

A faint, light-grey background diagram showing a data warehouse architecture. It includes several circular nodes connected by arrows. At the top left, a node with a crosshair is connected to a central node. This central node has arrows pointing to a top-right node (also with a crosshair) and a bottom-center node (with a crosshair). The bottom-center node is connected to a bottom-right node, which in turn connects to a bottom-most node. There are also curved arrows indicating data flow between the central and bottom-center nodes, and between the bottom-center and bottom-most nodes.

DATA WAREHOUSE AND O3 CONFIGURATION GUIDE

For Fuego 5.5 Enterprise and O3 v3.2

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1 Prerequisites and assumptions

This guide makes the following assumptions:

- Fuego Enterprise 5.1 GA or above is installed. We will refer to the installation folder as \$FUEGO throughout this document.
- The O3 installer, the latest patch and license keys are available.
- A 1.4.2-compliant Java Development Kit (JDK) is installed.
- The Fuego Data Warehouse will reside in a MS SQL Server database and the i-Net JDBC driver (Una2-0.jar) will be used. For other DBMS the appropriate drivers will be needed.

2 Overview

This document is divided in three major sections. We will first describe how to configure Fuego's Data Warehouse. In the second section we will go over the installation of O3 and we will provide the steps necessary to configure O3 to use Fuego's authentication framework. Finally, in the last section we will make sure the whole set up works together as expected.

3 Configuring the Data Warehouse database

Before the Data Warehouse can be created, Fuego requires that a database configuration be defined. This is achieved via the *Configurations* panel in the Fuego Web Console, by clicking on the *Add* button, as depicted in Figure 1 on the following page.

3 CONFIGURING THE DATA WAREHOUSE DATABASE **FUEGO**

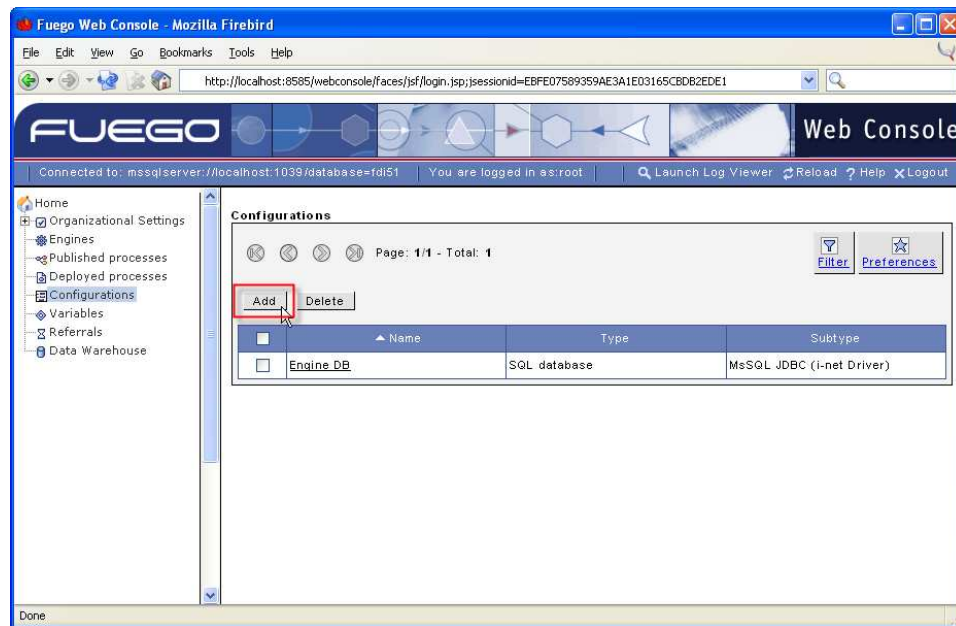


Figure 1: Configurations Panel

Defining a database configuration is a two-step operation. First, the following common attributes need to be set (see Figure 2 on the next page).

Name: a logical name for the configuration.

Type: the type of the configuration. Since we are creating a database configuration, type should be set to *SQL database*.

Subtype: for *SQL database*, the JDBC connector type. The appropriate JDBC must be installed.

