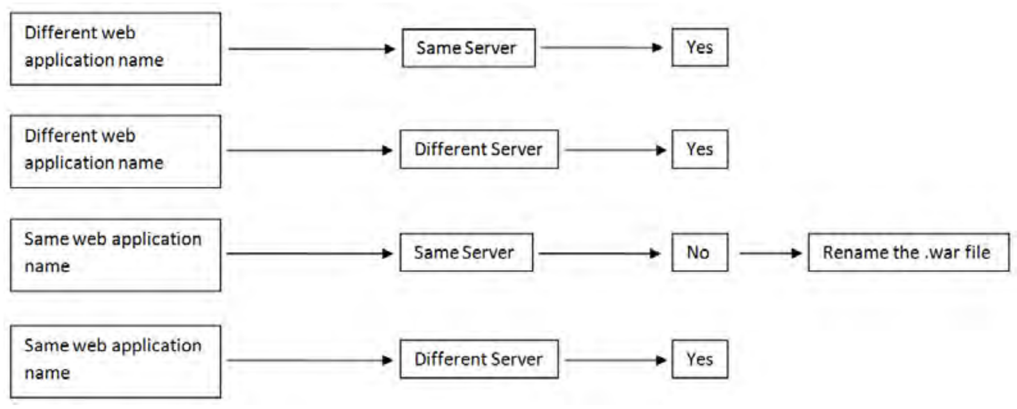
Banner XE Student API 9.5 is now certified on the following:

| Compile | Runtime | Application Server |
|---|---|---|
| Java 7 | Java 7 | Tomcat 7 |
| Java 7 | Java 7 | Weblogic 10.3.6 |

| Compile | Runtime | Application Server |
|---|---|---|
| Java 7 | Java 7 | Tomcat 8 |
| Java 7 | Java 7 | Weblogic 12.1.3 |
| Java 7 | Java 8 | Tomcat 8 |
| Java 7 | Java 8 | Weblogic 12.1.3 |

## Deployment of multiple web applications

The following diagram describes various scenarios of deploying multiple web applications:


Different web application name
Same Server
Yes
Different web application name
Different Server
Yes
Same web application name
Same Server
No
Rename the .war file
Same web application name
Different Server
Yes

In the first and second scenarios, you can deploy multiple web applications with different WAR file names on the same or different servers.

In the third scenario, if you want to deploy multiple web applications on the same server, the WAR file names must be different.

In the fourth scenario, you can deploy multiple web applications with the same WAR file name on different servers.

## F5 load balancer configuration

The application was tested using an F5 load balancer configured with the following settings:

```
Load Balancing type = Round Robin
```

**Note:** Other configurations may be supported depending on Network Load Balancing (NLB).

# Upgrade the Database

The following steps are used to upgrade the database:

- “Perform the Banner DB Upgrade steps” on page 11
- “Update login.sql” on page 11
- “Verify that the required products are applied” on page 12
- “Verify the banproxy database account” on page 12
- “Verify Oracle user accounts to connect through banproxy” on page 12
- “Migrate staged files to the permanent directories” on page 13
- “Update the version number” on page 14
- “Define user privileges for API access” on page 15

## Perform the Banner DB Upgrade steps

Some database upgrade steps are common to all Banner 9.x applications. These common database upgrade steps must be performed before you upgrade the database for Banner Student API.

Refer to the instructions in the *Banner DB Upgrade Guide* (`Banner_db_upgrade_9.4_Upgrade_Guide.pdf`) for the common database upgrade steps. The *Banner DB Upgrade Guide* is delivered in the `banner-db-upgrade-90400d.trz` file.

## Update login.sql

You must edit `login.sql` to update the schema owner’s default password and to specify the path to create log files. To update the delivered `login.sql` script, perform the following steps:

1. Replace the `#UPDATEME#` string with the value of a particular schema owner’s password in your environment. Make this update in your environment for each Banner schema owner.
2. Set the value that gets assigned to `splpref`. The value can be set to the ORACLE_SID or to a directory name. Your options depend on the operating system.

The `splpref` variable defines the file prefix that the installation process uses to generate listings or intermediate SQL routines. This feature allows you to segregate the generated output when the stage must be applied to more than one instance.

## Verify that the required products are applied

To check that all prerequisite products are applied to the environment, perform the following steps:

1. Invoke SQL*Plus and run the following procedure:

   ```
   sqlplus /nolog @ruappready
   ```

2. Review the `ruappready` listing.

## Verify the banproxy database account

The `banproxy` account is used for database connections for administrative applications. The database upgrade process grants the `BAN_DEFAULT_M` role to `banproxy`. If this role is revoked, the application will not start successfully.

## Verify Oracle user accounts to connect through banproxy

All Internet Native Banner (INB) or Oracle user accounts must connect using the `banproxy` privilege. To verify that Oracle user accounts can connect through `banproxy`, perform the following steps:

1. Access the Security Maintenance (GSASECR) page.
2. Enter a valid user name.
3. Click **Alter**.
4. Select the **Authorize banproxy** check box.
5. Click **Save**.

## Migrate staged files to the permanent directories

This release provides migration scripts for Unix and Windows platforms. These scripts expect your directory structure to match the directory structure created by the Banner installation process. If you choose a different directory structure, you must modify the scripts. The release does not include migration scripts for other platforms due to their highly customized structures. You can, however, use the file `STUMIGR.TXT` as a starting point for writing your own migration scripts.

### Unix

The file `STUMIGR.TXT` lists all files that must be deleted from your permanent directories, and all files that should be copied from the staging directory to your permanent directories. The destination is indicated in UNIX format. The format is different on other platforms.

The file `stumigr.shl` does the appropriate removes, copies, and links. The local LN variable at the top of `stumigr.shl` determines the type of links that are used in the migration. If you want to use symbolic links, set `LN='ln -s'` so that the command `${LN} file $BANNER_HOME/links` is translated to `ln -s file $BANNER_HOME/links`. If you want to force the removal of any existing targets before linking files, set `LN='ln -f'`.

To run the migration script in background on a Unix platform, perform the following steps:

1. Ensure that the directory path names in `stumigr.shl` are correct.
2. Ensure that the environment variable `$BANNER_HOME` in `stumigr.shl` is set to the appropriate directory.
3. Sign on to an operating system account that has write permission into the target Banner directories.
4. If you are a cshell user (your operating system prompt is a percent sign), enter `sh` and press Enter to enter the Bourne shell.
5. Navigate to the staging directory for the product.
6. Run the migration script as follows:

   ```
   sh stumigr.shl >stumigr.log 2>&1 &
   ```
7. If you were a cshell user and want to return to that mode, press CTRL-D or enter `exit`. Then press Enter.
8. Review `stumigr.log`. This file contains the results of the migration.

**Note:** Even if your directory structure matches the baseline perfectly, some link commands will fail (that is, where the link currently exists). Other link errors might indicate that you had two copies of an object when the migration script was executed. This condition must be corrected. The duplication is probably between links and the product subdirectory.

### Windows

The file `stumigr.pl` does the appropriate deletes and copies. To run the migration script on a Windows platform, perform the following steps:

1. Check the value of the `BANENV` environment variable by executing the SET command from the DOS prompt.

   - If the value of `BANENV` is `REG`, the value used for `BANNER_HOME` will be taken from the registry entry:

     ```
     HKEY_LOCAL_MACHINE\SOFTWARE\BANNER\BANNER_HOME
     ```

   - If the value of `BANENV` is `ENV`, the value used for `BANNER_HOME` will be taken from the environment variable `BANNER_HOME`.

2. Ensure that the directory path names in `stumigr.pl` are correct.
3. Sign on to an operating system account that has write permission into the target Banner directories.
4. Navigate to the staging directory for the product.
5. Run the migration script as follows:

   ```
   perl stumigr.pl >stumigr.log 2>&1
   ```

6. Review `stumigr.log`. This file contains the results of the migration.

## Update the version number

To insert the release version number into the Web Application (GURWAPP) table, perform the following steps:

1. Invoke SQL*Plus and run the following procedure:

   ```
   sqlplus general/password
   start versionupdate
   ```

2. Review the `versionupdate` listing.

## Define user privileges for API access

APIs must be submitted with an authorization header. The authorization header ID must use a valid Oracle ID with proxy access to the banproxy user. The ID must also have privileges to the Banner security objects.

**Note:** The Banner security objects for APIs are delivered with Banner Student 8.7. For guidelines on security objects, refer to the API documentation on the Ellucian XE Registry.

Security for accessing Banner 9.x APIs is similar to security for accessing Banner 8.x administrative forms. If the Oracle ID cannot access the Banner security object, the API does not run and returns an empty response.

To define privileges for the administrative account that accesses Banner Student APIs, perform the following steps:

1. Define the user's default role to be the Oracle `CREATE SESSION` privilege or the `USR_DEFAULT_CONNECT` Oracle role.
2. Grant the `BAN_DEFAULT_M` Oracle role to the user. This role does not need to be the default role, because it is password protected.
3. Authorize banproxy access on the Security Maintenance (GSASECR) page or with the `ALTER USER username GRANT CONNECT THROUGH BANPROXY` command.
4. Define access to the General Menu (GUAGMNU) Banner security object by using the Security Maintenance (GSASECR) page.

   **Note:** These are the minimum privileges for accessing Banner Student APIs.

# Install Banner Student API

The following sections detail the installation steps for Banner Student API 9.5:

- “Undeploy the existing application” on page 16
- “Customize the WAR file” on page 18
- “Regenerate the WAR file” on page 23
- “Configure and deploy the WAR file to a web application server” on page 24

## Undeploy the existing application

Before you install Banner Student API 9.5, you must undeploy previous 9.x versions of Banner Student API. If no previous 9.x versions are installed, skip this section.

The following sections give the required steps to undeploy Banner Student API in Tomcat and WebLogic servers.

### Tomcat

You can either use the Tomcat Manager web application to undeploy Banner Student API, or you can shut down Tomcat and manually remove the files.

#### Undeploy using the Tomcat Manager web application

Use the following procedure to undeploy Banner Student API using the Tomcat Manager web application:

1. Access the Tomcat Manager web application at one of the following URLs:

   ```
   http://server:8080/manager
   ```

   or

   ```
   http://server:8080/manager/html
   ```

2. Access the deployment page using a valid user name and password.
3. Under the Commands area, click **Stop** to stop the existing application.
4. In the confirmation dialog box, click **OK**.
5. Under the Commands area, click **Undeploy**.
6. In the confirmation dialog box, click **OK** to undeploy the application.

## Undeploy using a manual procedure

The following sections give the steps to manually undeploy Banner Student API on Unix and Windows operating systems.

### Unix

Use the following procedure to manually undeploy Banner Student API on a Unix operating system:

1. Log in to the server where Tomcat is running, using the same account credentials that were used to start Tomcat.
2. Shut down Tomcat by running the shutdown script:

   ```
   $CATALINA_HOME/bin/shutdown.sh
   ```
3. Remove the current deployment and associated WAR file:

   ```
   cd $CATALINA_HOME
   rm -rf $CATALINA_HOME/webapps/banner9application
   rm -rf $CATALINA_HOME/webapps/banner9application.war
   ```

### Windows

Use the following procedure to manually undeploy Banner Student API on a Windows operating system:

1. Use the command prompt to shut down Tomcat.

   **Note:** If you installed Tomcat as a service, use the Service Control panel to stop the application. Otherwise, use the shutdown script `%CATALINA_HOME%\bin\shutdown.bat`.
2. Remove the current deployment and associated WAR file:

   ```
   rmdir %CATALINA_HOME%\webapps\banner9application /s/q
   del %CATALINA_HOME%\webapps\banner9application.war /q
   ```

## WebLogic

Use the following procedure to stop and undeploy Banner Student API:

1. Access the administration server using the following URL:

   ```
   http://server:7001/console
   ```
2. In the Domain Structure frame, click **Deployments**.
3. In the Change Center, click **Lock and Edit**.
4. Select the check box to the left of the Banner 9.x application.

5. Click **Stop**.
6. Click **Force Stop Now**.
7. In the Force Stop Application Assistant page, click **Yes**.
8. Select the check box to the left of the Banner 9.x application.
9. Click **Delete**.
10. In the Delete Application Assistant page, click **Yes**.
11. In the Change Center frame, click **Activate Changes**.

## Customize the WAR file

The name of the release package is `release-StudentApi-9.5.zip`. This release package is moved to the `Banner_Home\student\java` subdirectory during the database upgrade. Use the following steps to unzip the release package and customize the WAR file for your institution.

**Note:** JDK 1.7 must be installed on your system. See the Java dependencies section for more information.

### Unzip the release package

To unzip the release package into a temporary directory, perform the following steps:

1. Log in to the application server platform.

   **Note:** You must have a valid application server account to deploy into the application server container (Tomcat or WebLogic).

2. Create a temporary directory. For example:

   ```
   mkdir $HOME/ban9temp
   ```

3. Locate the release package `release-StudentApi-9.5.zip.`
4. Transfer this file in binary mode using File Transfer Protocol (FTP) file into the temporary directory. For example:

   ```
   $HOME/ban9temp
   ```

5. Unzip `release-StudentApi-9.5.zip` into the temporary directory.

## Prepare the installer

To prepare the installer, perform the following steps:

1. Change the directory to the installer directory:

   ```
   cd installer
   ```

2. Run the `ant` command, which will build the installation tool.

   **Note:** For Unix, make sure the ant file is executable. For example, `chmod +x ant`.

Example:

```
ban9temp $ cd installer
ban9temp/installer $ ./ant
```

The message *Build successful* confirms a successful build.

