# Altova FlowForce

## User and Reference Manual

# Altova FlowForce User & Reference Manual



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# Chapter 1

# Altova FlowForce Server®

# 1 Altova FlowForce Server®

FlowForce Server® is a new Altova product that allows you to automate and schedule the execution of MapForce mappings, StyleVision transformations and other tasks on dedicated high-speed servers. Windows, Linux, and Mac OS X operating systems are supported.

Upgrading FlowForce version 2013 with FlowForce version 2014

The FlowForce Server system consists of the following modules, which can be installed individually:

- FlowForce Server (including FlowForce Server Administration Interface)
- License Server
- MapForce Server
- StyleVision Server
- RaptorXML Server

For an overview please see: FlowForce Server Architecture

This documentation is in multiple parts:

- The Administrator Guide describes how to install, setup and maintain the server, as well as how to define the access control settings.
- The Tutorial shows you how to deploy a mapping from MapForce, define a scheduled job in FlowForce Server Administration Interface, and execute that job to produce output files.
- The RaptorXML Server page describes the various RaptorXML editions and how to use it from within FlowForce Server.
- The User Guide describes the browser application in more detail; the different trigger types and the various execution steps. It also describes how you can change the input/output files supplied by the deployed mapping when the job executes.

Note:
The FlowForce Server administration interface does not support SSL.

**What's new** in Altova FlowForce Server® 2014 R2

- Enhancements to FlowForce caching
- Ability to rename users and roles
- Ability to rename containers/objects
- New Step expression functions
- List parameters for RaptorXML (key/value parameter pairs)

**What's new** in Altova FlowForce Server® 2014

- New server maintenance functions
- Ability to cache job results and use them in other jobs

- Extended RaptorXML support

What's new in Altova FlowForce Server® 2013R2

- Integration with RaptorXML Server edition
- Job flow control allowing the execution of job steps based on conditions
- Ability to repeat execution steps any number of times
- Definition of step variables allowing the results of one step to be used in following job steps
- An expanded set of built-in steps allowing mail notifications, FTP server interaction, and the ability to compute expressions

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# Chapter 2

# Administrator Guide

# 2 Administrator Guide

The Administrator guide focuses on the specifics of FlowForce Server namely:

- Upgrading FlowForce version 2013 with FlowForce version 2014 (if necessary)
- Getting started with FlowForce Server, i.e. how to install and start FlowForce Server
- Data storage and the various configuration files of FlowForce Server
- How to define the Access Control settings
- The architecture of the FlowForce Server system
- The FlowForce Server concepts

Please note:
You must install LicenseServer to be able to work with FlowForce Server.

**Accessing network drives - drive letters**
If the FlowForce Server service is to access a network resource, i.e. mapped network drives, please make sure that you use the Universal Naming Convention to do so. This is necessary because drive letters are not global to the system, and each logon session is assigned its own drive letters.

The UNC syntax is in the form:

*//server/sharedfolder/filepath*

Where:

- *server* references the server name in the network (defined by the DNS)
- *sharedfolder* references a label defined by the administrator, admin$ is generally the root directory of the operating system installation.
- *filepath* refers to the subdirectories below the share.

  Note:
  Microsoft Windows treat the delimiters slash "/" and backslash "\" as equivalent.

## 2.1 Upgrading FlowForce 2013 to FlowForce 2014

**Automatic data migration: Windows**
If FlowForce Server 2013 was installed at the default location (shown below) then this will be automatically detected by the installer when installing FlowForce Server 2014. An option in the installer allows you to choose if you want to migrate your data to the newer version.

If FlowForce Server 2013 was installed in any other directory, you will have to manually migrate the data, as discussed below.

**Manual data migration: Windows Vista, Windows 7/8**
The FlowForceServer 2013 default installation stores its data in "...\ProgramData\Altova \FlowForceServer2013\data".

The FlowForceServer 2014 default installation stores its data in "...\ProgramData\Altova \FlowForceServer2014\data".

1. Install FlowForce Server 2014 and any of the other server products. This automatically includes Altova ServiceController.
2. Start Altova ServiceController, Start Menu | All programs | Altova LiceneServer | Altova ServiceController, if it was not automaticlly started. It runs as an icon  in the system notification area.
3. Click the Altova ServiceController icon and stop the Altova FlowForce Server and Altova FlowForce Web services, by selecting "Stop service" from the popup menu for each of these services.
4. Delete or rename the data folder installed by the 2014 release, normally located at C: \ProgramData\Altova\FlowForceServer2014\data.
   This deletes all objects/data of the new version created during the installation process.
5. Start a command prompt, and enter the following command:

```
"C:\Program Files\Altova\FlowForceServer2014\bin\FlowForceServer.exe"
migratedb
--datadir=C:\ProgramData\Altova\FlowForceServer2014\data --olddatadir=C:
\ProgramData\Altova\FlowForceServer2013\data
```

   Data migration copies the old data (to the new location) and performs upgrade of the database. All objects/items are preserved by the upgrade.

6. Start Altova FlowForce Server service using Altova ServiceController, i.e. click the ServiceController application  icon in the system notification area.

**Manual data migration: Windows Vista 64-bit, Windows 7/8 64-bit, FlowForceServer 32-bit**
Follow the steps above but replace:

```
C:\Program Files     with C:\Program Files(x86)
```

**Manual data migration: Windows XP and Windows Server 2003**
Follow the steps above but replace:

```
C:\ProgrammData      with C:\Documents And Settings\All Users
```

**Manual data migration from Version 2013 to 2014 - Linux**
FlowForceServer 2013 stores its data in "/var/opt/Altova/FlowForceServer2013/data".

FlowForceServer 2014 uses "/var/opt/Altova/FlowForceServer2014/data" after installation.

The migration must be done as the root user. If you are logged in as root, leave out the "sudo" prefix when typing the following commands.

1. Stop the FlowForceServer daemon using:

```
[Debian]:       sudo /etc/init.d/flowforcewebserver stop
[Ubuntu]:       sudo initctl stop flowforcewebserver
[CentOS,        sudo initctl stop flowforcewebserver
RedHat]:
```

2. Remove or rename the data directory that was created during installation. This will delete any objects in the new version that were created after installation prior to performing this manual upgrade:

```
[Debian, Ubuntu]:sudo rm -rf /var/opt/Altova/FlowForceServer2014/data
[CentOS, RedHat]:sudo rm -rf /var/opt/Altova/FlowForceServer2014/data
```

3. Execute FlowForceServer with command "migratedb" e.g.:

```
sudo /opt/Altova/FlowForceServer2014/bin/flowforceserver migratedb
--olddatadir=/var/opt/Altova/FlowForceServer2013/data --datadir=/var/opt/
Altova/FlowForceServer2014/data
```

4. Start Altova FlowForce Server service using the start command.

**Manual data migration from Version 2013 to 2014 - Mac OS**
FlowForceServer 2013 stores its data in "/var/Altova/FlowForceServer2013/data".

FlowForceServer 2014 uses "/var/Altova/FlowForceServer2014/data" after installation.

1. Stop the FlowForceServer daemon using:

```
sudo launchctl unload /Library/LaunchDaemons/
com.altova.FlowForceServer.plist
```

2. Remove or rename the data directory that was created during installation. This will delete any objects in the new version that were created after installation prior to performing this manual upgrade:

```
sudo rm -rf /var/Altova/FlowForceServer2014/data
```

3. Execute FlowForceServer with command "migratedb" e.g.:

```
sudo /usr/local/Altova/FlowForceServer2014/bin/FlowForceServer migratedb
--olddatadir=/var/Altova/FlowForceServer2013/data --datadir=/var/Altova/
FlowForceServer2014/data
```