Configurations > Add Configuration

Type	
Name	Data Warehouse DB
Type	SQL database
Subtype	MsSQL JDBC (i-net Driver)
<input type="button" value="Next"/> <input type="button" value="Cancel"/> <input type="button" value="Reset"/>	

Figure 2: Database Configuration - Common Settings

The second step is JDBC connector-dependent. Our sample scenario uses a MS SQL Server database and its configuration screen is depicted in Figure 3 on the following page.

Configurations > Add Configuration

Type	
Name	Data Warehouse DB
Type	SQL database
Subtype	MsSQL JDBC (i-net Driver)

Properties	
Host	<input type="text" value="localhost"/>
Port	<input type="text" value="1039"/>
Database	<input type="text" value="datawarehouse"/>
User	<input type="text" value="datawarehouse"/>
Password	<input type="password" value="*****"/>

Runtime	
<input type="checkbox"/> Runtime	

Figure 3: Database Configuration - MS SQL Server connector settings

These are the parameters required by the MS SQL Server connector:

Host: the host name of the SQL Server where the Data Warehouse database will reside.

Port: the the port where SQL Server is listening for incoming requests.

Database : the name of the Data Warehouse database.

User: the user name to be used to access the Data Warehouse database. It must match the database name.

Password : the password to be used to access the Data Warehouse database.

3.1 Configuring the Data Warehouse service

The Data Warehouse configuration panel (see Figure 4) can be accessed via the *Data Warehouse* link in the Web Console. Following is a description of the available configuration options.

The screenshot shows the 'Data Warehouse' configuration panel. At the top, there are tabs for 'BAM' and 'O3'. The main section is titled 'Properties' and contains a table of settings:

Enable automatic update	<input checked="" type="checkbox"/>
Runtime Database Configuration	Datawarehouse DB ▼
Data detail level	Daily ▼
Snapshot Time	00:00
Update daily at time	02:00
Log Directory	c:\fuego5.1\enterprise
Messages logged from DataWarehouse Updater	Warning ▼
Language	English ▼
Generate O3 cubes	<input checked="" type="checkbox"/>

Below the 'Properties' section is an 'Advanced Properties' section with a link 'Manage database'. At the bottom, there are 'Save' and 'Reset' buttons.

Figure 4: Data Warehouse Settings

Enable Automatic Update: whether to run the Data Warehouse updater automatically at a specified time (see below).

Runtime Database Configuration: the configuration for the Data Warehouse database created in Section 3 on page 5.

Data detail level: the granularity level for the information aggregated into cubes.

Snapshot Time: the time slice to capture when building cubes. If *Data detail level* is set to *Hourly* only the minutes portion is used.

Update daily at time: the time of day at which the migration of events from the Engine to the Data Warehouse will occur.

Log Directory: the folder where log messages file will be placed. This directory must exist. Messages from the Data Warehouse updater service will be written to the `dwupdater-service.log` file in that folder. The verbosity level can be set by configuring the `wrapper.logfile.loglevel` property in `$FUEGO/conf/WarehouseService.conf`. Acceptable values are: *NONE*, *INFO* and *DEBUG*.

Messages logged from Data Warehouse Updater: the severity threshold for messages that will make it into the log file.

Language: the selected language used to render descriptions for Fuego objects such as activities and processes.

Generate O3 Cubes: whether to rebuild the O3 cubes automatically every time the Data Warehouse updater runs.

To proceed to creating the Data Warehouse database click on the *Save* button and then on the *Manage database* link at the bottom of the screen. The view depicted in Figure 5 should come up.

Database creation	
Drop database	<input type="checkbox"/>
Create database	<input checked="" type="checkbox"/>
Create data structure	<input checked="" type="checkbox"/>
User Name	<input type="text" value="sa"/>
User Password	<input type="password" value="....."/>
<input type="button" value="OK"/> <input type="button" value="Cancel"/> <input type="button" value="Show SQL statements"/>	

Figure 5: Managing the Data Warehouse Database

As this is the first time the database is built there is no need to check the *drop database* option. The user must have administrator rights to the DBMS

in order to create databases or schemas, so provide the appropriate credentials (typically, for the DBMS Administrator user).

3.2 Configuring the O3 service

In order for Fuego to generate cubes automatically, the O3 server location and port must be properly configured via the *Data Warehouse*→O3 panel in the Fuego Web Console (see Figure 6). Unless O3 has been set up to listen for remote commands on a non-standard port, the defaults provided in this screen should suffice. Additionally, Fuego can be configured to generate cubes at specified times, independently from when the Data Warehouse updater runs.