## Install into the product home directory

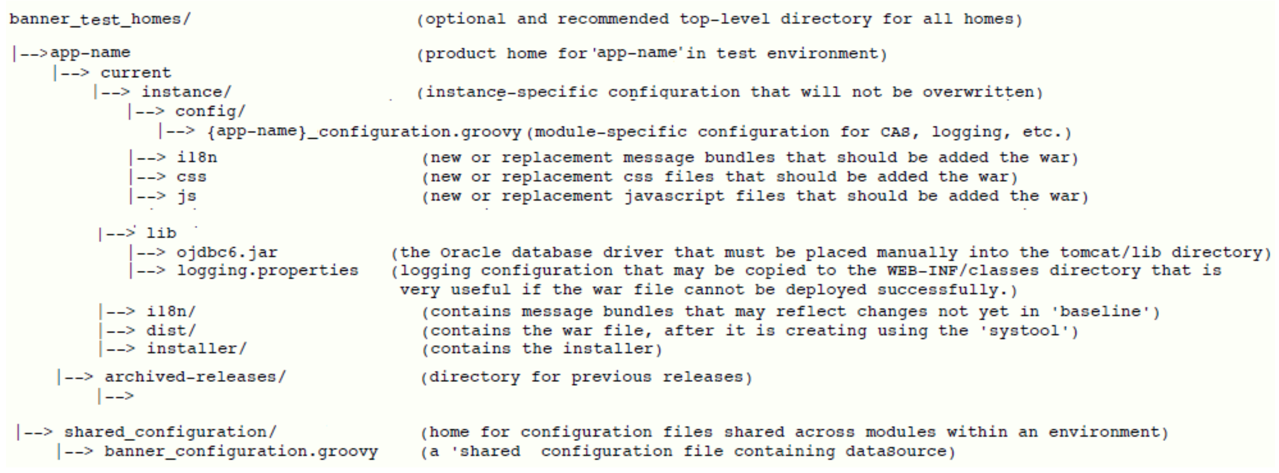
The product home directory supports the configuration and creation of a deployable WAR file. Although Banner 9.x web applications are modular and are installed independently, they share a common configuration. The package provides a common installer that creates consistent product home directory structures for all Banner 9.x applications.

Within a particular environment, you should place the product home directories for Banner 9.x applications in sibling directories. For example, the following directory structure includes two product home directories and a `shared_configuration` directory that support a common test environment.

```
TEST/
|--> StudentApi/
|--> Catalog/
|--> shared_configuration/
```

A product home directory is created for each deployment. For example, the home directory that is used for the application within a test environment is different than the home directory that is used for the production environment. When you are supporting different environments for multiple home directories for the same solution, this structure provides the necessary configuration, release level, and custom modification flexibility.

The following directory tree illustrates the product home directory that is created for the test environment:



```
banner_test_homes/                    (optional and recommended top-level directory for all homes)

|-->app-name                          (product home for 'app-name' in test environment)
    |--> current
        |--> instance/                (instance-specific configuration that will not be overwritten)
            |--> config/
               |--> {app-name}_configuration.groovy (module-specific configuration for CAS, logging, etc.)
            |--> i18n                 (new or replacement message bundles that should be added the war)
            |--> css                  (new or replacement css files that should be added the war)
            |--> js                   (new or replacement javascript files that should be added the war)

        |--> lib
            |--> ojdbc6.jar         (the Oracle database driver that must be placed manually into the tomcat/lib directory)
            |--> logging.properties (logging configuration that may be copied to the WEB-INF/classes directory that is
                                     very useful if the war file cannot be deployed successfully.)
        |--> i18n/                    (contains message bundles that may reflect changes not yet in 'baseline')
        |--> dist/                    (contains the war file, after it is creating using the 'systool')
        |--> installer/               (contains the installer)

    |--> archived-releases/           (directory for previous releases)
        |-->

|--> shared_configuration/            (home for configuration files shared across modules within an environment)
    |--> banner_configuration.groovy  (a 'shared  configuration file containing dataSource)
```

In addition to the application's product home directory, a separate `shared_configuration` home directory contains cross-application configuration for the test environment. This directory holds the `banner_configuration.groovy` file, which contains the shared JNDI datasource configuration.

To install the installer into the product home directory, perform the following steps:

1. Ensure that the installer is prepared using `ant`.
2. Use the installer to install the release file into the product home directory.

   **Note:** Your current working directory must be in the installer directory (`ban9temp/installer`) before executing the following commands.

   On Unix:
   ```
   $ bin/install home
   ```

   On Windows:
   ```
   > bin\install home
   ```

3. When prompted, enter the full path of the application home directory. The application will be installed within the `current` subdirectory within this home directory and the previous release will be archived.

   On Unix:
   ```
   []: Current_home_directory/banner_test_homes/StudentApi
   ```

   On Windows:
   ```
   []: c:\banner_test_homes\StudentApi
   ```

4. Enter the full path of the `shared_configuration` home directory. Banner 9.x applications that refer to this home directory share this configuration file.

   On Unix:
   ```
   []: Current_home_directory/banner_test_homes/
   shared_configuration
   ```

   On Windows:
   ```
   []: c:\banner_test_homes\shared_configuration
   ```

**Note:** If an identified home directory or the `shared_configuration` home directory does not exist, the installer creates it. The name of a product home directory is not restricted. You can name it when prompted by the installer.

## Configure shared settings

The `shared_configuration` home directory contains a cross-application configuration file called `banner_configuration.groovy`.

You can optionally change the datasource name in the configuration file to point to the JNDI datasource that is configured in your application server. For example, `jndiName = "jdbc/bannerDataSource"` is the default configuration. You can change this to match the JNDI datasource name in your environment. If you change the jndiName, you must regenerate the WAR file, even if you are using an external configuration.

## Configure application-specific settings

The `StudentApi\current\instance\config` directory contains the `StudentApi_configuration.groovy` file. This application-specific configuration file contains settings that you can customize for your specific environment.

### Database proxy

To improve API performance, set the `apiOracleUsersProxied` setting to `false`. If the setting is set to `true`, API database requests are sent through the slower `bannerDataSource`.

**Note:** When `apiOracleUsersProxied` is disabled (value is `false`), user audit trails are the username that is configured for `bannerSsbDataSource`.
To know more about the configuration changes, refer to the `StudentApi_configuration.groovy.example` file that is shipped along with this release.

### Cross Origin Resource Support (CORS)

By default, browsers do not allow JavaScript or Java applets to call APIs outside the origin site's domain. The `cors.enabled` setting can be used with the `cors.allow.origin.regex` setting to enable calls to APIs from client browsers if the origin sent in the request matches the `cors.allow.origin.regex` pattern set. This is accomplished by echoing the received matching origin in the allowed origin field of the response header.

## JMX MBean name

The name that is used to register MBeans must be unique for each application that is deployed into the JVM. This configuration should be updated for each instance of each application to ensure uniqueness.

```
jmx {
    exported {
        log4j = "StudentApi-log4j"
    } }
```

## Location of the logging file

Log4j is the common logging framework used with applications that run on the Java Virtual Machine. For more information, refer to the log4j documentation.

The configuration file includes documentation on various elements that can be modified depending on your environment.

The following is an example of how to override the location where the log file is saved.

```
loggingFileDir = "System.properties['logFileDir'] ?
"${System.properties['logFileDir']}" : "target/logs"
logAppName = "StudentApi"
loggingFileName = "${loggingFileDir}/${logAppName}.log".toString()
```

The following is an example of how to override the log file directory properties:

```
export JAVA_OPTS = "-DlogFileDir=/PRODUCT_HOME /"
```

The output logging file location is relative to the application server to which you are deploying.

## Logging level

The root logging level is pre-configured to the `ERROR` level. Multiple class or package level configurations, by default, are set to a status of "off." You can set a different logging level for any package or class. However, the running application must be restarted.

For example:

```
case 'production':
root {
error 'appLog' //change the log level here with the
appropriate log level value.
additivity = true
}
```

**Note:** Changing the logging level to `DEBUG` or `INFO` produces very large log files.

Changes to the `StudentApi_configuration.groovy` file require a restart of the application before those changes take effect.

Alternatively, you can use JMX to modify logging levels for any specified package or class, or even at the root level. When using JMX, the logging level changes only affect the running application. When you restart the application, changes that you made using JMX are lost. For more information on JMX configuration, see "Configure Java Management Extensions" on page 27.

## Regenerate the WAR file

Once the shared and application-specific configurations are complete, the application WAR file can be regenerated to include your customizations and application-specific settings. The WAR file can then be deployed into your specific application server.

The systool is used to create the WAR file. To set up the systool and to create the WAR file, perform the following steps:

1. Change your current working directory to the product home directory:

   ```
   StudentApi/current/installer
   ```

2. Run the ant command, which will build the systool module.

   **Note:** For Unix, make sure the ant file is executable. For example, `chmod +x ant`.

   Example:

   ```
   $ cd StudentApi/current/installer
   StudentApi/current/installer $ ./ant
   ```

3. Use the systool module to create the WAR file.

   Your current working directory must be in the `StudentApi/current/installer` directory before you execute the following command.

   On Unix:
   ```
   $ bin/systool war
   ```

   On Windows:
   ```
   > bin\systool war
   ```

The WAR file is created in the `StudentApi/current/dist` directory.

You can use external configuration files by setting appropriate system properties, although the configuration files are included in the WAR file to make the WAR file self-sufficient. For information on external configuration, see "Configure the Tomcat server" on page 24 or "Create a WebLogic server" on page 33.

# Configure and deploy the WAR file to a web application server

The following sections provides information on configuring the web application and deploying the WAR file to a web application server:

- "Tomcat" on page 24
- "WebLogic" on page 30

## Tomcat

The following sections provide information on configuring the web application and deploying the WAR file to the Tomcat server.

**Note:** If you choose to install the application on a Tomcat server, you do not need to install it on WebLogic.

**Note:** Tomcat version 7 or 8 is required. To download and install the Tomcat see http://tomcat.apache.org.

### Configure the Tomcat server

Use the following steps to configure the Tomcat server:

1. Locate the Oracle JDBC jar file (`ojdbc6.jar`) in the `StudentApi\current\lib` directory.

   **Note:** Later in the Tomcat configuration process, you will copy the Oracle JDBC jar file into the `\lib` folder under the Tomcat installation directory.

   The account that runs the Tomcat application server must configure environment settings to support the application.

2. On Linux, ensure `CATALINA_HOME` is defined to reference your Tomcat software installation location. For example, `CATALINA_HOME=/opt/apache-tomcat-6.0.xx` where xx indicates the point version of Tomcat you installed.

   ***Warning!*** *Do not perform this step on the Windows platform.*

3. Define `CATALINA_OPTS` to configure JVM settings. The following settings are recommended:

```
CATALINA_OPTS=-server -Xms2048m -Xmx4g
-XX:MaxPermSize=512m
```

**Note:** If you are deploying multiple Banner 9.x applications to the same Tomcat server, increase the max heap (`-Xmx`) by `2g` and `-XX:MaxPermSize` by `128m`. You should deploy Banner 9.x administrative applications to one Tomcat server instance and Banner 9.x self-service applications to a separate Tomcat server instance.

You can define this variable in the account's profile startup script, or you can add this definition in `$CATALINA_HOME/bin/catalina.sh` for Linux or `catalina.bat` for Windows.

4. (Optional) If you install Tomcat as a Windows service, specify the JVM arguments as follows:

   **4.1.** Select **Configure Tomcat** application from the Windows **Start** menu.

   **4.2.** Select the **Java** tab.

   **4.3.** In the **Java Options** field, add the following:

   ```
   -XX:MaxPermSize=512m
   ```

   **4.4.** Set the initial memory pool = 2048.

   **4.5.** Set the maximum memory pool = 4096.

   **4.6.** Save the settings.

   **4.7.** Restart the Tomcat Windows service.

5. (Optional) To set up the Tomcat server to enable remote JMX connections, perform the steps in the "Configure Java Management Extensions" section. This is useful for debugging and logging.

6. Define the JNDI datasource resource name for the application as follows:

   **6.1.** Edit `$CATALINA_HOME/conf/context.xml`.

   **6.2.** Uncomment `<Manager pathname="" />` to disable Tomcat session persistence. For example, change the following:

   ```
   <!-- Uncomment this to disable session persistence
   across Tomcat restarts -->

   <!--
   <Manager pathname="" />
   -->
   ```

   to:

   ```
   <!-- Uncomment this to disable session persistence
   across Tomcat restarts -->

   <Manager pathname="" />
   ```

   **6.3.** Add the following ResourceLink definitions inside the `<Context>` element:

   ```
    <ResourceLink global="jdbc/bannerDataSource"
                  name="jdbc/bannerDataSource"
                  type="javax.sql.DataSource"/>
   ```

```
<ResourceLink global="jdbc/bannerSsbDataSource"
              name="jdbc/bannerSsbDataSource"
              type="javax.sql.DataSource"/>
```

**6.4.** Save your changes in `context.xml`.

**6.5.** Edit `$CATALINA_HOME/conf/server.xml` to configure the database JNDI resource name and connection pool configuration.

**6.6.** Add the following Resource definitions inside the `<GlobalNamingResources>` element:

For Tomcat 7

```
<Resource name="jdbc/bannerDataSource" auth="Container"
  type="javax.sql.DataSource"
  driverClassName="oracle.jdbc.OracleDriver"
  url="jdbc:oracle:thin:@//hostname:port/service_name"
  username="banproxy" password="the_banproxy_password"
  initialSize="5" maxActive="100" maxIdle="-1"
  maxWait="30000"
  validationQuery="select 1 from dual"
  testOnBorrow="true"/>
<Resource name="jdbc/bannerSsbDataSource" auth="Container"
  type="javax.sql.DataSource"
  driverClassName="oracle.jdbc.OracleDriver"
  url="jdbc:oracle:thin:@//hostname:port/service_name"
  username="ban_ss_user" password="ban_ss_user_pasword"
  initialSize="5" maxActive="100" maxIdle="-1"
  maxWait="30000"
  validationQuery="select 1 from dual"
  testOnBorrow="true"/>
```

For Tomcat 8

```
<Resource name="jdbc/bannerDataSource" auth="Container"
  type="javax.sql.DataSource"
  driverClassName="oracle.jdbc.OracleDriver"
  url="jdbc:oracle:thin:@//hostname:port/service_name"
  username="banproxy" password="the_banproxy_password"
  initialSize="5" maxTotal="100" maxIdle="-1"
  maxWaitMillis="30000"
  validationQuery="select 1 from dual"
  accessToUnderlyingConnectionAllowed="true"
  testOnBorrow="true"/>
<Resource name="jdbc/bannerSsbDataSource" auth="Container"
  type="javax.sql.DataSource"
  driverClassName="oracle.jdbc.OracleDriver"
```

```
url="jdbc:oracle:thin:@//hostname:port/service_name"
username="ban_ss_user" password="ban_ss_user_pasword"
initialSize="5" maxTotal="100" maxIdle="-1"
maxWaitMillis="30000"
validationQuery="select 1 from dual"
accessToUnderlyingConnectionAllowed="true"
testOnBorrow="true"/>
```

For example, if your database server name is `myserver.university.edu` and the Oracle TNS Listener is accepting connections on port 1521 and your database service name is `SEED`, then the URL is `jdbc:oracle:thin:@//myserver.university.edu:1521/SEED`.