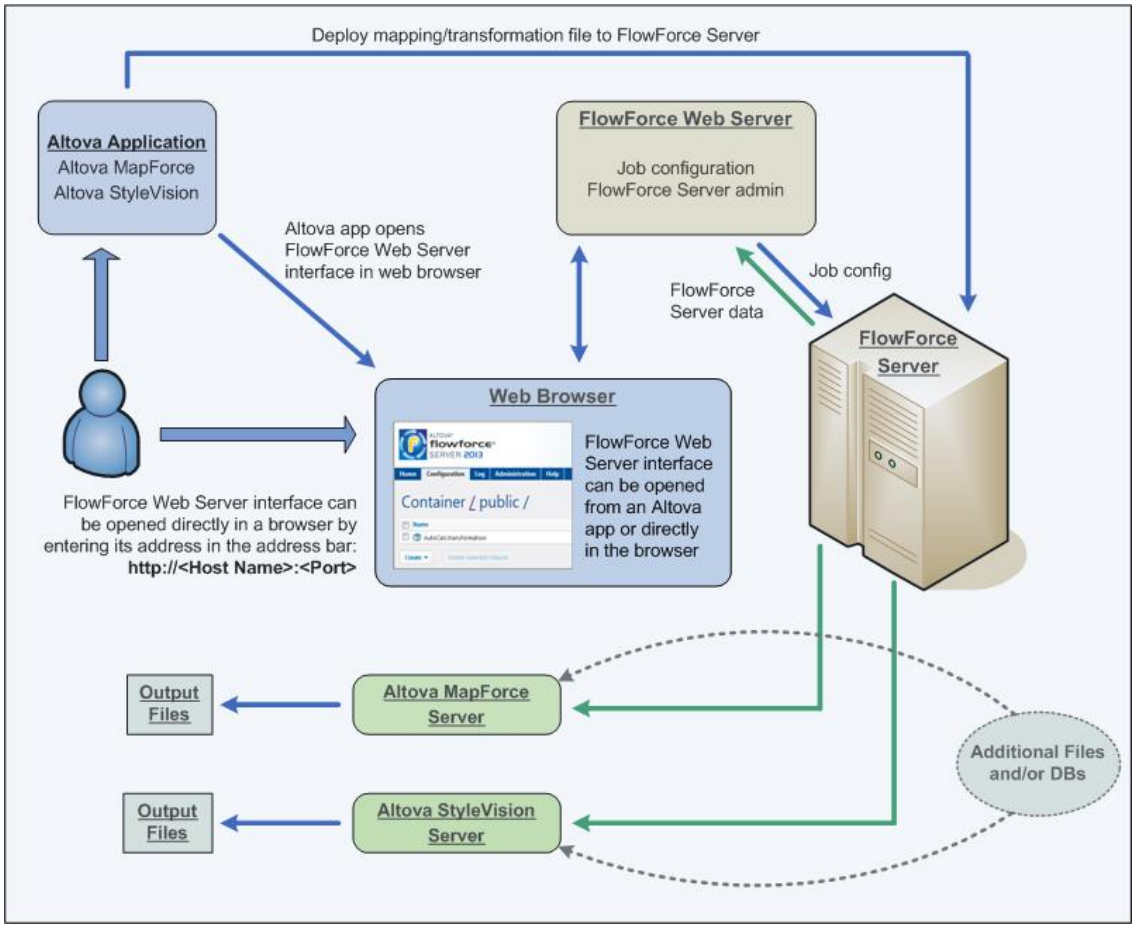
4. Start the Altova FlowForce Server daemon:

```
sudo launchctl load /Library/LaunchDaemons/com.altova.FlowForceServer.plist
```

See Starting FlowForce Server for more information.

## 2.2 Architecture

A FlowForce Server installation consists of several server modules and other components, that can be selected during the installation process.




**FlowForce Server Web Administration Interface**
This is the module that acts as the front-end to FlowForce Server. It is a standalone web application that is installed on the same machine as FlowForce Server.

The user interface runs in an internet browser and allows administrators to configure access control settings as well as the specific server operations including jobs, triggers, etc.

FlowForce Server supports the current versions of Mozilla Firefox, Google Chrome, and Microsoft Internet Explorer 9 and 8. Note: When using Internet Explorer 9 as your browser, please disable the "Show friendly HTTP error messages" in the Advanced tab, to view the HTML form when using FlowForce jobs as web services.

**FlowForce Server**
FlowForce Server is the core of the FlowForce Server system and runs as a background service without a graphical user interface. FlowForce Server continuously checks for trigger conditions, starts and monitors job execution, and writes detailed logs. To execute job steps that use a

deployed MapForce mapping, FlowForce Server sends an execution request to MapForce Server.

**Altova LicenseServer**
LicenseServer is a service that allows you to manage Altova licenses from one central location using a browser. The license server is installed on a server that all other servers and clients can access. Server licenses can be bound to specific machines and clients can be bound to specific servers.

Note:
LicenseServer must be installed to use FlowForce Server as well as **any** of the other server-based products (MapForce Server, Stylevision Server, or RaptorXML Server).

**MapForce**
The MapForce graphical mapping application has been enhanced with an integrated deployment feature. Once a mapping has been tested and debugged, MapForce lets you deploy it to FlowForce Server. The newly deployed mapping is then immediately available for use in any job on the server.

An administrator or developer runs MapForce on a personal Windows workstation to develop and deploy mappings onto the high-speed server.

Please note: when deploying a mapping to FlowForce, make sure that your target language is Built-in, i.e. click the Built-In icon 

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**MapForce Server**
MapForce Server is an implementation of the MapForce Built-in execution engine that executes mappings previously deployed via the MapForce graphical environment. MapForce Server is always installed on the same machine as FlowForce Server.

**Stylevision**
StyleVision allows you to design reports and forms based on XML, SQL database, and XBRL inputs. Once a stylesheet has been tested and debugged it can be deployed to FlowForce Server. The deployed files are then available for use in any transformation job on the server.

**Stylevision Server**
StyleVision Server is an implementation of the stand-alone version of StyleVision that executes transformations previously deployed via the StyleVision graphical environment. StyleVision Server is always installed on the same machine as FlowForce Server.

**RaptorXML (+XBRL) Server**
Altova RaptorXML Server is Altova's third-generation, super-fast XML and XBRL processor and validates XML documents, checks the well-formedness of XML documents, and transforms XSLT and XQuery documents. RaptorXML Server is always installed on the same machine as FlowForce Server.

# 2.3 FlowForce Server concepts

## Configuration

Configuration data in FlowForce Server's database are comprised of various objects that define the operation of FlowForce Server. This includes jobs, credentials, functions, triggers, and other objects.

Configuration objects are organized in a freely defined hierarchy of containers. Some configuration settings are edited together (e.g. jobs include triggers), and other settings can also be stored as standalone objects under their own name (e.g. credentials and functions).

**Container**
A container is similar to a folder in a commonly used file system. It is used to create a hierarchical structure for storing configuration objects and other containers. Containers can be assigned access permissions.

Two predefined containers exist in FlowForce Server: /system which contains system functions, e.g. copy, move, etc., and /public which is the default container when deploying a mapping to FlowForce Server from MapForce. Other containers can be created as needed, e.g. for departments or user groups.

**Function**
A FlowForce Server function performs a specific operation when used in a job execution step. It may have input parameters that need to be passed to it by the caller. Available functions include the system functions delivered with FlowForce Server, deployed MapForce mappings or StyleVision transformations, and the execution steps of other jobs.

**Job**
A Job consists of Triggers, Execution steps, input parameters, and other settings. Triggers define when a job will be executed, and the execution steps define what the job actually does when it executes. Multiple triggers and execution steps can be defined per job.

**Trigger**
Triggers define under which circumstances a job will be executed. Three types of triggers can currently be defined: Timer triggers, File system triggers, and HTTP triggers. Multiple triggers can be defined per job.

**Service**
FlowForce Server permits exposing jobs as web services via the HTTP protocol. This allows interactive or automated access to these jobs.

**Credential**
Credentials are stored login data used to execute FlowForce Server jobs. Credentials can be defined as standalone "objects" and be assigned to various jobs, or they can be manually entered for a specific job.

**Queue**
The queue settings in a FlowForce Server job allow limiting the number of parallel job executions to control use of server resources.

## Access Control

All important operations in FlowForce Server are linked to permissions or privileges which need to be assigned to the user to successfully execute them.

**User**
FlowForce Server users are persons that have been added to FlowForce Server by the FlowForce Server administrator with a login name and a password. Depending on the assigned rights and privileges, users can define FlowForce Server jobs, deploy mappings, or view logs.

Two special users are predefined by FlowForce Server: "root" is the initial administrator user, and "anonymous" is a special user account used for FlowForce Server services that should be available to users without explicit log in to FlowForce Server.

**Role**
Roles are used to manage privileges and object permissions for user groups as opposed to individual users.

Having defined users, you can assign them to a role thus creating user groups. The users become "members" assigned to the specific role.

**Permission**
Permissions control access to containers and configurations. Unlike privileges they can be redefined on every level of the container hierarchy, and are by default inherited from parent containers.

Permissions, like privileges, are inherited from all roles the user is a member of, as well as from permissions directly assigned to the user.

**Privilege**
Privileges control user rights globally. This means privilege settings cannot be overridden in the container hierarchy of FlowForce Server.

When a user logs into FlowForce Server, the set of effective privileges is determined by the user privileges and all role privileges the user is member of.