Properties	
Enable O3 cubes generation	<input type="checkbox"/>
Generate cubes daily at	<input type="text" value="02:00"/>
Host	<input type="text" value="localhost"/>
Port	<input type="text" value="8787"/>
<input type="button" value="Save"/> <input type="button" value="Reset"/>	

Figure 6: O3 Service Configuration

Enable O3 cubes generation: check this option if you want Fuego to create cubes automatically at a specified time (independently from when the Data Warehouse updater executes).

Generate cubes daily at: the time of day at which the cubes will be generated if the previous option is set.

Host: the host name of the O3 server.

Port: the port where the O3 server will listen for remote commands.

3.3 Installing the Data Warehouse updater service

The Fuego Data Warehouse service is installed and removed with the `fuegowarehouse.bat` command found in `$FUEGO/bin`. The file requires a few changes before it can be run. Open the file and look for the following:

```
REM set FUEGO_DIRECTORY_ID=  
REM set FUEGO_DIRECTORY_PRESET=  
REM set FUEGO_DIRECTORY_FILE=
```

Remove the `REM` keyword from the beginning of each line and set the appropriate values for each property as described below.

FUEGO_DIRECTORY_ID: the name of the FDI configuration. It can be found in the *Configuration*→*Directory* page in the Fuego Enterprise Administration Center.

FUEGO_DIRECTORY_PRESET: should be set to *datawarehouse*.

FUEGO_DIRECTORY_FILE: the path to the `directory.properties` file, typically `$FUEGO/bin/conf/directory.properties`.

As an example, if Fuego is installed under `C:\fuego5.1` and the FDI name is *fdi51*, the lines should read:

```
set FUEGO_DIRECTORY_ID=fdi51  
set FUEGO_DIRECTORY_PRESET=datawarehouse  
set FUEGO_DIRECTORY_FILE=C:\fuego5.1\conf\directory.properties
```

The `JAVA_HOME` environment variable must be set before running *fuegowarehouse.bat*. It can be set to `$FUEGO\jre`. `JAVA_HOME\bin` must also be in the command path (i.e., in the `PATH` environment variable).

To install the Fuego Data Warehouse service, run:

```
fuegowarehouse.bat install
```

To remove the Fuego Data Warehouse service, run:

```
fuegowarehouse.bat remove
```

3.4 Adding necessary roles

In order to access the cubes generated by O3 each Fuego participant must have a specific role. This role *must* be named *o3role* . You will need to create this role in Fuego through the Fuego Web Console. Remember to assign this new role to those participants that need access to the O3 cubes from Fuego's Work Portal.

Roles > Add Role

Properties	
Name	<input type="text" value="o3role"/>
Description	<input type="text" value="Role needed to access O3 cubes"/>
Is Parametric?	<input type="checkbox"/>
<input type="button" value="Save"/> <input type="button" value="Cancel"/> <input type="button" value="Reset"/>	

Figure 7: Add specific O3 role



Role name: Note the name given to the role. It must be 'o3role' and it must not contain any spaces and be in lower case.

4 Installing and configuring O3

To install O3, simply run the `O3Setup.exe` program provided with the O3 distribution. The installation process is fairly straightforward, but make sure at least the following modules are selected, as they will be needed in the next sections. From now on, we will refer to the installation directory as `$O3`.



Intalling under Windows 2003 Server: *In some Windows environments when you run the `O3Setup.exe` program you may get a **StringIndexOutOfBounds** error. To solve this problem, you need to right click on the `O3Setup.exe` and select **Properties** from the popup menu. Select the **compatibility** tab and check the 'Run this program in compatibility mode for' option. Select 'Windows 2000' and press 'Ok'. Then execute the `O3Setup.exe` file again.*

- Application
 - O3 Browser
 - O3 Builder
 - O3 Designer
 - O3 Server
 - O3 Server Administrator
- Web Resources
 - O3 Portal
 - Tomcat Web Server

4.1 Installing the license keys

O3 requires a license key in order to run. O3 applications expect to find the key in the `$O3/classes` folder.

The license key is contained in a file named *ISKey.properties*. The file must be copied into the two folders mentioned before. It is important that the file name matches exactly or O3 will not be able to find it.