**6.7.** Save your changes in `server.xml`.

**6.8.** Copy the Oracle JDBC jar file (`ojdbc6.jar`) from the `StudentApi/current/lib` directory to the `$CATALINA_HOME/lib` directory.

**6.9.** Copy xdb6.jar from the StudentApi/current/lib directory to the $CATALINA_HOME/lib directory.

**Note:** The 6.9 step is not required for Tomcat 8.

**6.10.** Validate the configuration of the Tomcat server by starting the application server. To accomplish this, perform the following steps:

– Run `$CATALINA_HOME/bin/startup.`

For Linux:

```
cd $CATALINA_HOME
$ bin/startup.sh
```

For Windows:

```
cd %CATALINA_HOME%
> bin\startup.bat
```

– Browse http://servername:<port>.

To override the configuration that was added into the WAR file, you must set system properties to point to external configuration files. For example, to point to a configuration file residing in the `PRODUCT_HOME` directory, export `JAVA_OPTS=`

```
"-DBANNER_APP_CONFIG=/PRODUCT_HOME/shared_configuration/
banner_configuration.groovy
-DBANNER_STUDENT_API_CONFIG=/PRODUCT_HOME/studentApi/
current/instance/config/StudentApi_configuration.groovy".
```

## Configure Java Management Extensions

This is an optional step that is needed only if you want to monitor or debug the application. Java Management Extensions (JMX) is a Java technology that supplies tools for managing and monitoring applications, system objects, devices, and service oriented networks.

Enabling JMX connections allows you to remotely monitor and debug the application server. To enable Java Management Extensions, perform the following steps:

1. Add the following options to the `catalina.sh` or `catalina.bat` file and then restart the Tomcat server:

   ```
   set CATALINA_OPTS=-Dcom.sun.management.jmxremote

   -Dcom.sun.management.jmxremote.port=8999

   -Dcom.sun.management.jmxremote.ssl=false

   -Dcom.sun.management.jmxremote.authenticate=false

   -Djava.rmi.server.hostname=your.hostname.com
   ```

2. Change the `java.rmi.server.hostname` value to the hostname or IP address of the machine where Tomcat is installed. For example:

   ```
   -Djava.rmi.server.hostname=prod.appserver1.com
   ```

   or

   ```
   -Djava.rmi.server.hostname=149.24.3.178
   ```

3. JMX does not define a default port number to use. If necessary, change `com.sun.management.jmxremote.port=8999`.

   **Note:** It is recommended that you connect remotely to the Tomcat server using JMX.

   ***Warning!*** *Ensure that the* `jmxremote.authenticate` *parameter is not set to* `false` *in a production environment. If it is set to* `false`*, it does not require connections to be authenticated and will create a security threat in a production environment. For more information on Tomcat Remote JMX documentation, see http://tomcat.apache.org/tomcat-6.0-doc/monitoring.html#Enabling_JMX_Remote.*

## Deploy the WAR file to the Tomcat server

The systool that is used to create the WAR file can also be used to deploy the WAR file to a Tomcat container. You should deploy 9.x administrative applications and 9.x self-service applications to separate Tomcat servers to increase performance.

**Note:** The systool does not provide the capability to undeploy or redeploy an application. If you are redeploying the application, you must use the Tomcat Manager web application to undeploy the existing application.

The target supports deploying the `dist/WAR` file using the Tomcat Manager web application. Because environments vary significantly with respect to user privileges, clustering approach, web container version, operating system, and more, the target may or may not be suitable for your use.

**Note:** You can also deploy the WAR file to the Tomcat server by copying the WAR file to the Tomcat `webapps/` directory.

To use the target, you must provide the following information:

| | |
|---|---|
| URL | This is the URL of the manager application in the Tomcat server. For example: `http://localhost:8080/manager` |
| Username | This Tomcat server username must have privileges to deploy WAR files. |
| Password | This is the password of the Tomcat server user. |

Username/password combinations are configured in your Tomcat user database `<TOMCAT_HOME>\conf\tomcat-users.xml.` For Tomcat 6.x, you must configure at least one username/password combination with the manager role. For example:

```
<user username="tomcat" password="tomcat" (your password)
roles="manager-gui, manager"/>
```

**Note:** The roles in Tomcat server changed between point releases in version 6.x. Refer to the Tomcat documentation specific to your release for information on enabling access to provide the appropriate role to a user account for deployment.

To deploy the WAR file to the Tomcat server, perform the following steps:

1. Navigate to the `StudentApi\current\installer` directory.
2. Enter one of the following commands:

   On Unix:
   ```
   $ bin/systool deploy-tomcat
   ```
   On Windows:
   ```
   > bin\systool deploy-tomcat
   ```
3. Enter the following URL for the Tomcat Manager:
   ```
   []: http://localhost:8080/manager
   ```
   This URL will be accessed to deploy the WAR file into the container.
4. Enter a valid Tomcat username to deploy the WAR file. For example:
   ```
   []: tomcat
   ```
   **Note:** This user must have the `manager-gui` role.

5. Enter the Tomcat password for the user:

   ```
   []: password
   ```

   **Note:** This password will not be persisted.

6. Test the Banner Student API 9.5 installation as follows:

   **6.1.** Install a REST client application.

   REST client is a plugin for Firefox and Google Chrome browsers. For example, Advance REST Client is provided for the Google Chrome browser.

   **6.2.** In the URL field, enter the Student API URL:

   ```
   http://<host>:<port>/StudentApi/api/about
   ```

   **6.3.** Add a new header for **Accept** type.

   **6.4.** Enter a value for Accept type. For example:

   ```
   Accept = application/json
   ```

   **6.5.** Click the **GET** option.

   **6.6.** Click **Send**. The application prompts for user authentication.

   **6.7.** Enter valid user credentials.

   If the installation is successful, the following message is displayed:

   *Status: 200 OK*

   Response body looks similar to the following:

   ```
   [
     {
       "applicationName": "StudentApi",
       "applicationVersion": "9.5"
     }
   ]
   ```

   where `applicationVersion` is the version of StudentApi application running at institution.

## WebLogic

The following sections provide information on configuring the web application and deploying the WAR file to the WebLogic server:

**Note:** If you choose to install the application on a WebLogic server, you do not need to install it on Tomcat.

## Verify WebLogic prerequisites

Before configuring your WebLogic server, ensure that the following prerequisites are met:

- WebLogic must be installed. If it is not, download and install WebLogic from the Oracle web site.
- The minimum requirements are OFM 11.1.1.4+.
- Both the WebLogic node manager and the administration server must be started. The administration server can be accessed using the following URL:

  ```
  http://server:7001/console
  ```

## Configure WebLogic server

**Note:** This step is not required for WebLogic 12c (12.1.3).

1. Copy the Oracle JAR files (ojdbc6.jar and xdb6.jar) from the $PRODUCT_HOME/current/lib directory to the $MIDDLEWARE_HOME/modules directory.
   - **1.1.** $PRODUCT_HOME is where the Student API 9.5 release zip file is unpacked and installed
   - **1.2.** $MIDDLEWARE_HOME is the location where Oracle Weblogic is installed
2. Go to $MIDDLEWARE_HOME/user_projects/domains/<CUSTOM_DOMAIN>/bin
3. Edit the setDomainEnv.sh (Linux).
   - **3.1.** Add the following after the line #ADD EXTENSIONS TO CLASSPATH:

     ```
     export MIDDLEWARE_HOME= <The location where Oracle
     Weblogic is installed>. Example: export
     MIDDLEWARE_HOME="/u01/app/oracle/Middleware"

     export WLS_MODULES="${MIDDLEWARE_HOME}/modules"

     export EXT_PRE_CLASSPATH="${WLS_MODULES}/xdb6.jar"
     ```
   - **3.2.** Post edit it should look like the following:

     ```
     # ADD EXTENSIONS TO CLASSPATHS

     export MIDDLEWARE_HOME= <The location where Oracle
     Weblogic is installed>. Example: export
     MIDDLEWARE_HOME="/u01/app/oracle/Middleware"

     export WLS_MODULES="${MIDDLEWARE_HOME}/modules"
     export EXT_PRE_CLASSPATH="${WLS_MODULES}/xdb6.jar"
     if [ "${EXT_PRE_CLASSPATH}" != "" ] ; then
     if [ "${PRE_CLASSPATH}" != "" ] ; then
     PRE_CLASSPATH="${EXT_PRE_CLASSPATH}${CLASSPATHSEP}${PR
     E_CLASSPATH}"
     ```

```
        export PRE_CLASSPATH
        else
           PRE_CLASSPATH="${EXT_PRE_CLASSPATH}"
           export PRE_CLASSPATH
         fi
    fi
```

4. Edit the setDomainEnv.cmd (Windows)

   4.1. Add the following after the line #ADD EXTENSIONS TO CLASSPATH:

   ```
   set MIDDLEWARE_HOME= <The location where Oracle
   Weblogic is installed>. Example: set
   MIDDLEWARE_HOME=D:\Oracle\Middleware

   set WLS_MODULES=%MIDDLEWARE_HOME%\modules

   set
   EXT_PRE_CLASSPATH=%EXT_PRE_CLASSPATH%;%WLS_MODULES%\
   xdb6.jar
   ```

   4.2. Post edit it should look like the following

   ```
   @REM ADD EXTENSIONS TO CLASSPATH

   set MIDDLEWARE_HOME= <The location where Oracle
   Weblogic is installed>. Example: set
   MIDDLEWARE_HOME=D:\Oracle\Middleware

   set WLS_MODULES=%MIDDLEWARE_HOME%\modules

   set
   EXT_PRE_CLASSPATH=%EXT_PRE_CLASSPATH%;%WLS_MODULES%\x
   db6.jar

   if NOT "%EXT_PRE_CLASSPATH%"=="" (

        if NOT "%PRE_CLASSPATH%"=="" (

             set
   PRE_CLASSPATH=%EXT_PRE_CLASSPATH%;%PRE_CLASSPATH%

        ) else (

            set PRE_CLASSPATH=%EXT_PRE_CLASSPATH%

        )

   )
   ```

5. Restart the WebLogic server.

## Create a WebLogic machine

**Note:** If you previously created a WebLogic machine definition, you can skip this section.

To create a WebLogic machine, perform the following steps:

1. In the Change Center frame, click **Lock & Edit**.
2. In the Domain Structure frame, click (**+**) to expand and view the list of environments.
3. Click the **Machines** link.
4. Click **New**.
5. Enter a machine name and click **Next**.
6. Accept the defaults and click **Finish**.
7. In the Change Center frame, click **Activate Changes**.

## Create a WebLogic server

**Note:** If you previously created a WebLogic server, you can skip this section.

**Note:** If you previously created a WebLogic server for the application, you can use the same server.

To create a WebLogic server, perform the following steps:

1. In the Change Center frame, click **Lock & Edit**.
2. In the Domain Structure frame, click (**+**) to expand and view the list of environments.
3. Click the **Servers** link.
4. Click **New**.
5. Enter a server name and server listen port. For example, you can have server name as `Banner9` and server listen port as `8180`.
6. Click **Finish**.
7. Click the newly created server link.
8. Under the **General** tab, assign the machine to this server.
9. Click **Save**.

10. Select the **Server Start** tab.
11. Add the following to the **Arguments** text area:

    If you are using Sun JVM, use the following parameters:

    ```
    -server -Xms2048m -Xmx4g -XX:MaxPermSize=512m
    ```

    **Note:** If you are deploying multiple Banner 9.x applications to the same WebLogic server, increase the max heap (`-Xmx`) by `2g` and `-XX:MaxPermSize` by `128m`. You should deploy Banner 9.x administrative applications to one WebLogic server instance and Banner 9.x self-service applications to a separate WebLogic server instance.

    If you are using JRockit JVM, use the following parameters:

    ```
    -Xms2048m -Xmx4g
    ```

    **Note:** For JRockit, increase the max heap (`-Xmx)` by `2g` for each Banner 9.x application that is deployed.

    To override the configuration that was added into the WAR file, you can set system properties to point to external configuration files. Append the following to the arguments text area:

    ```
    -DBANNER_APP_CONFIG=<full file path to
    banner_configuration.groovy>
    -DBANNER_STUDENT_API_CONFIG=<full file path to
    StudentApi_configuration.groovy>
    ```
12. Click **Save**.
13. In the Change Center frame, click **Activate Changes**.
14. In the Domain Structure frame, click the **Servers** link.
15. Select the **Control** tab.
16. Select the check box next to your new server definition.
17. Click **Start**.

## Create an administrative datasource and connection pool

**Note:** If you previously created an administrative datasource, you can skip this section.

To create an administrative datasource and connection pool, perform the following steps:

1. In the Change Center frame, click **Lock & Edit**.
2. In the Domain Structure frame, click (**+**) to expand Services and then select **Data Sources**.
3. Click **New**.

4. Select **Generic DataSource**.
5. Specify a name (for example, `Banner9DS`).
6. Specify the JNDI name (for example, `jdbc/bannerDataSource)`.
7. Specify `Oracle` for Database Type and then click **Next**.
8. Select **Oracle Driver (Thin) for Service Connections** and then click **Next**.
9. Clear the **Supports Global Transactions** check box and then click **Next**.
10. Enter the database name, host name, port, user name, password, and password confirmation, and then click **Next**. For example:

| | |
|---|---|
| Database name: | `BAN9` |
| Host name: | `yourhostname.yourdomain.com` |
| Port: | `1521` |
| UserName: | `banproxy` |
| Password: | `your_password` |

11. Click **Test Configuration**.
12. Click **Next** for the connection test to be successful.
13. Select the server that you previously created to allow the datasource to be deployed and used by this server.
14. Click **Finish**.
15. Select the datasource link that you created.
16. Select the **Connection Pool** tab.