## 2.4 Getting started

This section deals with what the first-time user of FlowForce, the administrator, has to do to set up the software and configure it for multiple users. Note, it is not necessary to add new users, roles etc. when you work through the tutorial. The tutorial makes use of default users and roles, built-in to FlowForce.

**Install the software**

To install FlowForce, LicenseServer and other Altova Server products, see: Installation Windows, Installation Linux, or Installation Max OS X

**Register FlowForce Server and other Altova Server products**

To register FlowForce Server and all other Altova Server products with Altova LicenseServer, see LicenseServer.

**Start FlowForce Server**

To start FlowForce Server and change your default password to something new, see: Initial setup - Windows, Initial setup - Linux, or Initial setup - Mac OS X

**Request evaluation license**

To request evaluation licenses for the Altova Server products, see: Server Management (LicenseServer)

**Add new users**

To add new users, see: Users.

- Users are persons that are allowed to define and/or start jobs.
- Note that users inherit privileges from all their roles in addition to the privileges defined here, so it is better to define them in the roles page.

**Add new roles and define the role privileges**

To add new roles and define privileges, see: Roles.

- The Role page lets you create new roles and define the role privileges.
- Roles are used to manage privileges and object permissions for user groups instead of individual users.
- This is the place that you define **role privileges,** as the privileges defined here are automatically inherited by users when you assign a role to a user.

- Having defined the users in the previous step, you can now assign users to a role, thus creating user groups assigned to the various roles. (The users become "members" assigned to the role).

  To assign users to a role, see: Assigning a user to a role.

**Define the work environment (container structure) and the read/write/use permissions of your users**

To add new permissions to the permission list see: Permissions.

- Containers are used to organize jobs, deployed MapForce mappings and StyleVision transformations into a hierarchy similar to that of a file system composed of folders.
- Read/Write/Use permissions should generally only be assigned to **roles**, not to individual users (although this is possible).

**Define the necessary credentials, i.e. the login data needed for FlowForce Server to access your operating system user accounts**

To add new credentials, see: Credentials.

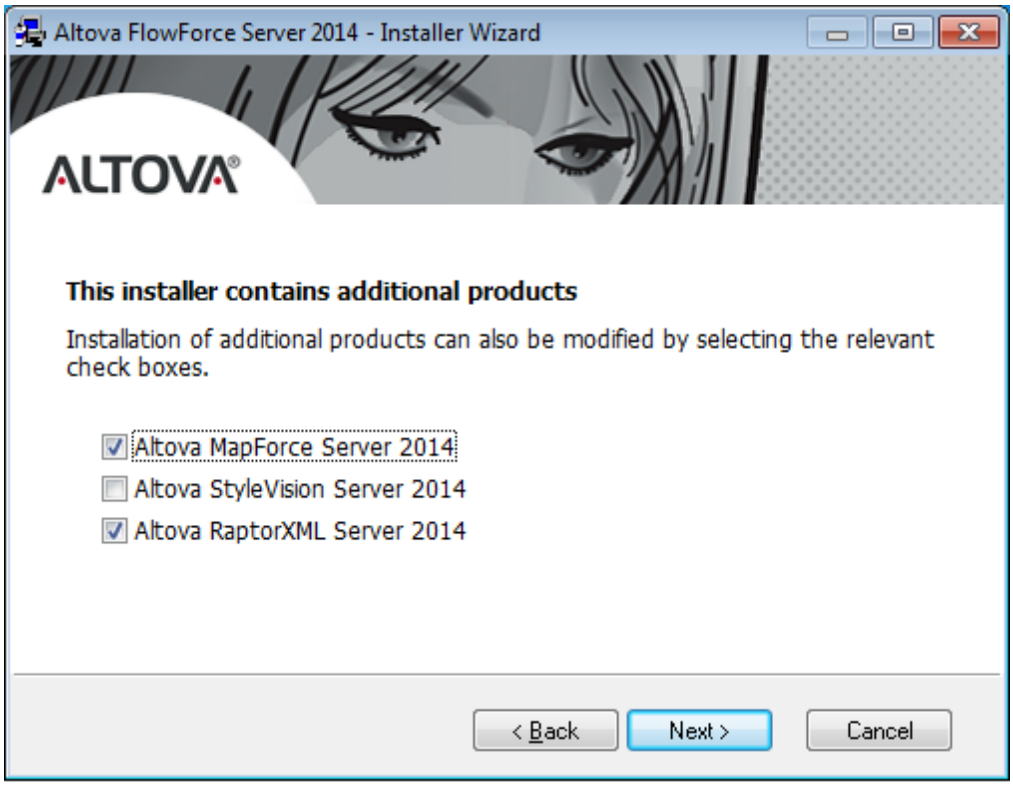
- Credentials are stored **login** data used to execute FlowForce Server jobs, and are stored in the FlowForce Server database as separate objects.
- Jobs are started automatically by FlowForce server, when the defined trigger conditions are met. FlowForce server then runs these jobs using a specific operating system **user account**, ensuring that execution steps do not access unauthorized data.
- Every job MUST have a credential assigned to it for the execution steps to be executed. This defines the **operating system** user account used to run the job execution steps. It is vital for the success of the job execution that the **operating system user** which is referenced by this credential has sufficient access permissions.

### 2.4.1 Installation Windows

Note:
All Altova Server products running under Windows have a minimum requirement: Windows XP with Service Pack 3.

Having downloaded FlowForce Server from the Altova website download page, making sure to select the correct operating system:

1. Double click the installation file to start the installation process.
2. Select the extra servers that you also want to install: MapForce Server, StyleVision Server, or RaptorXML Server.




3. Make sure that you also install and start the **LicenseServer** licensing process, when installing FlowForce Server. This step is not necessary if LicenseServer is already running somewhere in your network.
4. Follow the wizard instructions to install the software.

Note:
You can select the installation language using the combo box in the bottom left of the wizard. The currently supported languages are: English, German, Spanish, and Japanese.

The language you select here also determines the language of the FlowForce Server user interface in the web browser.

### File paths in Windows

File paths given in this documentation will not be the same for all operating systems. You should note the following locations:

- FlowForce Server stores all data in the following locations:

| | |
|---|---|
| Windows XP | `C:\Documents and Settings\All Users \Application Data\Altova\FlowForceServer2014` |
| Windows Vista, Windows 7/8 | `C:\ProgramData\Altova\FlowForceServer2014` |

- Application folder: The Application folder is the folder where your Altova application is located. The path to the Application folder is, by default, the following.

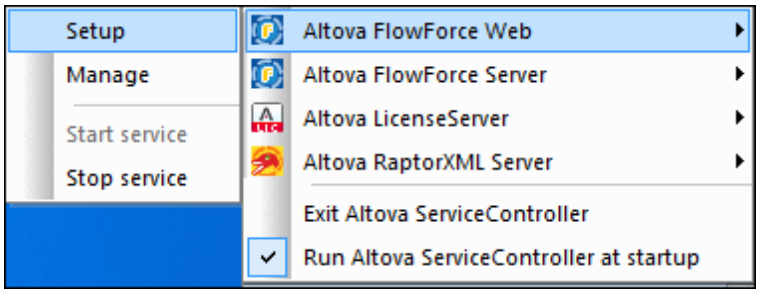
| | |
|---|---|
| Windows XP | `C:\Program Files\Altova` |
| Windows Vista, Windows 7/8 | `C:\Program Files\Altova` |
| 32 bit Version on 64-bit OS | `C:\Program Files (x86)\Altova` |

Next: Starting FlowForce

### Initial setup - Windows

#### To register FlowForce Server with LicenseServer

1. Click the Windows "**Start"** button and select **All Programs | Altova FlowForceServer | FlowForceServer Setup Page.**
   You can also open the Setup page by clicking the Altova ServiceController icon in the system tray, mouse over **Altova FlowForce Web** in the menu that pops up (*see screenshot below*), and then select **Setup** from the submenu.




The Setup page appears in a browser window.

2. Click the browse button  of the LicenseServer group and select your LicenseServer from the list.
3. Click the "Register with LicenseServer" button to register with LicenseServer.
   This opens the Altova Server Software License Agreement.
4. Click the "Accept" button of the agreement page if you agree to the license terms.
5. Click into the LicenseServer password field, enter the default password "default", and click the "Login" button.
   This opens the Server Management tab of LicenseServer where you can assign a license to FlowForce server, please see **Assign licenses to registered products**.