4.2 Installing the JDBC drivers

The O3 Server will connect to the Data Warehouse database via JDBC. Thus, it requires that the appropriate drivers be present. To make the JDBC drivers available to O3, copy the jar files into `$O3/classes`. In our sample scenario, MS SQL Server's i-net driver (i.e., `Una-2.0.jar`) needs to be placed in that folder.

4.3 Installing Fuego's authentication framework libraries

To integrate Fuego's Authentication Framework into O3, copy the following files into `$O3/classes`:

- If FDI provider is a DBMS, the appropriate JDBC drivers
- From `$FUEGO/webapps/portal/WEB-INF/lib`:
 - `ftboot.jar`
 - `ftlib.jar`
 - `fuegocore.jar`
 - `fuegofdi.jar`
 - `fuegofdi-*.jar`
 - `fuegomigration.jar`
 - `fuegoui.jar`
 - `ftjava.jar`
 - `jta-spec1.0_1.jar`
 - `rowset.jar`
- From `$FUEGO/lib`:
 - `fuegoconn.jar`
 - `fuegofdi-ui.jar`
- From `$FUEGO/ext`:
 - `o3fuego.jar`
 - `fuegoplugin-o3.jar`
 - `fuegoconn-*.jar`

- ftcom.jar

Also, you will need to delete (or change the extension to something else other than jar) to the following files:

- From `$O3/classes`:
 - o3p.jar

4.4 Configuring the O3 server

The O3 Server runs as a Windows Service. Before the service can be started, a few configuration options must be set in `$O3/GServer.properties`. The file can be edited with any text editor. Following is a list of all required properties and their description:

gserver.port: the RMI port that will be used by the O3 Server to communicate with other O3 applications (e.g., the O3 Portal). Make sure the port specified in this property is not taken by another running in the computer where O3 Server is installed. If the port is in use, it can be set to any positive integer number over 1024.

o3.net.commander: enable TCP/IP listener for remote commands (i.e., from the Data Warehouse updater service when it is time to rebuild the cubes. Set its value to *true*.

o3.net.commander.port: the port where O3 will listen on for remote commands. This parameter is optional and its default value is 8787. Make sure it matches the value in the *DataWarehouse→O3* configuration tab in the Fuego Web Console (see Figure 6 on page 11).

o3.environment.Factory: should be set to:
ideasoft.olap.mdserver.fuego.JNDIFuegoEnvFactory

o3fuego.directory.id: the name of the FDI configuration. It can be found in the *Configuration→Directory* page in the Fuego Enterprise Administration Center.

o3fuego.directory.preset: should be set to *datawarehouse*.

o3fuego.directory.file: the path to the `directory.properties` file. Use `\\` as the path separator. For example:
`C:\\fuego5.1\\enterprise\\conf\\directory.properties.`

o3fuego.plugins.dir: the full path to `$O3/classes`. Use `\\` as the path separator. For example: `C:\\O3\\classes.`



Java properties: Java fails to read the last line of a properties file. In order to ensure that all the properties are read, the last line in the file should contain only a single '#' sign.

Start the O3 Server through the Windows Services panel at this time.

4.5 Setting up authentication

In this section we describe how to configure O3 to authenticate users with Fuego. This is done via the O3 Server Administrator application.

To connect to the O3 Server, enter the address of the computer where the server is running into the *Host* field (see Figure 8 on the following page). Since we are running everything on the same machine, the default value *localhost* should be alright. Leave *Name* untouched. After clicking on the *Connect* button a window will pop up asking for credentials. Enter '*admin*' for the user name and '*admin*' as the password.

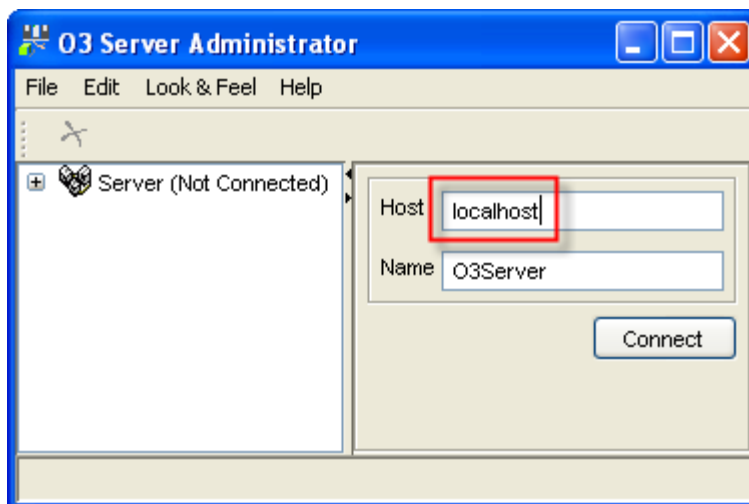


Figure 8: O3 Server Administrator

Once logged in, change the authentication mode to *LDAP* from *Server*→*Services*→*Security*, as shown in Figure 9 on the next page, then hit the *Apply* button.