    **16.1.** Set the Initial Capacity parameter to specify the minimum number of database connections to create when the server starts up. For example:

    ```
    Initial Capacity = 5
    ```

    **16.2.** Set the Maximum Capacity parameter to specify the maximum number of database connections that can be created. For example:

    ```
    Maximum Capacity = 100
    ```

17. Change `Statement Cache Type = Fixed`.
18. Change `Statement Cache Size = 0`.
19. Click **Save**.
20. In the Change Center frame, click **Activate Changes**.

## Create a self-service datasource and connection pool

**Note:** If you previously created a self-service datasource, you can skip this section.

To create a self-service datasource and connection pool, perform the following steps:

1. In the Change Center frame, click **Lock & Edit**.
2. In the Domain Structure frame, click (**+**) to expand Services and then select **Data Sources**.
3. Click **New**.
4. Select **Generic DataSource**.
5. Specify a name (for example, `Banner9SsbDS`).
6. Specify the JNDI name (for example, `jdbc/bannerSsbDataSource)`.
7. Specify `Oracle` for Database Type and then click **Next**.
8. Select **Oracle Driver (Thin) for Service Connections** and then click **Next**.
9. On the Transaction Options page, clear the **Supports Global Transactions** check box and then click **Next**.
10. Enter the database name, host name, port, user name, password, and password confirmation, and then click **Next**. For example:

| | |
|---|---|
| Database name: | `BAN9` |
| Host name: | `yourhostname.yourdomain.com` |
| Port: | `1521` |
| UserName: | `ban_ss_user` |
| Password: | `your_password` |

11. Click **Test Configuration**.
12. Click **Next** for the connection test to be successful.
13. Select the server that you previously created to allow the datasource to be deployed and used by this server.
14. Click **Finish**.
15. Select the datasource link that you created.
16. Select the **Connection Pool** tab.

    **16.1.** Set the Initial Capacity parameter to specify the minimum number of database connections to create when the server starts up. For example:

    ```
    Initial Capacity = 5
    ```

16.2. Set the Maximum Capacity parameter to specify the maximum number of database connections that can be created. For example:

    `Maximum Capacity = 100`

17. Change `Statement Cache Type = LRU`.
18. Change `Statement Cache Size = 20`.
19. Click **Save**.
20. In the Change Center frame, click **Activate Changes**.

## Deploy and start the application in the WebLogic server

To deploy and start the web application in the WebLogic server, perform the following steps:

1. Change the name of the WAR file to remove the version number. For example, change:

   `StudentApi/current/dist/StudentApi-9.5.war`

   to

   `StudentApi/current/dist/StudentApi.war`
2. Access the administration server at the following URL:

   `http://server:7001/console`
3. In the Domain Structure frame, select the **Deployments** link.
4. In the Change Center frame, select **Lock and Edit**.
5. Click **Install**.
6. Select the WAR file to be deployed and then click **Next**. The file is located in the following directory:

   `StudentApi/current/dist`
7. Select **Install this deployment** as an application and then click **Next**.
8. Select the target server on which to deploy this application (for example, `Banner9`) and then click **Next**.
9. Click **Finish**.
10. In the Change Center frame, click **Activate Changes**.
11. Select the deployed application and then click **Start**.
12. Select **Servicing all request**.
13. Access the application using the following URL format:

    `http://servername:<port>/<web application>`

    For example:

    `http://localhost:8080/StudentApi`

**14.** Test the Banner Student API 9.5 installation as follows:

**14.1.** Install a REST client application.

REST client is a plugin for Firefox and Google Chrome browsers. For example, Advance REST Client is provided for the Google Chrome browser.

**14.2.** In the URL field, enter the Student API URL:

```
http://<host>:<port>/StudentApi/api/about
```

**14.3.** Add a new header for **Accept** type.

**14.4.** Enter a value for Accept type. For example:

`Accept` = `application/json`

**14.5.** Click the **GET** option.

**14.6.** Click **Send**. The application prompts for user authentication.

**14.7.** Enter valid user credentials.

If the installation is successful, the following message is displayed:

*Status: 200 OK*

Response body looks similar to the following:

```
[
  {
    "applicationName": "StudentApi",
    "applicationVersion": "9.5"
  }
]
```

where `applicationVersion` is the version of StudentApi application running at institution.

# WebLogic Troubleshooting

If Banner Student API 9.5 is deployed on a WebLogic server, use this chapter to troubleshoot the WebLogic configuration for Java Persistence API (JPA).

## Disable WebLogic basic authentication

If you receive a prompt for authentication from a WebLogic realm rather than the Banner REST API realm, use the following procedure to disable WebLogic's default basic authentication security for the domain:

1. Navigate to the `config` directory where WebLogic is configured. For example:

   ```
   cd /MIDDLEWARE_HOME/user_projects/domains/base_domain/
   config
   ```

   where `MIDDLEWARE_HOME` is `/u01/app/oracle/middleware`.

2. Open `config.xml` in a text editor.
3. Add the tag `<enforce-valid-basic-auth-credentials>false</enforce-valid-basic-auth-credentials>` to `config.xml` as follows:
   - For WebLogic 10.3.5, add the tag before the `<cross-domain-security-enabled>false</cross-domain-security-enabled>` tag.
   - For other WebLogic servers, add the tag before the closing `</security-configuration>` tag.
4. Save the file.
5. Restart the WebLogic server.

## Change the WebLogic configuration for JPA 2.0

If the following error message is displayed after you start the application, you must change the WebLogic configuration for JPA 2.0.

*ERROR context.GrailsContextLoader - Error initializing the application: Error creating bean with name 'transactionManagerPostProcessor': Initialization of bean failed; nested exception is org.springframework.beans.factory.BeanCreationException: Error creating bean with name 'trans actionManager': Cannot resolve reference to bean 'sessionFactory' while setting bean property 'sessionFactory'; nested exception is org.springframework.beans.factory.BeanCreationException: Error creating bean with name 'sessionFactory': Invocation of init method failed; nested exception is* *java.lang.NoSuchMethodError: javax.persistence.OneToOne.orphanRemoval()Z org.springframework.beans.factory.BeanCreationException: Error creating bean with name 'transactionManagerPostProcessor': Initialization of bean failed; nested exception is org.springframework.b eans.factory.BeanCreationException: Error creating bean with name 'transactionManage! r': Cannot resolve reference to bean 'sessionFactory' while setting bean property 'sessionFactory'; nested exc eption is org.springframework.beans.factory.BeanCreationException: Error creating bean with name 'sessionFactory': Invocation of init method failed; nested exception is java.lang.NoSuchMethodErr or: javax.persistence.OneToOne.orphanRemoval*

**Note:** For more information on JPA 2.0 support documentation, see [http://docs.oracle.com/cd/E17904_01/web.1111/e13720/using_toplink.htm#EJBAD1309](http://docs.oracle.com/cd/E17904_01/web.1111/e13720/using_toplink.htm#EJBAD1309).

To correct the error, you must edit the `nodemanager.properties` file and the `setDomainsEnv.sh` file.

## Edit nodemanager.properties

Use the following procedure to edit the `nodemanger.properties` file:

1. Navigate to the `nodemanager` directory. For example:

   ```
   cd /MIDDLEWARE_HOME/wlserver_10.3/common/nodemanager
   ```

   where `MIDDLEWARE_HOME` is `/u01/app/oracle/middleware`.
2. Open `nodemanager.properties` in a text editor.
3. Change `StartScriptEnabled=true`.

   If the `StartScriptEnabled` property is not available, add the property in the `nodemanager.properties` file.
4. Save the file.

## Edit setDomainsEnv.sh

The following sections give the required steps to edit `setDomainsEnv.sh` for Unix and Windows environments.

### Unix

Use the following procedure to edit `setDomainsEnv.sh` in a Unix environment:

1. Navigate to the `bin` directory where WebLogic is configured. For example:

   ```
   cd /MIDDLEWARE_HOME/user_projects/domains/base_domain/bin
   ```

   where `MIDDLEWARE_HOME` is `/u01/app/oracle/middleware`.

2. Open `setDomainsEnv.sh` in a text editor.
3. Search for
   `CLASSPATH="${PRE_CLASSPATH}${CLASSPATHSEP}${CLASSPATH}"`

   **Note:** Make sure the referenced `javax.persistence_1.1.0.0_2-0.jar` and `com.oracle.jpa2support_1.0.0.0_2-1.jar` exist in the `MIDDLEWARE_HOME/modules` directory. These .jar file versions are for WebLogic 10.3.6 and might be different for other WebLogic versions.

4. Replace the following `if` statement:

```
if [ "${PRE_CLASSPATH}" != "" ] ; then

CLASSPATH="${PRE_CLASSPATH}${CLASSPATHSEP}${CLASSPATH}"
            export CLASSPATH
    fi
```

with the following statement:

```
# MOD GOES HERE

    # if [ "${PRE_CLASSPATH}" != "" ] ; then

    #
CLASSPATH="${PRE_CLASSPATH}${CLASSPATHSEP}${CLASSPATH}"

    #       export CLASSPATH

    # fi

if [ "${PRE_CLASSPATH}" != "" ] ; then

            CLASSPATH="${MIDDLEWARE_HOME}/modules/
javax.persistence_1.1.0.0_2-
0.jar${CLASSPATHSEP}${MIDDLEWARE_HOME}/modules/
com.oracle.jpa2support_1.0.0.0_2-
1.jar${CLASSPATHSEP}${PRE_CLASSPATH}${CLASSPATHSEP}${CL
ASSPATH}"

            export CLASSPATH

    else

            CLASSPATH="${MIDDLEWARE_HOME}/modules/
javax.persistence_1.1.0.0_2-
0.jar${CLASSPATHSEP}${MIDDLEWARE_HOME}/modules/
```

```
    com.oracle.jpa2support_1.0.0.0_2-
    1.jar${CLASSPATHSEP}${CLASSPATH}"

                  export CLASSPATH

          fi

          # MOD ENDS HERE
```

5. Save the file.

   This comments out (disables) the previous code and replaces the latest code.

   **Note:** Make sure you are in the right directory. If the error message *Directory not found* is displayed, you must change your path.

6. Restart the WebLogic server for the changes to reflect.

## Windows

Use the following procedure to edit `setDomainsEnv.sh` in a Windows environment:

1. Navigate to the `bin` directory where WebLogic is configured. For example:

   ```
   cd /MIDDLEWARE_HOME/user_projects/domains/base_domain/bin
   ```

   where `MIDDLEWARE_HOME` is `D:\Oracle\Middleware`.

2. Open `setDomainsEnv.cmd` in a text editor.

3. Search for `CLASSPATH=%PRE_CLASSPATH%;%CLASSPATH%`

   **Note:** Make sure the referenced `javax.persistence_1.1.0.0_2-0.jar` and `com.oracle.jpa2support_1.0.0.0_2-1.jar` exist in the `MIDDLEWARE_HOME\modules` directory. These .jar file versions are for WebLogic 10.3.6 and might be different for other WebLogic versions.

4. Replace the following `if` statement:

   ```
   if NOT "%PRE_CLASSPATH%"=="" (set
   CLASSPATH=%PRE_CLASSPATH%;%CLASSPATH%)
   ```

   with the following statement:

   ```
     @REM MOD GOES HERE

     @REM if NOT "%PRE_CLASSPATH%"=="" (

     @REM set CLASSPATH=%PRE_CLASSPATH%;%CLASSPATH%

     @REM )

     @REM - Change MIDDLEWARE_HOME value to match your
     environment
   ```

```
set MIDDLEWARE_HOME=D:\Oracle\Middleware

if NOT "%PRE_CLASSPATH%"=="" (

set
CLASSPATH=%MIDDLEWARE_HOME%\modules\javax.persistence_1
.1.0.0_2-
0.jar;%MIDDLEWARE_HOME%\modules\com.oracle.jpa2support_
1.0.0.0_2-1.jar;%PRE_CLASSPATH%;%CLASSPATH%

) else (

set
CLASSPATH=%MIDDLEWARE_HOME%\modules\javax.persistence_1
.1.0.0_2-
0.jar;%MIDDLEWARE_HOME%\modules\com.oracle.jpa2support_
1.0.0.0_2-1.jar;%CLASSPATH%

)
```

5. Save the file.

   This comments out (disables) the previous code and replaces the latest code.

   **Note:** Make sure you are in the right directory. If the error message *Directory not found* is displayed, you must change your path.

6. Restart the WebLogic server for the changes to reflect.

# Appendix A - Ellucian Messaging Service Installation and Configuration

To integrate Banner with Elevate, you must install the Ellucian Messaging Service.

The Ellucian Messaging Service is the messaging service that facilitates use of the Advanced Message Queuing Protocol (AMQP) standard and associated AMQP components. The Ellucian Messaging Service works as the intermediate system between Banner and Elevate. The tasks in this section will assist in the installation and configuration of the appropriate components and SSL setup on either a Linux or Windows operating system.

This section is intended for use by the IT system administrator.

The following details apply.

- You should install and configure the Ellucian Messaging Service components on the Banner Event Publisher (BEP) server. The Messaging Service includes Erlang and RabbitMQ 3.3.4.
- You can install the components on either a Linux or Windows operating system, depending on your institution's needs.

## Install and configure the Ellucian Messaging Service

This information covers the installation and configuration of the Ellucian Messaging Service on either Windows or Linux, including setup for SSL.

### Before you begin

The recommended installation platform is the Banner Event Publisher (BEP) server.

For Windows server installation, make sure to run the Ellucian Messaging Service installer while logged in as an Administrative user.

For Linux server installation, RHN must be enabled in the system.

**Note:** If Erlang or RabbitMQ are already installed for a prior product, they should not be re-installed. Multiple Ellucian products can and should use the same RabbitMQ installation, although sites may want different installations for production and non-production environments.

# Installing on Linux

The Ellucian Messaging Service is delivered on a ZIP file that must be extracted onto a Windows system before being moved to the Linux host.