### To configure network interfaces and ports

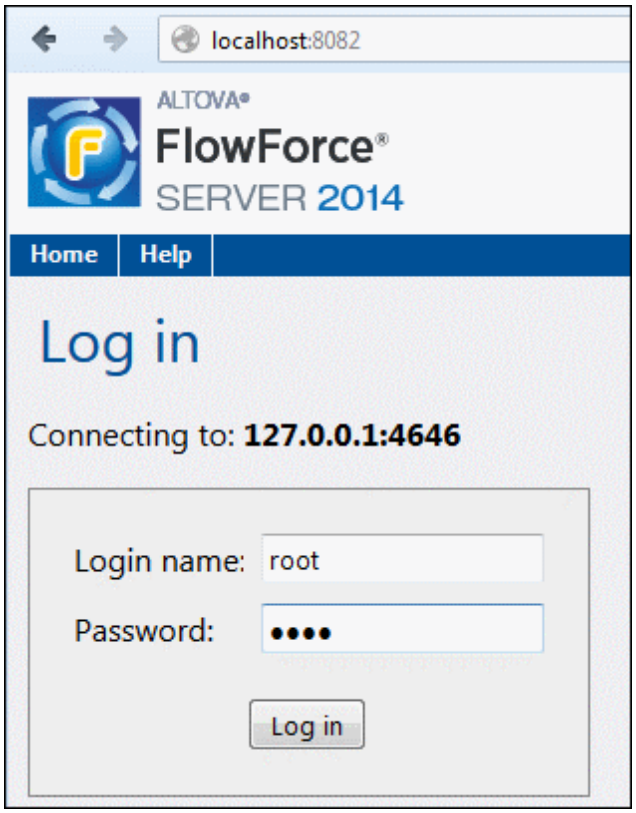
The default address and port will usually work fine, except if other services on the machine already use one of the ports, in which case you can change the ports used by FlowForce here.

1. Return to the FlowForce setup page.
2. Configure the bind address and port for the FlowForce Web Server. By default, the web interface is available to users on all network interfaces on port 8082.
3. Set the default time zone to use in the web interface.
4. Configure the bind address and port for the FlowForce Server. The default setting for the server accepts only requests from the same machine (127.0.0.1). If you intend to start jobs as web services via HTTP from remote machines, select "All interfaces (0.0.0.0)" from the Bind address combo box.
5. Click "Apply settings and restart FlowForce services". The FlowForce services will restart, and your browser will be redirected to the Login page.

Note:
TheFlowForce Server services are automatically started on every machine startup. Use the Windows control panel to disable the services if necessary. The "Services" management console can be found in "Administrative Tools", and can also be started using Start | Run | services.msc.

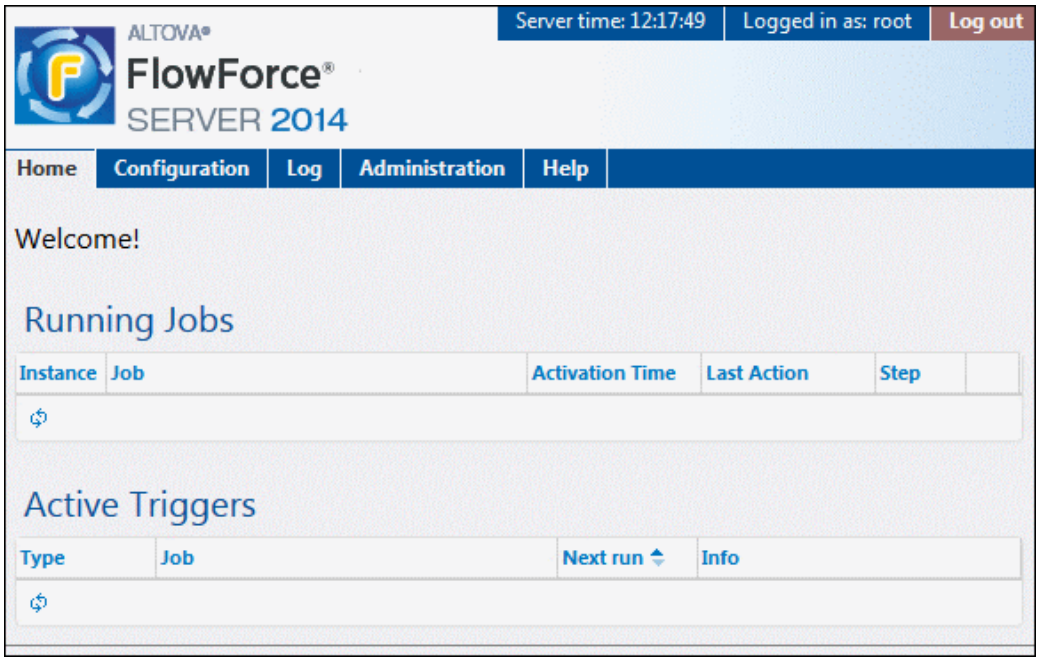
**To log in to the FlowForce Web Administration Interface:**

1. Start you browser and enter http://localhost:8082. If you changed the port on the FlowForce Server Configuration page, use the one you entered there.
   You are now connected to FlowForce Web Server and the Login page for FlowForce Server is opened.




   Enter login name "**root**", as well as the password "**root**" if this is the first time that you have started FlowForce Server.

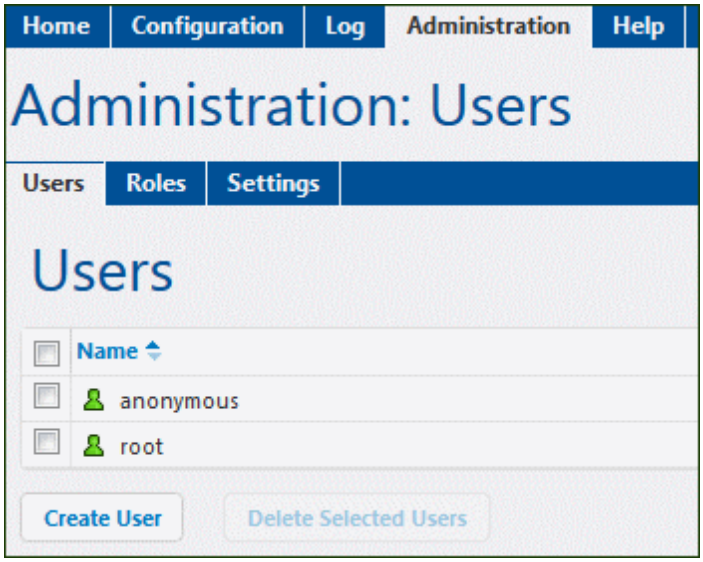
2. Click the "Log in" button to log in.
   You have now logged onto FlowForce Server.
   Connection information, as well as any running jobs and active triggers are visible on the Home screen.



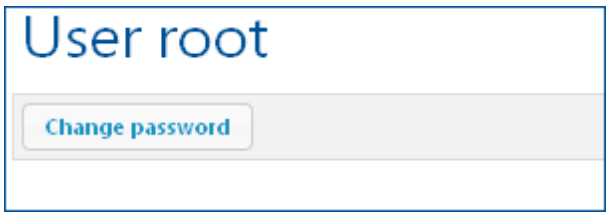

**Logging out:**
Click the "Log out" button at the far right of the browser window to log out.

**To change your default password:**
From the Home page shown above:

1. Click the "Administration" button, then the "Users" button.




2. Click the "root" user entry in the Users table.
3. Click the "Change password" button and enter your old and new passwords.




4. Click Save to complete the process.

## 2.4.2 Installation Linux

**Packages**
Installation packages are available for:

| Distribution | Package extension |
|---|---|
| Debian 6 | `.deb` |
| Ubuntu 12.04 | `.deb` |
| CentOS 6, RedHat 6 | `.rpm` |

The components of FlowForce Server are provided in separate packages and can be downloaded from the Altova website:

| Package name | Description |
|---|---|
| flowforceserver | Required for all FlowForce Server installations. Contains the FlowForce Server engine and the FlowForce Web Administration Interface. |
| licenseserver | Required if you do not already have an Altova LicenseServer running in your network |
| mapforceserver | Required to run deployed MapForce mappings |
| stylevisionserver | Required to run deployed StyleVision transformations |

Download the appropriate packages from the Altova website to your Linux computer and store them in any directory.

**Installation**
The installation must be done as the root user. If you are logged in as root, leave out the "sudo" prefix when typing the following commands.