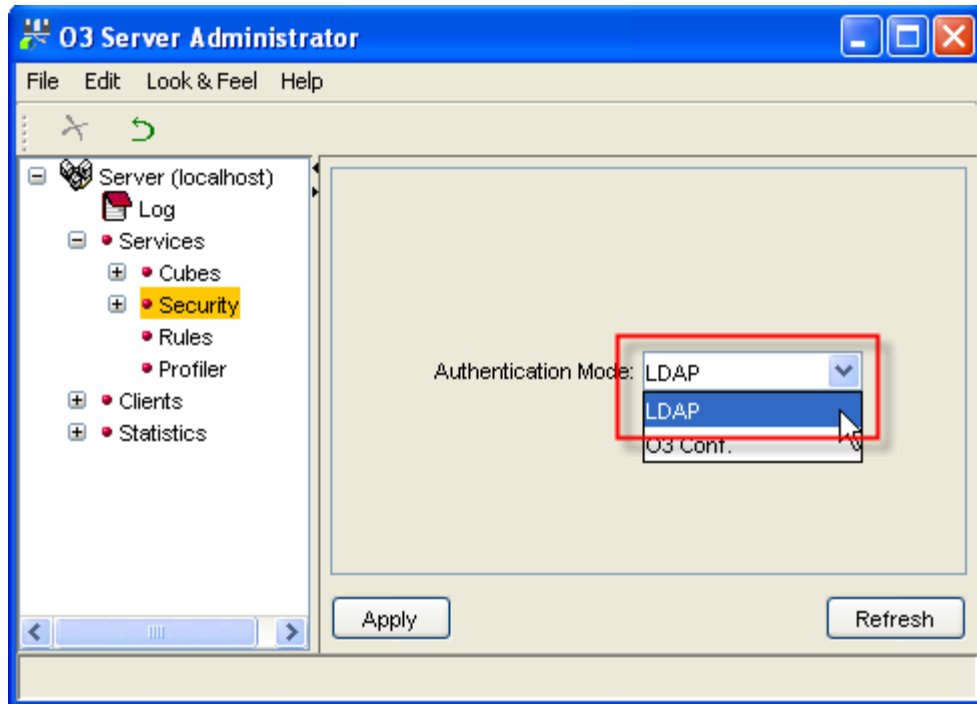


Figure 9: O3 Authentication Mode

At this point you need to exit the O3 Server Administrator and stop the O3 Server windows service. Restart the service once more so that the changes are taken into account.

4.6 Testing the connection

To check that you are connecting properly to Fuego's FDI, you can try to add the *o3role* to the *Demo* cube included by default with the O3 installation.

Start the O3 Server Administrator and press the *Connect* button. To connect ¹ to the O3 Server Administrator *you need to use the same user name and password you use to connect to Fuego's WebConsole*.

¹If you can not log in then O3 is having problems connecting to Fuego's directory, check the log files and review your connection arguments as described in section 4.4. You can also check section 6 for more troubleshooting tips.

From *Server*→*Services*→*Cubes*→*Server Cubes*→*Demo* hit the *Refresh* button first to update O3's internal information with that in Fuego. Then hit the *Add* button to add a new role to the cube. In the *Role* column, you should be able to see and select the *o3role* previously defined in Fuego.