## Prepare the service components

Unzip the *EllucianMessagingService100-RHEL5.zip* or *EllucianMessagingService100-RHEL6.zip* file to an empty directory (such as `C:\ellucian\EMS-Linux`) and navigate into it using Windows Explorer. The ZIP file will contain:

- a ConfigureEMS shell script
- an Erlang RPM file
- a RabbitMQ RPM file.

Transfer these files by FTP to the Linux host.

## Install Erlang

As root, install Erlang (examples shown for RHEL 5 and 6 using yum or rpm)

- (RHEL 5): `rpm -ivh erlang-R15B-02.1.el5.x86_64.rpm`
- (RHEL 6): `rpm -ivh erlang-R15B-02.1.el6.x86_64.rpm`
- (RHEL 5): `yum install erlang-R15B-02.1.el5.x86_64.rpm`
- (RHEL 6): `yum install erlang-R15B-02.1.el6.x86_64.rpm`

## Install RabbitMQ

As root, install RabbitMQ (examples shown using yum or rpm).

- `rpm -ivh pivotal-rabbitmq-server-3.3.4-3.noarch.rpm`
- `yum install pivotal-rabbitmq-server-3.3.4-3.noarch.rpm`

## Configure AMQP

This information covers the configuration of the Ellucian Messaging Service using the delivered ConfigureEMS shell script.

**1.** Change permissions on the configuration script:

Example: `chmod 700 ConfigureEMS`

**2.** As root, run the configuration script with its three required command line arguments:

- Admin user name
- Admin password
- Virtual host name

Syntax: `ConfigureEMS username password vhostname`

Example: `./ConfigureEMS ellucian rabbit EllucianMessaging`

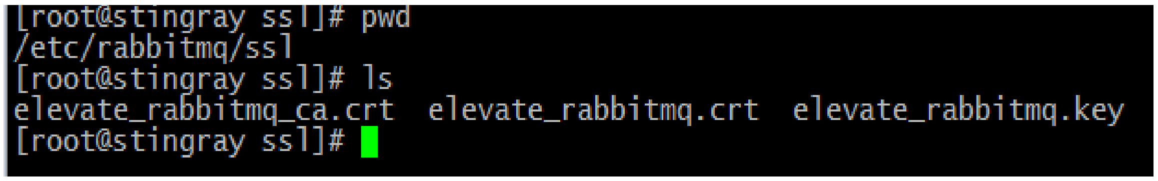
## Configure AMQP for SSL

Install the SSL certificate, private key, and CA certificates that are required in order to configure RabbitMQ for SSL.

**1.** Configure RabbitMQ to use the SSL certificates.

```
mkdir /etc/rabbitmq/ssl
```

**2.** Copy and upload the key and certificate files into the SSL directory.



```
[root@stingray ssl]# pwd
/etc/rabbitmq/ssl
[root@stingray ssl]# ls
elevate_rabbitmq_ca.crt  elevate_rabbitmq.crt  elevate_rabbitmq.key
[root@stingray ssl]#
```

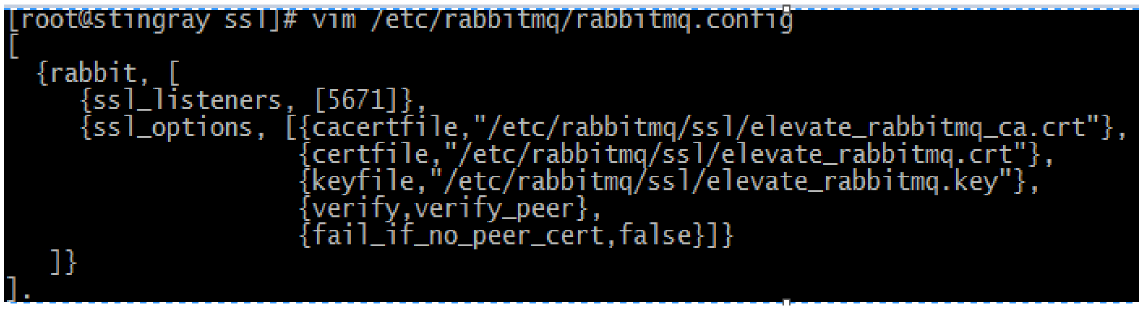
**3.** Create a rabbitmq.config file using a UNIX text editor, such as vi:

```
vi /etc/rabbitmq/rabbitmq.config
```

Add the following to the file, using the appropriate certificate file names:

```
    [
      {rabbit, [
         {ssl_listeners, [5671]},
         {ssl_options, [{cacertfile,"/etc/rabbitmq/ssl/ellucian_messaging_ca.crt"},
                        {certfile,"/etc/rabbitmq/ssl/ellucian_messaging.crt"},
                        {keyfile,"/etc/rabbitmq/ssl/ellucian_messaging.key"},
                        {verify,verify_peer},
                        {fail_if_no_peer_cert,false}]}
       ]}
].
```

**Note:** Ensure to include a period (.) at the end of the code snippet.



```
[root@stingray ssl]# vim /etc/rabbitmq/rabbitmq.config
[
  {rabbit, [
     {ssl_listeners, [5671]},
     {ssl_options, [{cacertfile,"/etc/rabbitmq/ssl/elevate_rabbitmq_ca.crt"},
                    {certfile,"/etc/rabbitmq/ssl/elevate_rabbitmq.crt"},
                    {keyfile,"/etc/rabbitmq/ssl/elevate_rabbitmq.key"},
                    {verify,verify_peer},
                    {fail_if_no_peer_cert,false}]}
   ]}
].
```

## Verify the Messaging Service

### Start the service

```
/sbin/chkconfig rabbitmq-server on
```

```
/etc/init.d/rabbitmq-server restart
```

or

```
service rabbitmq-server restart
```

## Verify the service

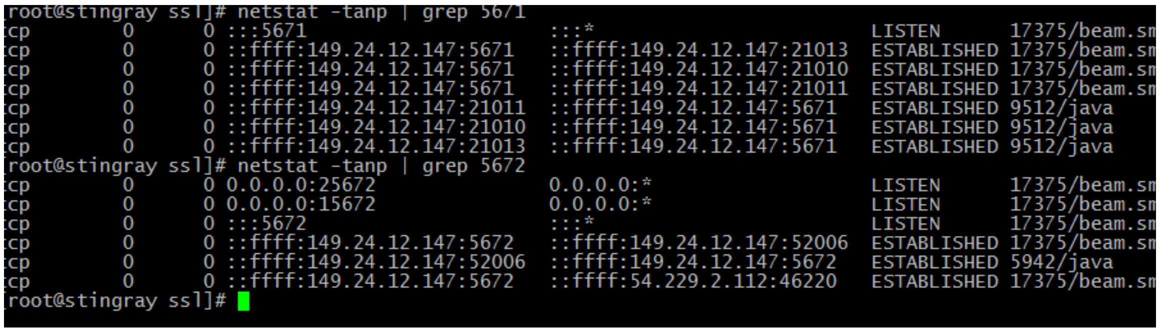
Check that the RabbitMQ SSL Port 5671 is being listened on actively.

As root, grep listeners from rabbitmqctl status output:

```
/usr/sbin/rabbitmqctl status | grep listeners
```

Otherwise, as any user, grep 5671 from the netstat output:

```
netstat -tanp | grep 5671
```



```
root@stingray ssl]# netstat -tanp | grep 5671
cp        0      0 :::5671                     :::*                        LISTEN      17375/beam.sm
cp        0      0 ::ffff:149.24.12.147:5671   ::ffff:149.24.12.147:21013  ESTABLISHED 17375/beam.sm
cp        0      0 ::ffff:149.24.12.147:5671   ::ffff:149.24.12.147:21010  ESTABLISHED 17375/beam.sm
cp        0      0 ::ffff:149.24.12.147:5671   ::ffff:149.24.12.147:21011  ESTABLISHED 17375/beam.sm
cp        0      0 ::ffff:149.24.12.147:21011  ::ffff:149.24.12.147:5671   ESTABLISHED 9512/java
cp        0      0 ::ffff:149.24.12.147:21010  ::ffff:149.24.12.147:5671   ESTABLISHED 9512/java
cp        0      0 ::ffff:149.24.12.147:21013  ::ffff:149.24.12.147:5671   ESTABLISHED 9512/java
root@stingray ssl]# netstat -tanp | grep 5672
cp        0      0 0.0.0.0:25672               0.0.0.0:*                   LISTEN      17375/beam.sm
cp        0      0 0.0.0.0:15672               0.0.0.0:*                   LISTEN      17375/beam.sm
cp        0      0 :::5672                     :::*                        LISTEN      17375/beam.sm
cp        0      0 ::ffff:149.24.12.147:5672   ::ffff:149.24.12.147:52006  ESTABLISHED 17375/beam.sm
cp        0      0 ::ffff:149.24.12.147:52006  ::ffff:149.24.12.147:5672   ESTABLISHED 5942/java
cp        0      0 ::ffff:149.24.12.147:5672   ::ffff:54.229.2.112:46220   ESTABLISHED 17375/beam.sm
root@stingray ssl]#
```

## Installing on Windows

Make sure to run the Ellucian Messaging Service installer while logged in as an Administrative user.

**Note:** If Erlang or RabbitMQ are already installed for a prior product, they should not be re-installed. Multiple Ellucian products can and should use the same RabbitMQ installation, but you might want to use different installations for production and non-production environments.

### Run the Ellucian Messaging Service installer

1. Run the *EllucianMessagingService100Setup.exe* installer and enter the following information when prompted:
   - AMQP admin username
   - AMQP admin password
   - AMQP virtual host name, for example "EllucianMessaging"
2. As you follow the prompts, the installer will perform the following actions:
   - Install Erlang and RabbitMQ
   - Enable the RabbitMQ admin UI
   - Configure RabbitMQ for the specified admin user
   - Create the indicated virtual host

### Configure AMQP for SSL

Follow these steps to install the SSL certificate, private key, and CA certificates required to configure RabbitMQ for SSL.

1. Create a directory to store the files required for SSL support, such as:

CD C:\Program Files\Ellucian\EllucianMessagingService\AMQP\rabbit

MKDIR SSL

2. Copy the two certificate files and one key file into the SSL directory.
3. Create or edit the file: %APPDATA%\RABBITMQ\rabbitmq.config
4. Add the following to the file, replacing the highlighted file names and locations with the correct information for your institution (use "/" to delimit the directories in the paths instead of the regular Windows "\" character):

```
[
  {rabbit, [
     {ssl_listeners, [5671]},
     {ssl_options, [{cacertfile,"C:/Program Files/Ellucian/
EllucianMessagingService/AMPQ/rabbit/ssl/certfile_ca.crt"},
                    {certfile,"C:/Program Files/Ellucian/
EllucianMessagingService/AMPQ/rabbit/ssl/certfile.crt"},
                    {keyfile,"C:/Program Files/Ellucian/
EllucianMessagingService/AMPQ/rabbit/ssl/certfile.key"},
                    {verify,verify_peer},
                    {fail_if_no_peer_cert,false}]}
   ]}
].
```

**Note:** Make sure to include a period (.) at the end of the code snippet.

**5.** Locate the RabbitMQ Server folder under Start > All Programs and select the "(Re)install Service" option.

**6.** Go to the Windows Services by running services.msc. Scroll down to the RabbitMQ service, which should be running.

**7.** Right-click on the service and restart it.

## Validating the messaging service

This section discusses validating the message service.

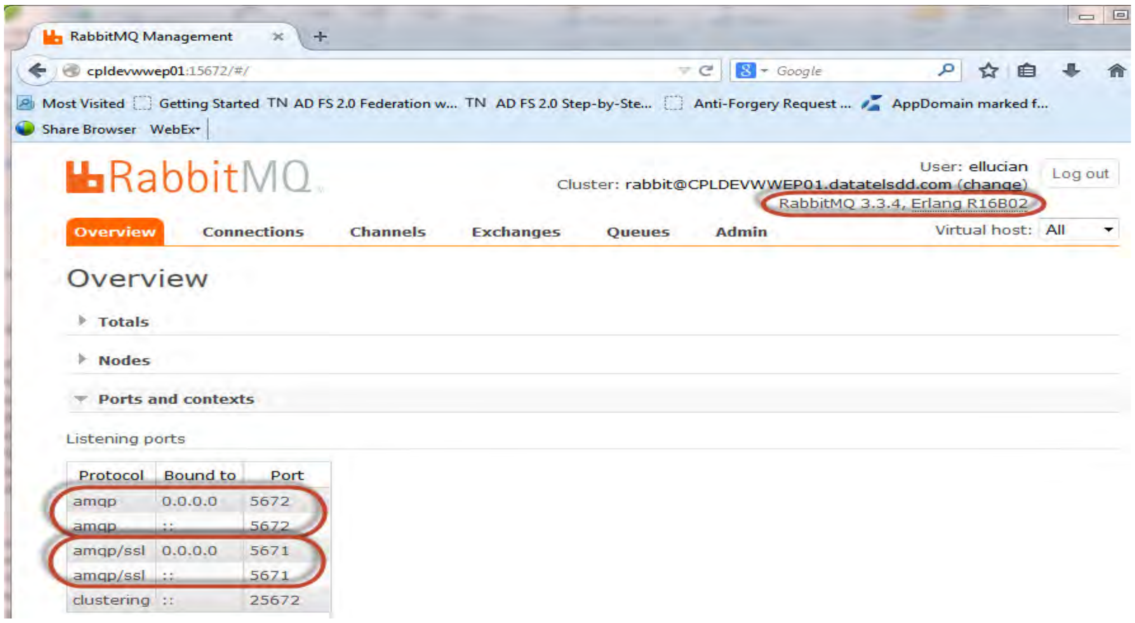
### The Admin Console

Use a browser to navigate to port 15672 of the server and confirm that the management plugin is enabled.