**Uninstalling old versions**
On the Linux command line, you can check which Altova server products are installed with the following command:

```
[Debian, Ubuntu]:   dpkg --list | grep Altova
[CentOS, RedHat]:   rpm -qa | grep server
```

If FlowForce Server is not installed, go ahead with the installation as documented in the next steps. If FlowForce Server is installed and you wish to install a newer version of FlowForce Server, uninstall the old version with the command:

```
[Debian, Ubuntu]:   sudo dpkg --remove flowforceserver
[CentOS, RedHat]:   sudo rpm -e flowforceserver
```

If you need to uninstall other packages, use the same command as above and replace "flowforceserver" with the package name of the package you want to remove. For example:

```
[Debian, Ubuntu]:   sudo dpkg --remove licenseserver
[CentOS, RedHat]:   sudo rpm -e licenseserver
```

**Installing FlowForce Server**
In a terminal window, switch to the directory where you have downloaded the Linux package. For example, if you downloaded it to a directory called `MyAltova` (that is located, say, in the `/home/User` directory), then switch to this directory as follows:

```
cd /home/User/MyAltova
```

Install FlowForce Server with the following command:

```
[Debian]:   sudo dpkg --install flowforceserver-2014-debian.deb
[Ubuntu]:   sudo dpkg --install flowforceserver-2014-ubuntu.deb
[CentOS, RedHat]:   sudo rpm -ivh flowforceserver-2014-1.x86_64.rpm
```

**Installing Altova LicenseServer**
In order for FlowForce Server to run, it must be licensed via an Altova LicenseServer on your network. Download Altova LicenseServer package from the Altova website to any directory on the Linux system. Install it just like you did FlowForce Server (*see previous step*).

```
[Debian]:   sudo dpkg --install licenseserver-1.8-debian.deb
[Ubuntu]:   sudo dpkg --install licenseserver-1.8-ubuntu.deb
[CentOS, RedHat]:   sudo rpm -ivh licenseserver-1.8-1.x86_64.rpm
```

**Installing MapForce Server and StyleVision Server**
Install these packages just like you did FlowForce Server (*see previous step*).

**Setting services to start automatically**
On Ubuntu and CentOS, RedHat, the services are set to start automatically by default. On Debian, use the **`update-rc.d`** command to configure the runlevels.

The next step is the initial setup to link FlowForce Server to LicenseServer, and to configure service interfaces and ports.

## File paths in Linux

- Application path

| | |
|---|---|
| Linux | `/opt/Altova/FlowForceServer2014/bin` |

- Data folder

| | |
|---|---|
| Linux | `/var/opt/Altova/FlowForceServer2014` |

### Initial setup - Linux

#### Starting LicenseServer as a service

If LicenseServer is not already running on a different server in your network, LicenseServer must be installed and running as a service on the same machine as FlowForce Server. Start LicenseServer as a service with the following command:

```
[Debian]:       sudo /etc/init.d/licenseserver start
[Ubuntu]:       sudo initctl start licenseserver
[CentOS,        sudo initctl start licenseserver
RedHat]:
```

(If you need to stop LicenseServer, replace **start** with **stop** in the above command)

#### Starting FlowForce Web Administration Interface

The initial setup can be performed in a browser-based interface. Start FlowForce Web Server as a service with the following command:

```
[Debian]:       sudo /etc/init.d/flowforcewebserver start
[Ubuntu]:       sudo initctl start flowforcewebserver
[CentOS,        sudo initctl start flowforcewebserver
RedHat]:
```

On first run and without any custom configuration files FlowForceWebServer will start on a random port and provide a setup page.

If your server machine has a GUI web browser, you can then open the setup page using the following URL:

**file:///var/opt/Altova/FlowForceServer2014/flowforceweb.html**

Note: you need to have "root" permissions to be able to open this file.

If your browser is running on a different machine:

On Debian, the URL to the setup page appears in the terminal window. On other distributions, you need to extract the URL to the setup page from the log file using the following command:

```
grep running /var/opt/Altova/FlowForceServer2014/data/ffweb.log
```

The output is similar to:

FlowForceWeb running on **http://127.0.0.1:34597/setup?key=52239315203**

Type this link into the address bar of your browser (and replace "127.0.0.1" with the host name of your server machine).

#### Firewall

If you use the setup page for your first time FlowForceServer configuration please make sure the

random port address FlowForceWebServer was started on is not blocked from your firewall.

### To register FlowForce Server with LicenseServer

Having followed the Linux installation procedure and started LicenseServer and FlowForce Web Server:

1. Open the setup page in your web browser as described above.


The Setup page appears in a browser window.

2. Click the browse button  of the LicenseServer group and select your LicenseServer from the list.
3. Click the "Register with LicenseServer" button to register with LicenseServer. This opens the Altova Server Software License Agreement.
4. Click the "Accept" button of the agreement page if you agree to the license terms.

5. Click into the LicenseServer password field, enter the default password "default", and click the "Login" button.
   This opens the Server Management tab of LicenseServer where you can assign a license to FlowForce server, please see **Assign licenses to registered products**.

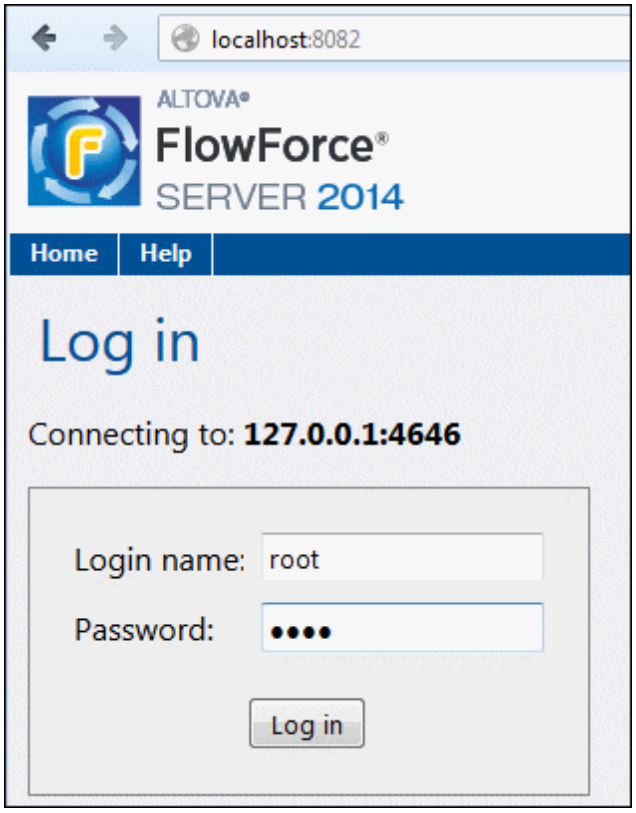
### To configure network interfaces and ports

The default address and port will usually work fine, except if other services on the machine already use one of the ports, in which case you can change the ports used by FlowForce here.

1. Return to the FlowForce setup page.
2. Configure the bind address and port for the FlowForce Web Server. By default, the web interface is available to users on all network interfaces on port 8082.
3. Set the default time zone to use in the web interface.
4. Configure the bind address and port for the FlowForce Server. The default setting for the server accepts only requests from the same machine (127.0.0.1). If you intend to start jobs as web services via HTTP from remote machines, select "All interfaces (0.0.0.0)" from the Bind address combo box.
5. Click "Apply settings and restart FlowForce services". The FlowForce services will restart, and your browser will be redirected to the Login page.

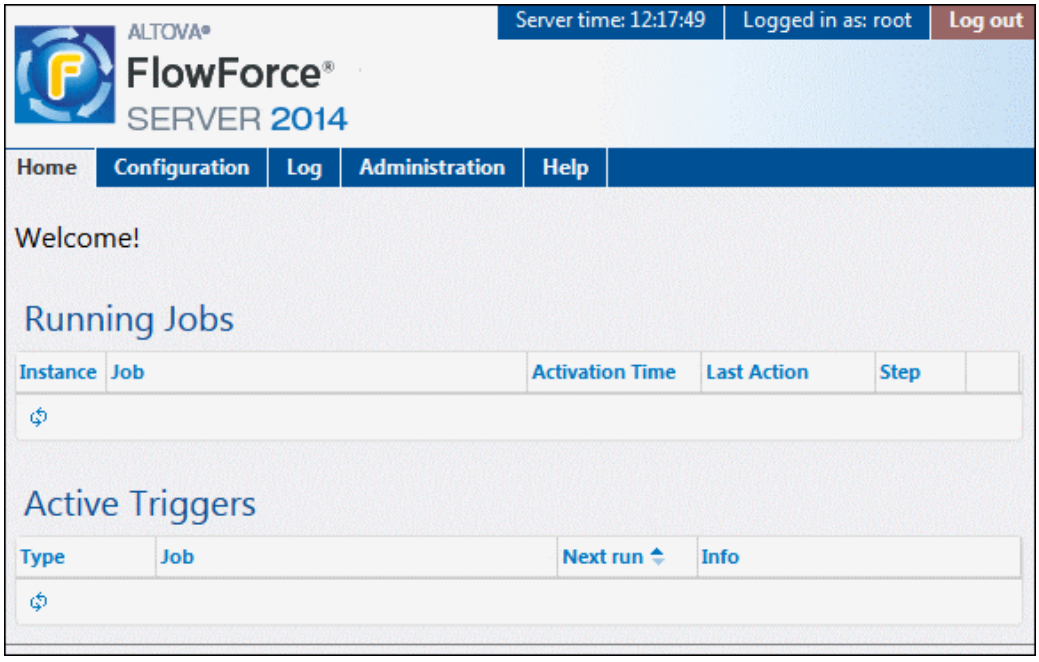
### To log in to the FlowForce Web Administration Interface:

1. Start you browser and enter http://localhost:8082. If you changed the port on the FlowForce Server Configuration page, use the one you entered there.
   You are now connected to FlowForce Web Server and the Login page for FlowForce Server is opened.