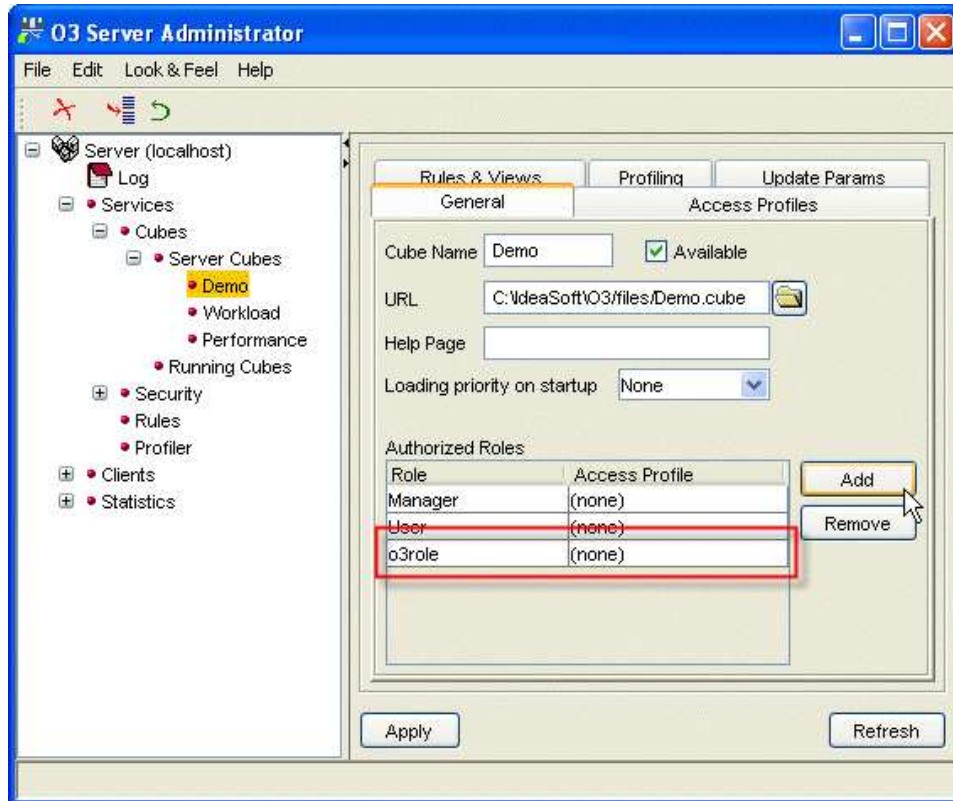


Figure 10: Test O3 Authentication Mode



No Visible Roles: If you go down to *Server*→*Services*→*Security*→*Roles* or *Server*→*Services*→*Security*→*Users* you will notice that nothing is listed. This is normal when using O3 together with Fuego's FDI. Eventhough no roles are displayed, they exist and are picked directly from Fuego's directory.

4.7 Deploying the cubes

The two Fuego cube models (Performance.mdl and Workload.mdl) need to be copied into the `$O3/models` directory. You may need to create the directory first. Note that the cube models are RDBMS-specific, so make sure to install the ones appropriate for the DBMS where the Data Warehouse database resides.

Start the O3 Server Administrator and connect to the O3 Server. Remember that the application will authenticate against Fuego, so you will need to log in with the Fuego administrator user.

The following is an explanation of how to deploy the Workload cube. The same procedure applies to the Performance cube.

Start by right clicking on the *Server Cubes* node as shown in Figure 11 and selecting the *Add cube* option.

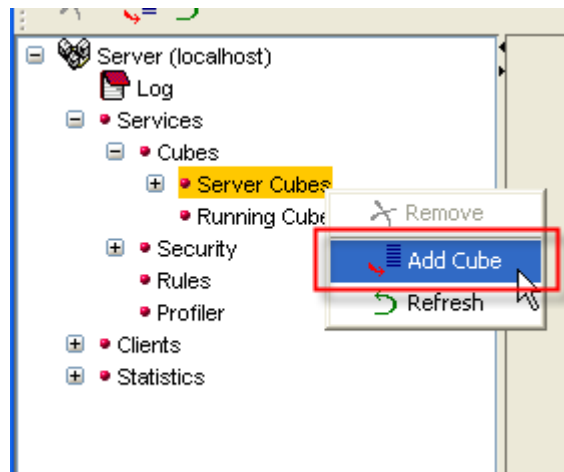


Figure 11: Adding a Cube

A few fields must be completed on the cube definition screen. You will need to provide a name for the cube, which in our case must be either *Workload* or *Performance*. A location for the cube must also be specified, for example `C:\fuego5.1\O3\server\Workload.cube`. Note that it is the location for the *generated* cube, not the model.