1. Enter the credentials that were previously created. For example, Username=ellucian Password=rabbit

   The overview page should show the following:

   - amqp::5672 and amqp/ssl::5671 as Listening ports
   - Erlang and RabbitMQ version information


RabbitMQ Management

cpldevwwep01:15672/#/

User: ellucian

Log out

Cluster: rabbit@CPLDEVWWEP01.datatelsdd.com (change)

RabbitMQ 3.3.4, Erlang R16B02

Overview | Connections | Channels | Exchanges | Queues | Admin — Virtual host: All

Overview

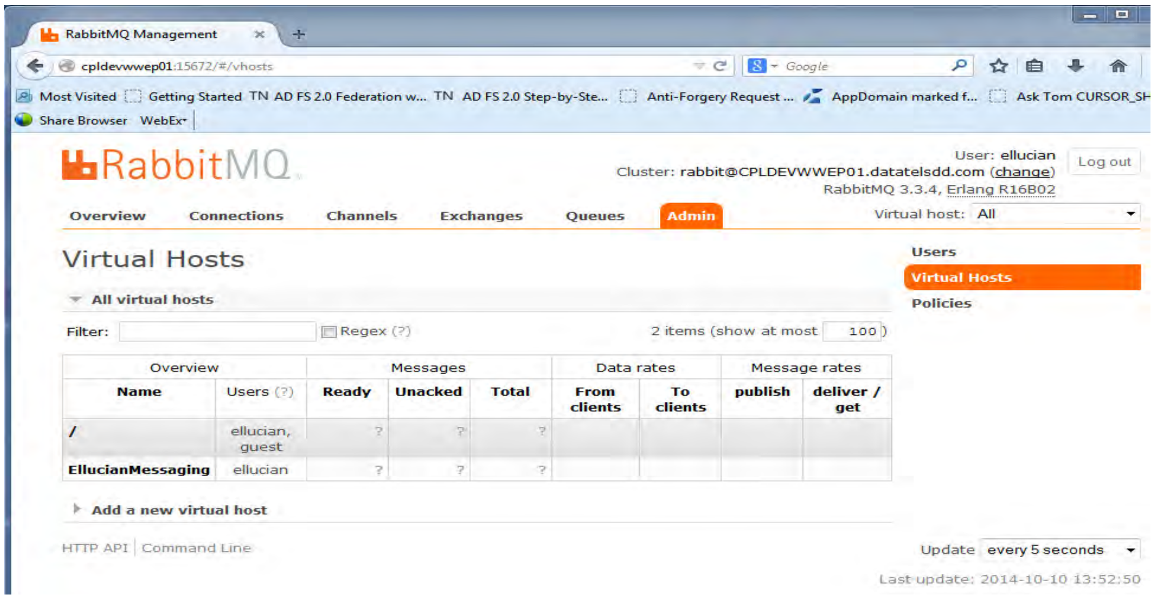
- Totals
- Nodes
- Ports and contexts

Listening ports

| Protocol | Bound to | Port |
|---|---|---|
| amqp | 0.0.0.0 | 5672 |
| amqp | :: | 5672 |
| amqp/ssl | 0.0.0.0 | 5671 |
| amqp/ssl | :: | 5671 |
| clustering | :: | 25672 |

2. Select the **Admin** tab along the top of the Admin form, and then select the **Virtual Hosts** tab on the right-hand side of the form.

3. Confirm that the EllucianMessaging virtual host exists and that the ellucian user has access to it.


RabbitMQ Management

cpldevwwep01:15672/#/vhosts

User: ellucian

Log out

Cluster: rabbit@CPLDEVWWEP01.datatelsdd.com (change)

RabbitMQ 3.3.4, Erlang R16B02

Overview | Connections | Channels | Exchanges | Queues | Admin — Virtual host: All

Users | Virtual Hosts | Policies

Virtual Hosts

All virtual hosts

Filter: Regex (?) — 2 items (show at most 100)

| Overview | | Messages | | | Data rates | | Message rates | |
|---|---|---|---|---|---|---|---|---|
| Name | Users (?) | Ready | Unacked | Total | From clients | To clients | publish | deliver / get |
| / | ellucian, guest | ? | ? | ? | | | | |
| EllucianMessaging | ellucian | ? | ? | ? | | | | |

Add a new virtual host

HTTP API | Command Line

Update every 5 seconds

Last update: 2014-10-10 13:52:50

4. If the user does not exist, you can add one using the Add a user feature on the Users page, which can be reached by clicking **Users** on the right margin of the Admin page.

5. If the virtual host does not exist, you can add one using the Add a new virtual host feature on the Virtual Hosts page, which can be reached by clicking **Virtual Hosts** on the right margin of the Admin page.

6. If either a user or virtual host needs to be added, make sure to grant permissions to the user for the virtual host. Click on the username on the Users page to access the Permissions page, where you can set permissions to any of the defined virtual hosts. (Set default ".*" permissions for configure, write, and read).

## Configure and Deploy the Ellucian Messaging Adapter

This section provides steps to configure the Ellucian Messaging Adapter component of the Ellucian Messaging Service and to review the deployment of the WAR file to either a Tomcat or WebLogic server.

- For Tomcat installations, make sure that the Tomcat Manager UI is configured and available.
- For WebLogic installations, make sure that the WebLogic Server Administration Console is configured and available.

### Configure the Ellucian Messaging Adapter

The Ellucian Messaging Adapter is delivered in a ZIP file that must be extracted onto a Windows system that has browser access to the target Tomcat or WebLogic server.

#### Prepare the service components

Unzip the *EllucianMessagingAdapter101.zip* file to an empty directory (such as `C:\ellucian\EMS-Adapter`) and navigate into it using Windows Explorer.

The ZIP file contains:

- the Ellucian Messaging Adapter WAR file
- an emsConfig template file
- a ConfigureEMS batch file

#### Configure the Ellucian Messaging Adapter WAR file

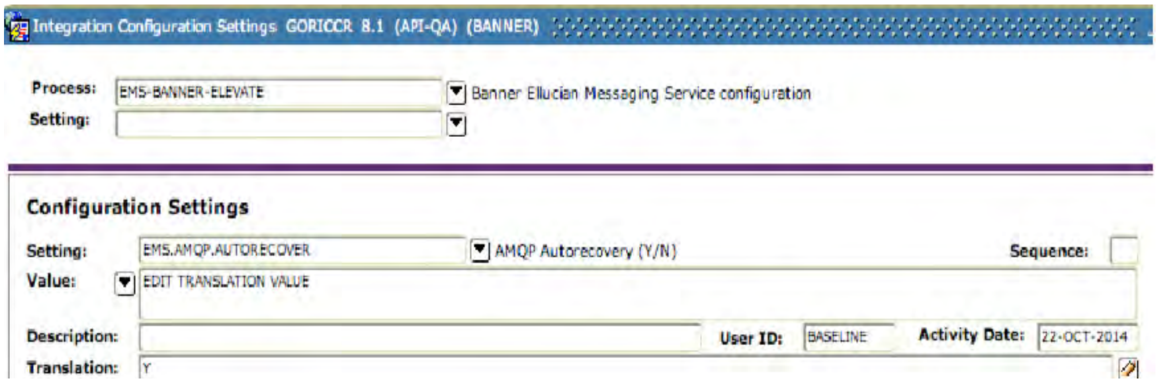
1. Within the unzipped components directory (such as `C:\ellucian\EMS-Adapter`) double-click on the *ConfigureEMS*.bat file.
2. Launch for the *WEB-INF\emsConfig.xml* file using Notepad.
3. Update the XML values for the target Banner API installation as follows:

| XML Attribute | XML Value | Descriptions |
|---|---|---|
| baseUrl | https://server:port/apiPath | The baseUrl will be the installation path of the Banner Web API. |
| username | web user used to retrieve EMS configuration | The username/password credentials required to access the configuration API. |
| password | password of the web user | |
| configId | key of the configuration record being retrieved | The configId is the name of the configuration record to retrieve on startup, such as EMS-BANNER-ELEVATE. |

After saving and exiting from Notepad, the WAR file will be updated with the new *WEB-INF\emsConfig.xml* file. It is now ready for deployment.

## Configure the Messaging Adapter settings in Banner (GORICCR)

This section provides information on setting the adapter configuration stored within Banner. You will need the values used in previous steps when setting up the AMQP server and your Banner API deployment.


Integration Configuration Settings GORICCR 8.1 (API-QA) (BANNER)

Process: EMS-BANNER-ELEVATE Banner Ellucian Messaging Service configuration
Setting:

Configuration Settings

Setting: EMS.AMQP.AUTORECOVER AMQP Autorecovery (Y/N) Sequence:
Value: EDIT TRANSLATION VALUE
Description: User ID: BASELINE Activity Date: 22-OCT-2014
Translation: Y

In GORICCR, enter EMS-BANNER-ELEVATE as the Process, leave the Setting empty, and go to the next box. Descriptions of each available setting follow.

## AMQP settings

**Note:** The values of these settings are not optional and are case sensitive.

| | |
|---|---|
| **EMS.AMQP.AUTORECOVER** | Whether AMQP connection failures should auto-recover (Y or N). |
| **EMS.AMQP.HEARTBEAT** | Frequency of any keep-alive signal sent to AMQP (seconds). Example: 30 |
| **EMS.AMQP.HOST** | The AMQP server host. |
| **EMS.AMQP.USERNAME** | The AMQP server username from the Ellucian Messaging Service install. |
| **EMS.AMQP.PASSWORD** | The AMQP server password from the Ellucian Messaging Service installation. |
| **EMS.AMQP.PORT** | The AMQP server port. Example: 5671 for secure, else 5672. |
| **EMS.AMQP.SECURE** | The AMQP SSL enabled setting (Y or N). |
| **EMS.AMQP.TIMEOUT** | The AMQP connection timeout (seconds). Example: 900 |
| **EMS.AMQP.VIRTUALHOST** | The AMQP virtual host from the Ellucian Messaging Service installation. |

## API deployment settings

| | |
|---|---|
| **EMS.API.USERNAME** | The oracle user with access to BAN_ELEVATE_API_C used for all API calls. |
| **EMS.API.PASSWORD** | The oracle password for the API user. |

## Business event settings

| | |
|---|---|
| **EMS.EVENT.ERP.EXCHANGENAME** | Name of the BEP AMQP topic exchange. Example: *BusinessEventTopic* |
| **EMS.EVENT.ERP.QUEUENAME** | Name of the BEP AMQP topic queue. Example: *BusinessEventQueue* |

## Message In/Out exchange settings

| | |
|---|---|
| **EMS.MESSAGE.IN.EXCHANGENAME** | Name of the AMQP inbound exchange. *Example: MessageInTopic* |
| **EMS.MESSAGE.IN.QUEUENAME** | Name of the AMQP inbound exchange queue. *Example: MessageInQueue* |
| **EMS.MESSAGE.OUT.EXCHANGENAME** | Name of the AMQP outbound exchange. *Example: MessageOutTopic* |

## Messaging adapter settings

| | |
|---|---|
| **EMS.LOGLEVEL** | The maximum detail level of any logging. *Example: ERROR* |
| **EMS.GUID.LIFESPAN** | The length of time a record update will block reverse updates (seconds). *Example: 30* |

## Integration Hub (iHUB) settings

Additional configuration settings must be configured for EMA to communicate with the Integration Hub.

| Configuration Settings Name | Description |
|---|---|
| **EMS.IHUB.USE** | Values available are:<br>*Y*: Use iHUB<br>*N*: Do not use iHUB |
| **EMS.IHUB.APPLICATION.API.KEY** | API Key of the application from the hub admin UI. |
| **EMS.IHUB.TOKEN.URL** | URL for the hub token service. |
| **EMS.IHUB.PUBLISH.URL** | URL for the hub publish service. |
| **EMS.IHUB.SUBSCRIBE.URL** | URL for the hub subscribe service |
| **EMS.IHUB.ERROR.URL** | URL for the hub error reporting service |
| **EMS.IHUB.MEDIATYPE** | The media type for messages getting published and retrieved (that is, application/vnd.hedtech.change-notifications.v2+json) |

## Deploy the Ellucian Messaging Adapter

This section provides information on deploying the Ellucian Messaging Adapter WAR file to either a Tomcat or WebLogic server.

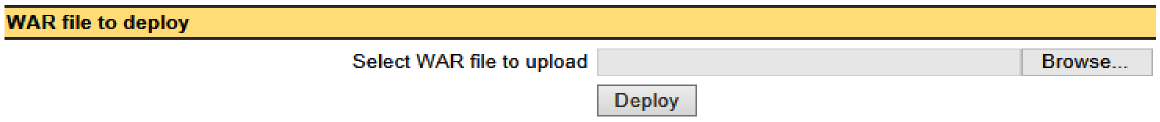
***Warning!*** *As soon as the adapter is deployed, it will call the Web API defined in its emsConfig.xml file for its configuration information and attempt to start processing messages. If Banner is not upgraded or configured to use the Ellucian Messaging Service, the adapter should not be deployed yet!*

***Warning!*** *Deployment will initiate the asynchronous messaging exchange between systems and should therefore be one of the last steps in the activation of the integration.*

## Deploy to Tomcat

You can deploy the WAR file to a Tomcat web server using the Tomcat Web Application Manager GUI.

1. Log into the Tomcat Manager GUI (typically running on port 8080 on the web server).
2. Click **Tomcat Manager** in the “Administration” section in the left margin.
3. Scroll down to the “WAR file to deploy” section at the bottom of the form.



4. Use the browse button to navigate to C:\ellucian\EMS-Adapter
5. Select the newly configured WAR file.
6. Click **Deploy**.

## Deploy to WebLogic

You can deploy the WAR file to a WebLogic server using the Administration Console.

1. Place the newly configured WAR file on the WebLogic server and then log into the WebLogic Administration Console.
2. Select **Deployments** in the “Domain Structure” section of the left margin.
3. Select **Lock & Edit** in the “Change Center” section of the left margin.
4. Select **Install** in the Deployments page.
5. Navigate to the path of the WAR file that you placed on the server.
6. Select the WAR file from the available list and click **Next**.
7. Select **Install this deployment as an application** and click **Next**.
8. Select the Server that the service should be deployed to and click **Next**.
9. Optionally, change the name of the deployment.
10. Leave the Security model set to “DD Only”, leave the Source accessibility set to “Use the defaults defined by the deployment’s targets”, and click **Next**.
11. Select **No, I will review the configuration later**, and click **Finish**.
12. The Summary of Deployments page should show the WAR file in a state of “distribute Initializing”.
13. To apply the changes and deploy the service, click **Activate Changes** in the Change Center in the left navigation. To reject the changes, click **Undo All Changes**.