Enter login name "**root**", as well as the password "**root**" if this is the first time that you have started FlowForce Server.

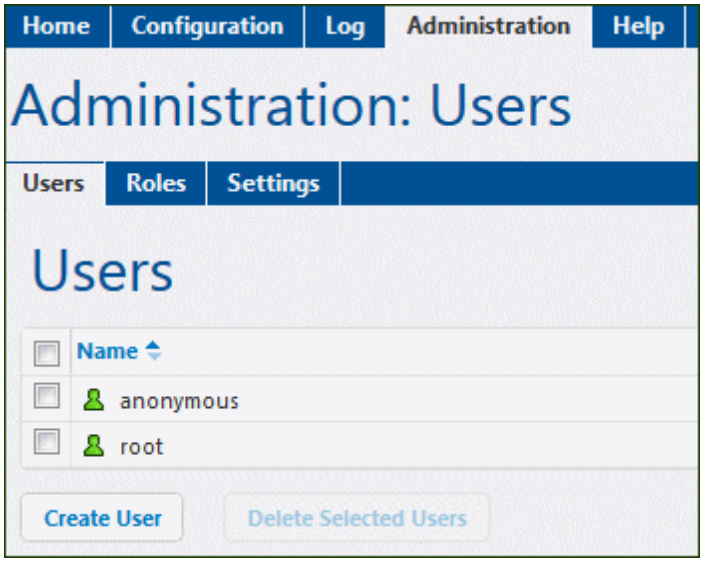
2. Click the "Log in" button to log in.
   You have now logged onto FlowForce Server.
   Connection information, as well as any running jobs and active triggers are visible on the Home screen.



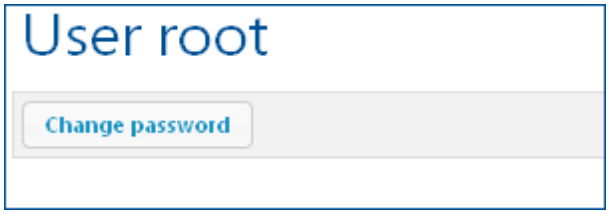
**Logging out:**
Click the "Log out" button at the far right of the browser window to log out.

**To change your default password:**
From the Home page shown above:

1. Click the "Administration" button, then the "Users" button.




2. Click the "root" user entry in the Users table.
3. Click the "Change password" button and enter your old and new passwords.




4. Click Save to complete the process.

### 2.4.3 Installation Mac OS X

FlowForce Server can be installed on Mac OS X systems (version 10.7 or higher). Since you might need to uninstall a previous version, uninstalling is described first.

**Uninstalling old versions of FlowForce Server and LicenseServer**
Before uninstalling FlowForce Server, stop the service with the following command:

```
sudo launchctl unload /Library/LaunchDaemons/com.altova.FlowForceServer.plist
```

To check whether the service has been stopped, open the Activity Monitor terminal and make sure that FlowForce Server is not in the list.

In the Applications terminal, right-click theFlowForce Server icon and select **Move to Trash**. The application will be moved to Trash. You will, however, still need to remove the application from the `usr` folder. Do this with the command:

```
sudo rm -rf /usr/local/Altova/FlowForceServer2014/
```

If you need to uninstall an old version of Altova LicenseServer, use the same procedure outlined above for FlowForce Server.

```
sudo launchctl unload /Library/LaunchDaemons/com.altova.LicenseServer.plist
```

**Downloading the Mac OS X package**
After downloading the Linux package from the Altova website, copy the package to any directory on the Linux system.

Since you will need an Altova LicenseServer in order to run FlowForce Server, you may want to download LicenseServer from the Altova website at the same time as you download FlowForce Server, rather than download it at a later time. The Mac OS X installer file has a `.pkg` file extension.

**Installing FlowForce Server**
In a terminal window, switch to the directory where you have copied the installer file, and double-click it. Go through the successive steps of the installer wizard. These are self-explanatory and include one step in which you have to agree to the license agreement before being able to proceed.

The FlowForce Server package will be installed in the folder:

```
/usr/local/Altova/FlowForceServer2014/
```

Clicking the FlowForce Server icon in the Application terminal pops up the onscreen help (this documentation).

**Installing Altova LicenseServer**

For FlowForce Server to run, it must be licensed via an Altova LicenseServer on your network. On Mac OS X systems, Altova LicenseServer will need to be installed separately.

Download Altova LicenseServer from the Altova website and double-click the installer package top start the installation. Follow the on-screen instructions. You will need to accept the license agreement for installation to proceed.

The LicenseServer package will be installed in the folder:

```
/usr/local/Altova/LicenseServer
```

For information about how to register FlowForce Server with Altova LicenseServer and license it, see the section, Initial setup - Mac OS X.

### Initial setup - Mac OS X

#### Licensing procedure

To license FlowForce Server on Mac OS X systems, do the following:

1. If LicenseServer is not already running as a service, **start** it as a service.
2. **Start** FlowForce Server as a service.
3. **Register** FlowForce Server with LicenseServer.
4. In the configuration page of LicenseServer, **assign** a license to FlowForce Server machine. How to do this is described in the Altova LicenseServer documentation.

**Note:** You must have both FlowForce Server and Altova LicenseServer installed and running as services. See the section Installation on Mac OS X for information about installing these packages.

You must have administrator (root) privileges to be able to register FlowForce Server with LicenseServer.

#### Starting LicenseServer as a service

To correctly register and licenseFlowForce Server with LicenseServer, LicenseServer must be running as a service. Start LicenseServer as a service with the following command:

```
sudo launchctl load /Library/LaunchDaemons/com.altova.LicenseServer.plist
```

If at any time you need to stop LicenseServer, use:

```
sudo launchctl unload /Library/LaunchDaemons/com.altova.LicenseServer.plist
```

#### Starting FlowForce Server as a service

Start FlowForce Server as a service with the following command:

```
sudo launchctl load /Library/LaunchDaemons/com.altova.FlowForceServer.plist
```

If at any time you need to stop FlowForce Server, use:

```
sudo launchctl unload /Library/LaunchDaemons/com.altova.FlowForceServer.plist
```

**Registering FlowForce Server**

Before assigning a license to FlowForce Server from LicenseServer, FlowForce Server must be registered with LicenseServer. You can register FlowForce Server by using the `licenseserver` command of its CLI. Note that FlowForce Server must be started with root rights.

```
sudo /usr/local/Altova/FlowForceServer2014/bin/FlowForceServer licenseserver
localhost
```

In the command above, `localhost` is the name of the server on which LicenseServer is installed. Notice also that the location of the FlowForce Server executable is:

```
/usr/local/Altova/FlowForceServer2014/bin
```

After successfully registering FlowForce Server, you can go to LicenseServer and assign a license to FlowForceServer. How to do this is described in the Altova LicenseServer documentation.

## 2.5 Altova LicenseServer

Altova LicenseServer (hereafter also called LicenseServer) provides a central location for the management of licenses for Altova products. Altova applications running in a network can have licenses assigned to them from the LicenseServer, thus giving administrators the flexibility to manage and monitor licenses.

---

**Licensing process with Altova LicenseServer**
To assign an Altova server product a license using Altova LicenseServer, you need to do the following:

1. Start LicenseServer.
2. Open the LicenseServer Configuration page, which is the administrator's interface with LicenseServer, on Windows, Linux, or Mac OS X.
3. Upload the license/s you have received from Altova to the license pool of your Altova LicenseServer. Do this in the License Pool tab of the LicenseServer Configuration page.
4. Register the Altova server product (FlowForce Server, MapForce Server, StyleVision Server, RaptorXML(+XBRL) Server) with LicenseServer. Depending on the product's type, the method of registering it with LicenseServer will be different: either via the product's GUI or its command line. See the documentation of your Altova server product for information about how to register it with LicenseServer.
5. In the Server Management tab of the LicenseServer Configuration page, assign a license to the Altova server product according to the number of cores on the product machine.