Appropriate access permissions must be granted, too. Using Fuego authentication requires that the *o3role* role be authorized to browse the cube. For

this, click on the *Add* button next to the *Authorized Roles* box. A new entry will be added to the list of authorized roles. If it is not *o3role* you can change the selected one by double clicking on the role name and picking the appropriate entry from the list (see Figure 12). Hit *Apply* and ignore any warning messages that may show up.

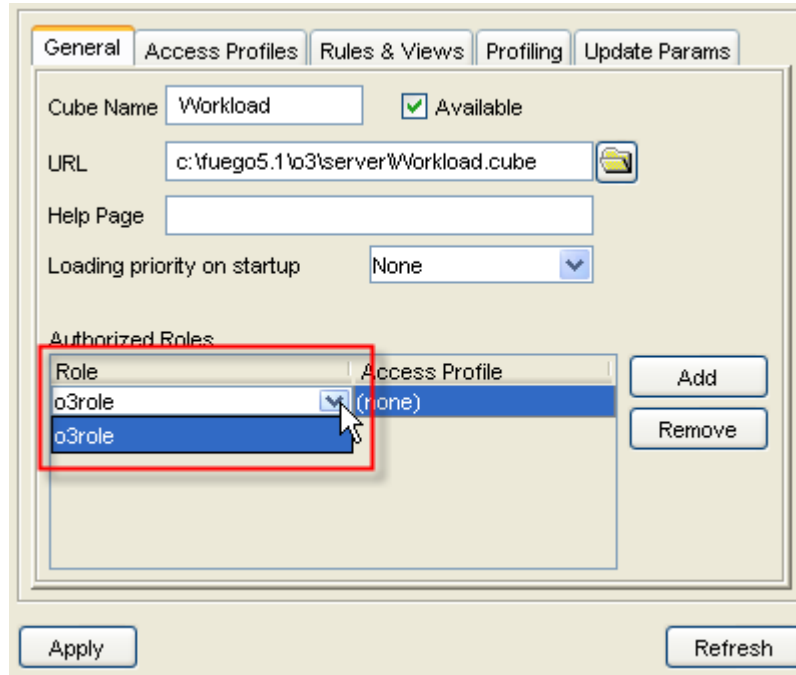


Figure 12: Configuring the Cube

4.8 Configuring the O3 Portal

O3 cubes may be viewed via a web browser (thin client). This requires that the O3 Portal, the component that will handle the requests to the O3 Server on behalf of the web browser, be properly installed and configured. The O3 Portal can be deployed in an existing J2EE-compatible web server or in the Tomcat server included in the O3 package. This guide describes the configuration changes needed for the latter.

Make sure that a 1.4.2-compatible JDK must be present in the computer where the portal is installed. For the purpose of this guide we will assume it is installed under `C:\jdk1.4.2`. Then, replace all the occurrences of

JAVA_HOME in `$O3/bin/Tomcat.lax` and `$O3/bin/ShutdownTomcat.lax` with the path to the JDK, for example, `C:\\jdk1.4.2` (use double backslash if on Windows).

You may also want to add the following two properties to *Tomcat.lax*. These will ensure that the service's standard output and error information are captured into a file.

lax.stdout.redirect: the full path for the standard output file, for example `C:\\fuego5.1/O3/tomcat/logs/stdout.log`.

lax.stderr.redirect: the full path for the standard error file, for example `C:\\fuego5.1/O3/tomcat/logs/stderr.log`.

The built-in Tomcat server is pre-configured to listen on port 8080. The port can be changed by replacing the value of the *port* attribute in `$O3/tomcat/conf/server.xml`:

```
<Connector className="..." port="8080" ... />
```

The O3 Portal may be started from the Windows Services panel. It will be listed as *O3 - Tomcat Web Server*.

4.9 Installing the license keys

The O3 portal also requires a license key in order to run. It will look for the key inside the *WEB-INF/classes* folder of the *o3portal* web application (e.g., `$O3/tomcat/webapps/o3portal/WEB-INF/classes`).

The license key is the same file you used in section 4.1 on page 14.

Note that the *WEB-INF* folder of the web application may not exist when O3 is initially installed. It will be created the first time the portal is launched as mentioned in the previous section. You will need to create the *classes* folder manually, though, and place the license file in it.