14. To start the EMS service, in the Deployments page, select the checkbox for the EMS service that was just deployed. It should show a state of “Prepared.” In the Start field, select **Servicing all requests**.
15. To stop the EMS service, select the checkbox for the EMS service. It should show a state of “Active.” From the Stop dropdown, select **Force Stop Now**.

## WebLogic SSL troubleshooting

If the EMS service fails to make connections to RabbitMQ or the Banner APIs using SSL, there are two settings that may need to be changed in the WebLogic Server configuration.

1. Log into the WebLogic Server
2. Expand the Environment tree in the Domain Structure section in the left navigation.
3. Click on **Servers**.
4. In the Summary of Servers page, select the name of the server running the EMS service.
5. On the Settings page, select the Configuration tab and then select the SSL tab.
6. Click **Lock & Edit** in the Change Center section of the left navigation.
7. Click the **Advanced** option near the bottom of the SSL page.
8. Set the Hostname Verification to “NONE”
9. At the bottom of the page, select the **Use JSSE SSL** check box.
10. Click **Save**.
11. Click **Activate Changes** in the Change Center section of the left navigation.
12. Restart the Server for the SSL change to take effect.
13. Click the **Servers** link under Environment in the Domain structure in the left navigation.
14. Click the **Control** tab in the Summary of Servers page.
15. Select the check box for the Server with the SSL changes.
16. Perform a shutdown and then a start of the server
17. If the EMS service does not start with the server, go back to Deployments and start the EMS service.

# Appendix B - Elevate Support

Fine-Grained Access Control (FGAC) and Value-Based Security (VBS) are used to restrict access to Elevate data to read only. Scripts and seed data are delivered for FGAC and VBS.

A course is considered to be an Elevate course when the integration partner value in the `SCRINTG_INTG_CDE` field is `ELEV8`, or when the value in `SCBCRSE_DATA_ORIGIN` field is `Elevate`.

A section is considered to be an Elevate course when the integration partner value in the `SSBSECT_INTG_CDE` field is `ELEV8`

## Forms restricted using FGAC

This section lists the forms that are restricted to use FGAC.

### Courses

You can view Elevate courses on the following forms. You cannot perform any inserts, updates, or deletions for Elevate courses.

- Basic Course Information (SCACRSE) form
- Course Detail Information (SCADETL) form
- Course Registration Restrictions (SCARRES) form
- Catalog Prerequisite and Test Score Restrictions (SCAPREQ) form
- Catalog Schedule Restrictions (SCASRES) form
- College and Department Text (SCATEXT) form
- Course Syllabus (SCASYLB) form
- Mutual Course Exclusion (SCAMEXC) form

## Sections

You can view Elevate sections on the following forms. You cannot perform any inserts, updates, or deletions for Elevate sections.

- Faculty Assignment (SIAASGN) form
- Schedule (SSASECT) form
- Schedule Detail (SSADETL) form
- Schedule Restrictions (SSARRES) form
- Schedule Prerequisite and Test Score Restrictions (SSAPREQ) form
- Section Comment (SSATEXT) form
- Section Web Controls (SSAWSEC) form
- Schedule Evaluation (SSAEVAL) form
- Schedule Override (SSAOVRR) form
- Schedule Calendar (SSAACCL) form
- Schedule Processing Rules (SSARULE) form
- Section Syllabus (SSASYLB) form

## New packages

The following packages have been added for integration.

### SPKCMTH0/SPKCMTH1/

This package is a wrapper PLSQL package for the Person common matching rule. The package supports an API which is used to find duplicate persons in the system using the common matching rule.

### SIKWKLD0/SIKWKLD1

This package is used to calculate the workload of a faculty member using his/her contract information.

# Elevate and Banner FGAC and VBS

Banner users are prevented from modifying Course Catalog and Class Schedule data that originates from the Elevate system. The Oracle ID that executes the API to post catalog course and schedule section entries from Elevate must still be able to insert, update, and delete data. Therefore, FGAC with VBS is used to control access to the data. Seed data and scripts are delivered to run the required processes, including defining the FGAC rule and predicates and enabling policies.

For more information on using FGAC with VBS, refer to the Banner General Data Security Handbook and the "Student System Management" chapter of the *Banner Student User Guide*.

## Guidelines for Oracle user that submits API

The Oracle user should be able to log in to SQL*Plus but does not have any Banner table access. The Oracle user that is created and used in the authorization header of the API that posts catalog and schedule entries to Banner must have the following:

- Default proxy access to `BAN_PROXY`
- Default connect and `ban_default_m` access
- Access to security class for the `BAN_ELEVATE_API_C` Elevate API. This API includes objects for each individual API such as `PERSONS`, `API_COURSES`, etc.

## Update scripts

Scripts and seed data are delivered to control access to Course Catalog and Class Schedule. Scripts are used to set up and populate the Business Profile and the FGAC and VBS rules, predicates, and restrictions. Users are listed in a Banner business profile, and the business profile is restricted on the FGAC predicate.

The following is a list of scripts, in the order in which they must be run. A description of each script follows.

1. sgtvintpi_080700.sql
2. sgorintgi_080700.sql
3. sgtvfdmni_080700.sql
4. sgobfdmni_080700.sql
5. sgorfdpli_080700.sql
6. sgtvfgaci_080700.sql
7. sgtvfbpri_080700.sql
8. sgobfgaci_080700.sql
9. sgorfbpri_080700.sql

10. sgorfprdi_080700.sql
11. sgorfgbpi_080700.sql
12. sgorfdplu_080700.sql
13. sgorfbpri_sync_job.sql

## 1. sgtvintpi_080700.sql

This script is delivered as part of the DML directory and is used to create a record in the GTVINTP table for the integration partner code. The data is displayed on the Integration Partner System Code Validation (GTVINTP) form.

| Integration Partner System | Description |
|---|---|
| ELEV8 | Elevate Partner |

## 2. sgorintgi_080700.sql

This script is delivered as part of the DML directory and is used to create a record in the GORINTG table for the integration partner code. The data is displayed on the Integration System Partner Rules (GORINTG) form.

| Integration Partner System | Description | Cross Referenced Partner System | Description |
|---|---|---|---|
| ELEV8 | Elevate | ELEV8 | Elevate Partner |

## 3. sgtvfdmni_080700.sql

This script is delivered as part of the DML directory and is used to insert new VBS domains for the Course Catalog module in the GTVFDMN table. This data is displayed on the FGAC Domain Validation (GTVFDMN) form.

| VBS Domain Code | Description | Additional Information |
|---|---|---|
| SB_CATALOG_ELEVATE_VBS | Student Catalog Elevate VBS Security | Used for policy driven by the SCBCRKY table on all Catalog tables except SCRINTG |
| SB_SCRINTG_ELEVATE_VBS | Student Catalog Elevate VBS Security | Used for policy driven by the SCBCRKY table only on the SCRINTG table |

## 4. sgobfdmni_080700.sql

This script is delivered as part of the DML directory and is used to insert the SCBCRKY driver table for the two new VBS domains into the GOBFDMN table.

| Domain Code | Table Name | Domain Type Predicate Code | Sys Req | Enable PII |
|---|---|---|---|---|
| SB_CATALOG_ELEVATE_VBS | SCBCRKY | VBS | Y | N |
| SB_SCRINTG_ELEVATE_VBS | SCBCRKY | VBS | Y | N |

## 5. sgorfdpli_080700.sql

This script is delivered as part of the DML directory and is used to insert table definitions for the Course Catalog tables defined for the SB_CATALOG_ELEVATE_VBS and SB_CATALOG_ELEVATE_VBS domains into the GORFDPL table.

| Domain Code | Table Name | Sys Req | Active Ind | Driver SQL |
|---|---|---|---|---|
| SB_SCRINTG_ ELEVATE_VBS | SCRINTG | Y | Y | `' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRINTG_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRINTG_SUBJ_CODE '` <br><br> `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_SCRINTG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRINTG');` |
| SB_SCRINTG_ ELEVATE_VBS | SCBCRKY | Y | Y | `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_SCRINTG_ELEVATE_VBS' and gorfdpl_table_name = 'SCBCRKY');` |
| SB_CATALOG_ ELEVATE_VBS | SCRINTG | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRINTG_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRINTG_SUBJ_CODE '` <br><br> `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRINTG');` |
| SB_CATALOG_ ELEVATE_VBS | SCBCRKY | Y | Y | `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCBCRKY');` |

| Domain Code | Table Name | Sys Req | Active Ind | Driver SQL |
|---|---|---|---|---|
| SB_CATALOG_ ELEVATE_VBS | SCBCRSE | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCBCRSE_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCBCRSE_SUBJ_CODE '` `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCBCRSE');` |
| SB_CATALOG_ ELEVATE_VBS | SCBDESC | Y | Y | `' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCBDESC_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCBDESC_SUBJ_CODE '` `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCBDESC');` |
| SB_CATALOG_ ELEVATE_VBS | SCBSUPP | Y | Y | `' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCBSUPP_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCBSUPP_SUBJ_CODE '` `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCBSUPP');` |
| SB_CATALOG_ ELEVATE_VBS | SCRATTR | Y | Y | `' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRATTR_CRSE_NUMB  AND SCBCRKY_SUBJ_CODE = SCRATTR_SUBJ_CODE  '` `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRATTR');` |
| SB_CATALOG_ ELEVATE_VBS | SCRCLBD | Y | Y | `' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRCLBD_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRCLBD_SUBJ_CODE '` `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRCLBD');` |

| Domain Code | Table Name | Sys Req | Active Ind | Driver SQL |
|---|---|---|---|---|
| SB_CATALOG_ ELEVATE_VBS | SCRCORQ | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRCORQ_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRCORQ_SUBJ_CODE '` `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRCORQ');` |
| SB_CATALOG_ ELEVATE_VBS | SCRCPRT | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRCPRT_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRCPRT_SUBJ_CODE '` `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRCPRT');` |
| SB_CATALOG_ ELEVATE_VBS | SCRCRDF | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRCRDF_CRSE_NUMB  AND SCBCRKY_SUBJ_CODE = SCRCRDF_SUBJ_CODE  '` `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRCRDF');` |
| SB_CATALOG_ ELEVATE_VBS | SCREQIV | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCREQIV_CRSE_NUMB  AND SCBCRKY_SUBJ_CODE = SCREQIV_SUBJ_CODE  '` `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCREQIV');` |
| SB_CATALOG_ ELEVATE_VBS | SCRFEES | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRFEES_CRSE_NUMB  AND SCBCRKY_SUBJ_CODE = SCRFEES_SUBJ_CODE  '` `from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRFEES');` |

| Domain Code | Table Name | Sys Req | Active Ind | Driver SQL |
|---|---|---|---|---|
| SB_CATALOG_ ELEVATE_VBS | SCRGMOD | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRGMOD_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRGMOD_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRGMOD'); |
| SB_CATALOG_ ELEVATE_VBS | SCRLEVL | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRLEVL_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRLEVL_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRLEVL'); |
| SB_CATALOG_ ELEVATE_VBS | SCRMEXC | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRMEXC_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRMEXC_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRMEXC'); |
| SB_CATALOG_ ELEVATE_VBS | SCRRARE | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRARE_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRRARE_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRARE'); |
| SB_CATALOG_ ELEVATE_VBS | SCRRATT | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRATT_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRRATT_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRATT'); |
| SB_CATALOG_ ELEVATE_VBS | SCRRCAM | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRCAM_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRRCAM_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRCAM'); |

| Domain Code | Table Name | Sys Req | Active Ind | Driver SQL |
|---|---|---|---|---|
| SB_CATALOG_ ELEVATE_VBS | SCRRCHR | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRCHR_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRRCHR_SUBJ_CODE ' <br><br> from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRCHR'); |
| SB_CATALOG_ ELEVATE_VBS | SCRRCLS | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRCLS_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRRCLS_SUBJ_CODE ' <br><br> from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRCLS'); |
| SB_CATALOG_ ELEVATE_VBS | SCRRCMP | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRCMP_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRRCMP_SUBJ_CODE ' <br><br> from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRCMP'); |
| SB_CATALOG_ ELEVATE_VBS | SCRRCOL | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRCOL_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRRCOL_SUBJ_CODE ' <br><br> from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRCOL'); |
| SB_CATALOG_ ELEVATE_VBS | SCRRDEG | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRDEG_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRRDEG_SUBJ_CODE ' <br><br> from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRDEG'); |
| SB_CATALOG_ ELEVATE_VBS | SCRRDEP | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRDEP_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRRDEP_SUBJ_CODE ' <br><br> from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRDEP'); |

| Domain Code | Table Name | Sys Req | Active Ind | Driver SQL |
|---|---|---|---|---|
| SB_CATALOG_ ELEVATE_VBS | SCRRLVL | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRLVL_CRSE_NUMB  AND SCBCRKY_SUBJ_CODE = SCRRLVL_SUBJ_CODE '`<br>`from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRLVL');` |
| SB_CATALOG_ ELEVATE_VBS | SCRRMAJ | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRMAJ_CRSE_NUMB  AND SCBCRKY_SUBJ_CODE = SCRRMAJ_SUBJ_CODE  '`<br>`from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRMAJ');` |
| SB_CATALOG_ ELEVATE_VBS | SCRRPRG | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRPRG_CRSE_NUMB  AND SCBCRKY_SUBJ_CODE = SCRRPRG_SUBJ_CODE  '`<br>`from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRPRG');` |
| SB_CATALOG_ ELEVATE_VBS | SCRRTRM | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRTRM_CRSE_NUMB  AND SCBCRKY_SUBJ_CODE = SCRRTRM_SUBJ_CODE  '`<br>`from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRTRM');` |
| SB_CATALOG_ ELEVATE_VBS | SCRRTST | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRRTST_CRSE_NUMB  AND SCBCRKY_SUBJ_CODE = SCRRTST_SUBJ_CODE '`<br>`from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRRTST');` |
| SB_CATALOG_ ELEVATE_VBS | SCRSBGI | Y | Y | `'  EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRSBGI_CRSE_NUMB  AND SCBCRKY_SUBJ_CODE = SCRSBGI_SUBJ_CODE  '`<br>`from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRSBGI');` |