Licenses can thereafter be conveniently monitored and managed centrally with LicenseServer. See the Configuration Page Reference for available functionality.

**Note:** The LicenseServer Configuration page does not support SSL.

---

**LicenseServer versions and their compatibility with Altova server products**
New versions of Altova server products can only be licensed with the version of LicenseServer that is the latest at the time of the server product's release. However, older versions of Altova server products will work with newer versions of LicenseServer.

So, if you are installing a new version of an Altova server product and if your current LicenseServer version is not the latest, de-install the older version of LicenseServer and install the latest version available on the Altova website. All registration and licensing information held in your older version of LicenseServer will be saved at the time of de-installation to a database on your server machine, and will be imported automatically into the newer version.

***Current version: 1.8***

---

**About this documentation**

This documentation is organized into the following parts:

- Introductory information about: network requirements; installation on Windows and Linux; and Altova ServiceController.
- How to Assign Licenses, which describes in a step-by-step way how to assign licenses with Altova LicenseServer.
- Configuration Page Reference: A description of the administrator's interface with LicenseServer.

*Last updated: 04-18-2014*

### 2.5.1 Network Information

Altova LicenseServer must be installed on a server machine that is accessible by all clients running Altova products that require a license. Any firewall on both the client and server must allow the network traffic to and from the LicenseServer that is necessary for the LicenseServer to operate correctly.

On the LicenseServer, **port 35355** is used to distribute licenses, and therefore it must be open for network traffic with client machines.

The following are the default networking parameters and requirements of LicenseServer:

- *For LicenseServer license distribution:*
  Either one or both of
  IPv4 TCP connection on port 35355
  IPv6 TCP connection on port 35355

For administrative tasks, The LicenseServer is accessed by a web interface that uses port 8088. The port used can be configured to suit your requirements.

**Connection to the Master Licensing Server at altova.com**
The Altova LicenseServer needs to be able to communicate with the Master Licensing Server at `altova.com` to validate and authenticate license-related data and to ensure continuous compliance with the Altova license agreements. This communication occurs over HTTPS using port 443. If the Altova LicenseServer, after making the initial verification with the `altova.com` Master Licensing Server, is unable to again connect with `altova.com` for a duration of more than 5 days (= 120 hours), then the Altova LicenseServer will no longer permit the usage of any Altova software products connected to the Altova LicenseServer.

Any such loss of connection with the `altova.com` master servers will be logged in the Messages tab of the Configuration page of the Altova LicenseServer. In addition, the administrator can configure the Altova LicenseServer to automatically send an alert email when the connection to `altova.com` is lost. Alert Mail settings are available in the Settings tab of the Configuration page.

### 2.5.2 Installation (Windows)

Altova LicenseServer can be installed on Windows systems in one of two ways:

- As an independent installation.
- As part of an Altova server product installation. (Altova server products are: Altova FlowForce Server, Altova MapForce Server, and Altova SyleVision Server.)

If LicenseServer is not installed on your system at the time an Altova server product is installed, the option to install LicenseServer is selected by default during installation setup. If LicenseServer is already installed, the option to install it is deselected by default. You can change the default option if you like.

For information about how to proceed with assigning licenses, see the section How to Assign Licenses.

---

**LicenseServer versions and their compatibility with Altova server products**
New versions of Altova server products can only be licensed with the version of LicenseServer that is the latest at the time of the server product's release. However, older versions of Altova server products will work with newer versions of LicenseServer.

So, if you are installing a new version of an Altova server product and if your current LicenseServer version is not the latest, de-install the older version of LicenseServer and install the latest version available on the Altova website. All registration and licensing information held in your older version of LicenseServer will be saved at the time of de-installation to a database on your server machine, and will be imported automatically into the newer version.

***Current version: 1.8***

The version number of the currently installed LicenseServer is given at the bottom of the LicenseServer configuration page. The version number of the LicenseServer that is appropriate for any particular version of a server product is displayed during the installation of that version of the server product. You can choose to install this version of LicenseServer along with the server product, or you can install the newer version of LicenseServer separately. Note, however, that you must de-install the older version of LicenseServer before installing the new version.

### 2.5.3 Installation (Linux)

Altova LicenseServer can be installed on Linux systems (Debian, Ubuntu, CentOS, RedHat).

---

**Uninstalling old versions of LicenseServer**
On the Linux command line interface (CLI), you can check whether LicenseServer is installed with the following command:

```
[Debian, Ubuntu]:   dpkg --list | grep Altova
[CentOS, RedHat]:   rpm -qa | grep server
```

If LicenseServer is not installed, go ahead with the installation as documented in the next steps. If LicenseServer is installed and you wish to install a newer version of it, uninstall the old version with the command:

```
[Debian, Ubuntu]:   sudo dpkg --remove licenseserver
[CentOS, RedHat]:   sudo rpm -e licenseserver
```

---

**Installing Altova LicenseServer**
On Linux systems, LicenseServer must be installed independently of other Altova server products. It is not included as part of the installation packages of Altova server products. Download Altova LicenseServer from the Altova website and copy the package to any directory on the Linux system.

| Distribution | Installer extension |
|---|---|
| Debian | .deb |
| Ubuntu | .deb |
| CentOS | .rpm |
| RedHat | .rpm |

In a terminal window, switch to the directory where you have copied the Linux package. For example, if you copied it to a user directory called `MyAltova` (that is located, say, in the `/home/User` directory), then switch to this directory as follows:

```
cd /home/User/MyAltova
```

Install LicenseServer with the following command:

```
[Debian]:   sudo dpkg --install licenseserver-1.8-debian.deb
[Ubuntu]:   sudo dpkg --install licenseserver-1.8-ubuntu.deb
[CentOS]:   sudo rpm -ivh licenseserver-1.8-1.x86_64.rpm
[RedHat]:   sudo rpm -ivh licenseserver-1.8-1.x86_64.rpm
```

The LicenseServer package will be installed in:

```
/opt/Altova/LicenseServer
```

For information about how to proceed with assigning licenses, see the section How to Assign Licenses.

---

**LicenseServer versions and their compatibility with Altova server products**
New versions of Altova server products can only be licensed with the version of LicenseServer that is the latest at the time of the server product's release. However, older versions of Altova server products will work with newer versions of LicenseServer.

So, if you are installing a new version of an Altova server product and if your current LicenseServer version is not the latest, de-install the older version of LicenseServer and install the latest version available on the Altova website. All registration and licensing information held in your older version of LicenseServer will be saved at the time of de-installation to a database on your server machine, and will be imported automatically into the newer version.

***Current version: 1.8***

### 2.5.4 Installation (Mac OS X)

Altova LicenseServer can be installed on Mac OS X systems (version 10.7 or higher). Since you might need to uninstall a previous version, uninstalling is described first.

---

**Uninstalling old versions of LicenseServer**
Before uninstalling LicenseServer, stop the service with the following command:

```
sudo launchctl unload /Library/LaunchDaemons/com.altova.LicenseServer.plist
```

To check whether the service has been stopped, open the Activity Monitor terminal and make sure that LicenseServer is not in the list.

In the Applications terminal, right-click the LicenseServer icon and select **Move to Trash**. The application will be moved to Trash. You will, however, still need to remove the application from the `usr` folder. Do this with the command:

```
sudo rm -rf /usr/local/Altova/LicenseServer
```

---

**Installing Altova LicenseServer**
Download Altova LicenseServer from the Altova website (the installer file has a `.pkg` file extension), and double-click the installer package to start the installation. Follow the on-screen instructions. You will need to accept the license agreement for installation to proceed.

The LicenseServer package will be installed in the folder:

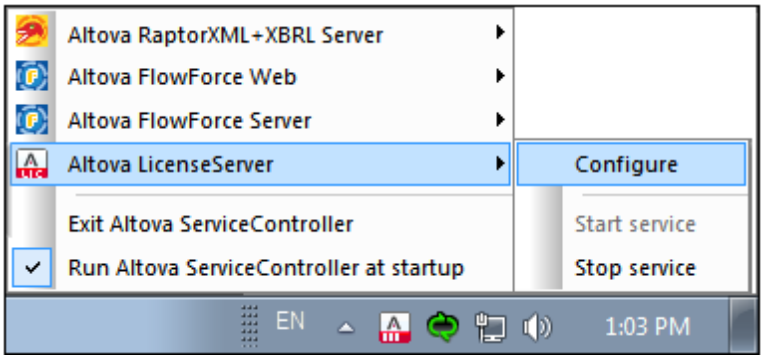
```
/usr/local/Altova/LicenseServer
```

### 2.5.5 Altova ServiceController

The Altova ServiceController (hereafter also called ServiceController) is an application for conveniently starting, stopping and configuring Altova services **on Windows systems**. It is not available on Linux systems.