5 Testing the setup

5.1 Running the Data Warehouse updater

Although the updater will run automatically at the scheduled time (see Section 3.1 on page 9), there is no need to wait for that to happen to ensure that the setup works properly and that the cubes are generated correctly. The Data Warehouse updater can be executed manually from a shell session. Make sure you are standing in the `$FUEGO/bin` folder and type in the following command:

```
fuegodwupdater -i FDI_name -p datawarehouse
```

FDI_name is the name of the FDI provider configured in the Fuego Enterprise Administration Center.

If the execution succeeds, the cubes will be found in the location specified when the cubes were created (see Section 4.7 on page 21), for example, `C:\fuego5.1\O3\server\Workload.cube`.

5.2 Browsing the cubes via the web client

O3 cubes may be viewed over a web browser. The precondition, of course, is that the O3 Portal is configured and running. The URL for the portal is `http://host:port/o3web`, where *host* is the address of the computer where the O3 Portal is installed and *port* is the TCP port the portal is listening to for incoming requests (typically, 8080, but see Section 4.8 on page 22 for details on how to choose a different value).

To log into the portal you will need to provide credentials for a valid Fuego user. Remember that authentication is handled by Fuego in this setup.

5.3 Browsing the cubes via the O3 Browser (rich client)

Alternatively, the O3 Browser can be used for a richer and more interactive browsing experience. To open a cube, select *Open* from the *File* menu. The *Open Cube or View* window will pop up (see Figure 13 on the following page).

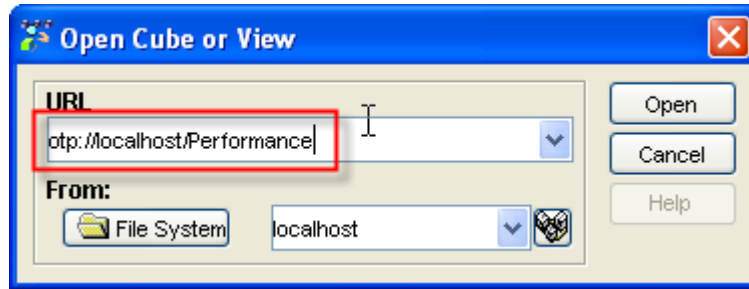


Figure 13: Open Cube or View Dialog

Type in the URL of the cube you to open and then click on the *Open* button. The URL has the form `otp://host/cube`, where *host* is the address of the O3 server and *cube* is the name given to the cube when it was created (in our case, either Workload or Performance).

Proceed by clicking on the *Ok* button. You will be asked to provide credentials to connect to the O3 Server. Remember that authentication is handled by Fuego, so the user must be a valid Fuego user.

6 Troubleshooting & Known Issues

6.1 Can not log in to O3 Server Administrator

Sometimes after having configured everything you still can not log in to the O3 Server Administrator. Unfortunately, O3 does not provide comprehensive error messages and to understand exactly what the problems is you will need to run the O3 Server service from command line. You will need to:

1. stop the O3 Server windows service
2. open a command line window (DOS prompt in windows)
3. navigate to %O3%/bat
4. execute `'server.bat -debug'`

This will start the O3 server and any errors encountered should be displayed in the command line window.

6.2 Can not log in using Linux/Unix

Due to different encoding used by the installer and the Linux/Unix operating system, the default password may not be successfully decrypted by the *O3 Server Administrator*. If you find out that you are not able to log in as described in section 4.4 then you should try the following. Close the *O3 Server Administrator* and stop the O3 server service. Open the `o3server.cfg` file located in `\%O3%/classes` directory and delete the value assigned to the `ServerConfig.services.Security.Users.admin.LoginParams.password` property. Save the file and start O3 again (server and *Server Administrator*). Now try logging using the default *Admin* user but leave the password blank. You should be able to log in without problems. Once you log in you can change the password to whatever you like.

6.3 Tomcat can not find JDK

If Tomcat can not find Java's JDK then you will need to manually set the JDK location in Tomcat's LAX file. Look for the `tomcat.lax` file located

in the `\$O3/bin` directory and replace every occurrence of `JAVA_HOME` (it should appear twice) for the actual path to the JDK installation folder.

6.4 Missing file error

In certain occasions, starting the O3 server produces an error saying that the file `gserver.key` file is missing. You can safely ignore this error.

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