| Domain Code | Table Name | Sys Req | Active Ind | Driver SQL |
|---|---|---|---|---|
| SB_CATALOG_ ELEVATE_VBS | SCRSCHD | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRSCHD_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRSCHD_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRSCHD'); |
| SB_CATALOG_ ELEVATE_VBS | SCRSYLN | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRSYLN_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRSYLN_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRSYLN'); |
| SB_CATALOG_ ELEVATE_VBS | SCRSYLO | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRSYLO_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRSYLO_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRSYLO'); |
| SB_CATALOG_ ELEVATE_VBS | SCRSYRM | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRSYRM_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRSYRM_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRSYRM'); |
| SB_CATALOG_ ELEVATE_VBS | SCRSYTR | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRSYTR_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRSYTR_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRSYTR'); |
| SB_CATALOG_ ELEVATE_VBS | SCRTEXT | Y | Y | ' EXISTS (SELECT ''X'' FROM SCBCRKY WHERE SCBCRKY_CRSE_NUMB = SCRTEXT_CRSE_NUMB AND SCBCRKY_SUBJ_CODE = SCRTEXT_SUBJ_CODE ' from dual where not exists ( select 1 from gorfdpl where gorfdpl_fdmn_code = 'SB_CATALOG_ELEVATE_VBS' and gorfdpl_table_name = 'SCRTEXT'); |

| Domain Code | Table Name | Sys Req | Active Ind | Driver SQL |
|---|---|---|---|---|
| SB_SCHEDULE _VBS | SIRASGN | Y | Y | ' EXISTS (SELECT ''X'' FROM SSBSECT WHERE SSBSECT_CRN = SIRASGN_CRN AND SSBSECT_TERM_CODE = SIRASGN_TERM_CODE' FROM dual WHERE NOT EXISTS (SELECT 1 FROM gorfdpl WHERE GORFDPL_FDMN_CODE ='SB_SCHEDULE_VBS' AND GORFDPL_TABLE_NAME='SIRASGN'); |
| SB_SCHEDULE _VBS | SSRRATT | Y | Y | ' EXISTS (SELECT ''X'' FROM SSBSECT WHERE SSBSECT_CRN = SSRRATT_CRN AND SSBSECT_TERM_CODE = SSRRATT_TERM_CODE' FROM dual WHERE NOT EXISTS (SELECT 1 FROM gorfdpl WHERE GORFDPL_FDMN_CODE ='SB_SCHEDULE_VBS' AND GORFDPL_TABLE_NAME='SSRRATT'); |
| SB_SCHEDULE _VBS | SSBWLSC | Y | Y | ' EXISTS (SELECT ''X'' FROM SSBSECT WHERE SSBSECT_CRN = SSBWLSC_CRN AND SSBSECT_TERM_CODE = SSBWLSC_TERM_CODE' FROM dual WHERE NOT EXISTS (SELECT 1 FROM gorfdpl WHERE GORFDPL_FDMN_CODE ='SB_SCHEDULE_VBS' AND GORFDPL_TABLE_NAME='SSBWLSC'); |
| SB_SCHEDULE _VBS | SSRCLBD | Y | Y | ' EXISTS (SELECT ''X'' FROM SSBSECT WHERE SSBSECT_CRN = SSRCLBD_CRN AND SSBSECT_TERM_CODE = SSRCLBD_TERM_CODE' FROM dual WHERE NOT EXISTS (SELECT 1 FROM gorfdpl WHERE GORFDPL_FDMN_CODE ='SB_SCHEDULE_VBS' AND GORFDPL_TABLE_NAME='SSRCLBD'); |
| SB_SCHEDULE _VBS | SSRRCHR | Y | Y | ' EXISTS (SELECT ''X'' FROM SSBSECT WHERE SSBSECT_CRN = SSRRCHR_CRN AND SSBSECT_TERM_CODE = SSRRCHR_TERM_CODE' FROM dual WHERE NOT EXISTS (SELECT 1 FROM gorfdpl WHERE GORFDPL_FDMN_CODE ='SB_SCHEDULE_VBS' AND GORFDPL_TABLE_NAME='SSRRCHR'); |
| SB_SCHEDULE _VBS | SSRRDEP | Y | Y | ' EXISTS (SELECT ''X'' FROM SSBSECT WHERE SSBSECT_CRN = SSRRDEP_CRN AND SSBSECT_TERM_CODE = SSRRDEP_TERM_CODE' FROM dual WHERE NOT EXISTS (SELECT 1 FROM gorfdpl WHERE GORFDPL_FDMN_CODE ='SB_SCHEDULE_VBS' AND GORFDPL_TABLE_NAME='SSRRDEP'); |

## 6. sgtvfgaci_080700.sql

This script is delivered as part of the DML directory and is used to insert the VBS rule code used to identify the Elevate rules into the GTVFGAC table. This data is displayed on the FGAC Group Validation (GTVFGAC) form.

| FCAC Code | Description |
|---|---|
| ELEVATE | Elevate Restrictions |

## 7. sgtvfbpri_080700.sql

This script is delivered as part of the DML directory and is used to create the business profile code in the GTVFBPR table. The data is displayed on the FGAC Business Profile Validation (GTVFBPR) form.

| FGAC Business Profile Code | Description |
|---|---|
| ELEVATE | Restrict Users from Elevate Data |

## 8. sgobfgaci_080700.sql

This script is delivered as part of the DML directory and is used to insert the header record into the GOBFGAC table. The header record stores the **Active** indicator setting and the **Effective Date** value. The data is displayed on the FGAC Group Rules (GOAFGAC) form for the **Group** value in the Key Block.

| FGAC Code | Active Indicator | Effective Date |
|---|---|---|
| ELEVATE | Y | SYSDATE |

## 9. sgorfbpri_0080700.sql

This script is delivered as part of the DML directory and is used to populate the business profile with users in the GORFBPR table. The data is displayed on the FGAC Business Profile Assignments (GOAFBPR) form for the **FGAC Business Profile Code** value and the associated **Fine-Grained Access User ID** values.

| FGAC User ID | Business Profile Code |
|---|---|
| a.username | ELEVATE |

## 10. sgorfprdi_080700.sql

This script is delivered as part of the DML directory and is used to create the predicates. The predicates state that the user assigned to the rule can insert, update, and delete data, when the selects are true.

Entries are created for catalog (SB_CATALOG_ELEVATE_VBS), (SB_SCRINTG_ELEVATE_VBS), and schedule (SB_SCHEDULE_VBS) in the GORFPRD table where the GORFPRD_FGAC_CODE is ELEVATE. (Entries use the VBS domains that are part of the existing baseline seed data.)

The data is displayed on the FGAC Group Rules (GOAFGAC) form.

| FGAC Code | Domain Code | Sys Num | Predicate |
|---|---|---|---|
| ELEVATE | SB_SCHEDLE_VBS | 1 | `select 'ELEVATE', 'SB_SCHEDULE_VBS', 1, sysdate, user, 'nvl(SSBSECT_INTG_CDE,''x'')  != ''ELEV8''' from dual where not exists ( select 1 from gorfprd where gorfprd_fgac_code = 'ELEVATE' and gorfprd_fdmn_code = 'SB_SCHEDULE_VBS');` |
| ELEVATE | SB_CATALOG_VBS | 2 | `select 'ELEVATE', 'SB_CATALOG_ELEVATE_VBS', 2, sysdate, user, '  not exists ( select 1 from scrintg vbs where vbs.scrintg_subj_code = scbcrky_subj_code and vbs.scrintg_crse_numb = scbcrky_crse_numb and vbs.scrintg_intg_cde = ''ELEV8'' )' from dual where not exists ( select 1 from gorfprd where gorfprd_fgac_code = 'ELEVATE' and gorfprd_fdmn_code = 'SB_CATALOG_ELEVATE_VBS');` |

| FGAC Code | Domain Code | Sys Num | Predicate |
|---|---|---|---|
| ELEVATE | SB_SCRINTG_VBS | 3 | `select 'ELEVATE', 'SB_SCRINTG_ELEVATE_VBS', 3, sysdate, user, '  not exists ( select 1 from scbcrse vbs where vbs.scbcrse_subj_code = scbcrky_subj_code and vbs.scbcrse_crse_numb = scbcrky_crse_numb and upper(nvl(vbs.scbcrse_data_origin,''X'' )) = ''ELEVATE''  )' from dual where not exists ( select 1 from gorfprd where gorfprd_fgac_code = 'ELEVATE' and gorfprd_fdmn_code = 'SB_SCRINTG_ELEVATE_VBS');` |

## 11. sgorfgbpi_080700.sql

This script is delivered as part of the DML directory and is used to insert access definition/ restrictions for the three domains on the Elevate VBS rule into the GORFGBP table. Access is through the business profile. The ability to select, insert, update, and delete data is determined by the predicate. The settings for the GORFGBP_SELECT_IND, GORFGBP_INSERT_IND, GORFGBP_UPDATE_IND, and GORFGBP_DELETE_IND are displayed on the FGAC Group Rules (GOAFGAC) form.

| FGAC Code | Domain Code | Predicate Seq Num | FBPR Code | Select Ind | Insert Ind | Update Ind | Delete Ind |
|---|---|---|---|---|---|---|---|
| ELEVATE | SB_SCHEDULE_VBS | 1 | ELEVATE | N | Y | Y | Y |
| ELEVATE | SB_CATALOG_ ELEVATE_VBS | 2 | ELEVATE | N | Y | Y | Y |
| ELEVATE | SB_SCRINTG_ ELEVATE_VBS | 3 | ELEVATE | N | Y | Y | Y |

## 12. sgorfdplu_080700.sql

This script is delivered as part of the DML directory and is used to update the status on the domain policy tables to “active” in the GORFDPL table.

| Domain Name | Table Name | Active Ind |
|---|---|---|
| SB_CATALOG_ELEVATE_VBS | All tables in GORFDPL with domain SB_CATALOG_ELEVATE_VBS except SCRINTG | Y |
| SB_SCHEDULE_VBS | All tables in GORFDPL with domain SB_SCHEDULE_VBS | Y |
| SB_SCRINTG_ELEVATE_VBS | SCRINTG | Y |

## 13. sgorfbpri_sync_job.sql

This script is delivered as part of the PLUS directory and is used to schedule a daily job (at 3:00 AM) to populate the business profile with new Oracle users in the GORFBPR table.

## FGAC tips

When using FGAC, remember the following:

Variables for FGAC in Banner are managed within the Oracle session. If the predicate or restrictions are changed, the user must log out of Banner and re-enter a new session to pick up any changes.

The scripts used to enable the policies should be run after regular business hours.

## Create/activate FGAC policies

After running the Elevate FGAC seed data scripts, the gfvbsaddpol.sql script must be run to create policies for Banner tables. The gfvbsaddpol.sql script is located in the Banner General PLUS directory.

### Use BANINST1 to run gfvbsaddpol.sql

You must use the BANINST1 User ID when you run the script to create the policies. The predicate package owner must equal the policy owner. In this case, GOKFGAC is owned by BANINST1.

1. From SQL*Plus, run the `gfvbsaddpol.sql` script while logged in with the BANINST1 User ID.
2. You are prompted for a table name. You can use wildcards (SS for Schedule tables, SC for Catalog tables).
3. Provide the owner name for the table owner when prompted, for example SSBSECT is owned by SATURN.

This task is performed once per module to create policies for SC% and SS% tables as identified in the GORFDPL table. The script will create a policy for each table. This task does not need to be repeated if the `gorfdpl_driver.sql` script changes, the table is added to another domain, or there is any change to the domain and table.

**Note:** The `gfvbsaddpol.sql` script is can be rerun and restarted. The process will not try to recreate a policy. If the policy exists, the task to add the policy is skipped.

Run `gfvbsaddpol.sql`.for the following tables:

| | |
|---|---|
| SCBCRKY | SCRRDEG |
| SCBCRSE | SCRRDEP |
| SCBDESC | SCRRLVL |
| SCBSUPP | SCRRMAJ |
| SCRATTR | SCRRPRG |
| SCRCLBD | SCRRTRM |
| SCRCORQ | SCRRTST |
| SCRCPRT | SCRSBGI |
| SCRCRDF | SCRSCHD |
| SCREQIV | SCRSYLN |
| SCRFEES | SCRSYLO |
| SCRGMOD | SCRSYRM |
| SCRINTG | SCRSYTR |
| SCRLEVL | SCRTEXT |
| SCRMEXC | SIRASGN |
| SCRRARE | SSBWLSC |
| SCRRATT | SSRCLBD |
| SCRRCAM | SSRCLBD |
| SCRRCHR | SSRRATT |
| SCRRCLS | SSRRCHR |
| SCRRCMP | SSRRDEP |
| SCRRCOL | |

## View Policy Data from SQL*Plus

GORFDPL creates four policies per table, one each for the insert, update, delete and select items. All have the package defined as GOKFGAC and must be owned by BANINST1.

### Policy names

The `gokfgac.f_get_policy_name` function ensures that the policy name created is less than 30 characters in length.

If the table name length is less than 19 characters, the policy name will use the following pattern: `GOKFGAC_tablename_INS (INS, UPD, DEL, SEL)`

If the table name length is 19 or more characters, the policy name will use the following pattern: `tablename_I (I, U, D, S)`

### Drop a policy

To drop a policy, run the `gfgacdroppol.sql` script from the Banner General PLUS directory using the BANINST1 ID. This script accepts wildcards for the table name prompt.

### Schedule a daily job to populate the business profile

A `sgorfbpri_sync_job.sql` script is delivered with this release and can be found in the PLUS directory. It is run using the SATURN ID. It is used to schedule the synchronization process for the user IDs that adds new Oracle users to the Elevate group business profile.

Automation of the synchronization process ensures that newly created users are not able to modify any data related to Elevate courses and sections. The default synchronization is performed each day at 3:00 AM. The default value can be changed according to your site-specific synchronization interval requirements.