Altova ServiceController is installed with Altova LicenseServer, and can be started by clicking its command in the Altova LicenseServer folder of the **Start** menu. After the ServiceController has been started, it can be accessed via the system tray (*screenshot below*).


To run the ServiceController after logging in to the system, click the ServiceController icon in the system tray to pop up the ServiceController menu (*screenshot below*), and then toggle on the command **Run Altova ServiceController at Startup**. (This command is toggled on by default.) To exit ServiceController, click the ServiceController icon in the system tray and, in the menu that pops up (*see screenshot below*), click **Exit Altova ServiceController**.

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**Starting and stopping Altova services**
Each installed Altova service component will have an entry in the ServiceController menu (*see screenshot above*). An Altova service can be started or stopped via a command in its ServiceController sub-menu. Additionally, important administration tasks of individual services can be accessed via the ServiceController menu. In the screenshot above, for example, the Altova FlowForce Web service has a sub-menu in which you can choose to access its Setup page.

### 2.5.6 How to Assign Licenses

To assign an Altova server product a license using Altova LicenseServer, you need to do the following:

1. Start LicenseServer.
2. Open the LicenseServer Configuration page, which is the administrator's interface with LicenseServer, on Windows or Linux.
3. Upload the license/s you have received from Altova to the license pool of your Altova LicenseServer. Do this in the License Pool tab of the LicenseServer Configuration page.
4. Register the Altova server product (FlowForce Server, MapForce Server, StyleVision Server) with LicenseServer. Depending on the product's type, the method of registering it with LicenseServer will be different: either via the product's GUI or its command line. See the documentation of your Altova server product for information about how to register it with LicenseServer.
5. In the Server Management tab of the LicenseServer Configuration page, assign a license to the Altova server product according to the number of cores on the product machine.

---

**Note on cores and licenses**
The licensing of Altova server products is based on the number of processor cores available on the product machine. For example, a dual-core processor has two cores, a quad-core processor four cores, a hexa-core processor six cores, and so on. The number of cores licensed for a product on a particular server machine must be greater than or equal to the number of cores available on that server, whether it's a physical or virtual machine.

For example, if a server has eight cores (an octa-core processor), you must purchase at least an 8-core license. You can also combine licenses to achieve the core count. So, two 4-core licenses can also be used for an octa-core server instead of an 8-core license.

If you are using a computer server with a large number of CPU cores but only have a low volume to process, you may also create a virtual machine that is allocated a smaller number of cores, and purchase a license for that number. Such a deployment, of course, will have less processing speed than if all available cores on the server were utilized.

**Note:** Each license can be used for only one client machine at a time, even if it has unused licensing capacity. For example, if a 10-core license is used for a client machine that has 6 CPU cores, then the remaining 4 cores of the license cannot be used simultaneously for another client machine.

**Start LicenseServer**

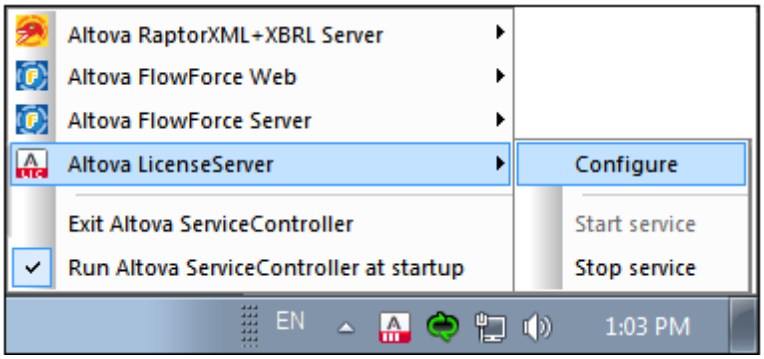
*This section:*

- How to start LicenseServer on Windows systems
- How to start LicenseServer on Linux systems
- How to start LicenseServer on Mac OS X systems
- Note about Connection to altova.com

---

**Windows systems**
You can start LicenseServer via the Altova ServiceController, which is available in the system tray.

First, click **Start | All Programs | Altova LicenseServer | Altova ServiceController** to start Altova ServiceController and display its icon in the system tray (*see screenshot below*). If you select the *Run Altova ServiceController at Startup* option, Altova ServiceController will start up on system start and its icon will be available in the system tray from then onwards.




To start LicenseServer, click the Altova ServiceController icon in the system tray, mouse over **Altova LicenseServer** in the menu that pops up (*see screenshot above*), and then select **Start Service** from the LicenseServer submenu. If LicenseServer is already running, the *Start Service* option will be disabled.

---

**Linux systems**
To start LicenseServer as a service on Linux systems, run the following command in a terminal window.

```
[Debian]:          sudo /etc/init.d/licenseserver start

[Ubuntu]:          sudo initctl start licenseserver

[CentOS]:          sudo initctl start licenseserver

[RedHat]:          sudo initctl start licenseserver
```

(If you need to stop LicenseServer, replace **`start`** with **`stop`** in the above command.)

---

**Mac OS X systems**
To start LicenseServer as a service on Mac OS X systems, run the following command in a terminal window:

```
sudo launchctl load /Library/LaunchDaemons/com.altova.LicenseServer.plist
```

If at any time you need to stop LicenseServer, use:

```
sudo launchctl unload /Library/LaunchDaemons/com.altova.LicenseServer.plist
```

---

**Connection to the Master Licensing Server at altova.com**
The Altova LicenseServer needs to be able to communicate with the Master Licensing Server at `altova.com` to validate and authenticate license-related data and to ensure continuous compliance with the Altova license agreements. This communication occurs over HTTPS using port 443. If the Altova LicenseServer, after making the initial verification with the `altova.com` Master Licensing Server, is unable to again connect with `altova.com` for a duration of more than 5 days (= 120 hours), then the Altova LicenseServer will no longer permit the usage of any Altova software products connected to the Altova LicenseServer.

Any such loss of connection with the `altova.com` master servers will be logged in the Messages tab of the Configuration page of the Altova LicenseServer. In addition, the administrator can configure the Altova LicenseServer to automatically send an alert email when the connection to `altova.com` is lost. Alert Mail settings are available in the Settings tab of the Configuration page.

### Open LicenseServer Config Page (Windows)

*This section:*

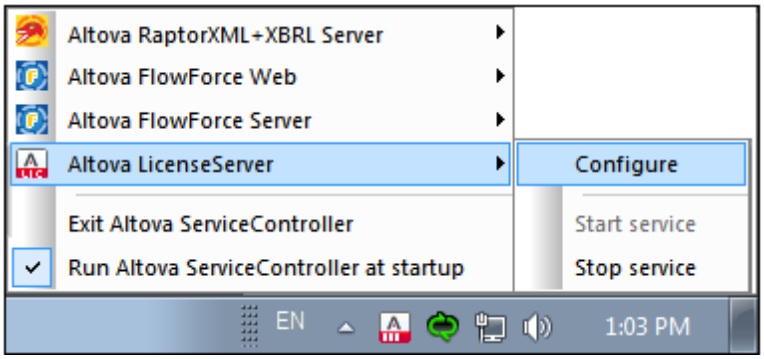
- Opening the Configuration page if LicenseServer is on the same machine
- Opening the Configuration page if LicenseServer is on another machine
- Logging in with the initial password
- Setting a fixed port for the Configuration page

---

**Opening the Configuration page if LicenseServer is on the same machine**
On Windows systems, if LicenseServer is on the same machine, you can open the Configuration page of LicenseServer in one of two ways:

- Click **Start | All Programs | Altova LicenseServer | LicenseServer Configuration Page**. The Configuration page opens in a new tab of your Internet browser.

- Click the Altova ServiceController icon in the system tray, mouse over **Altova LicenseServer** in the menu that pops up (*see screenshot below*), and then select **Configure** from the LicenseServer submenu.




The Configuration page opens in a new browser window, and its login mask is displayed (*screenshot below*).

---

**Opening the Configuration page if LicenseServer is on another machine**
To open the LicenseServer Configuration page from some other Windows machine on the local network (than that on which LicenseServer is installed), enter the URL of the LicenseServer Configuration page in the address bar of a browser and press **Enter**. By default, the URL of the Configuration page will be:

```
http://<serverIPAddressOrName>:8088/
```

The URL is present in the HTML code of the Configuration page itself, which is named **`WebUI.html`** and is located at:

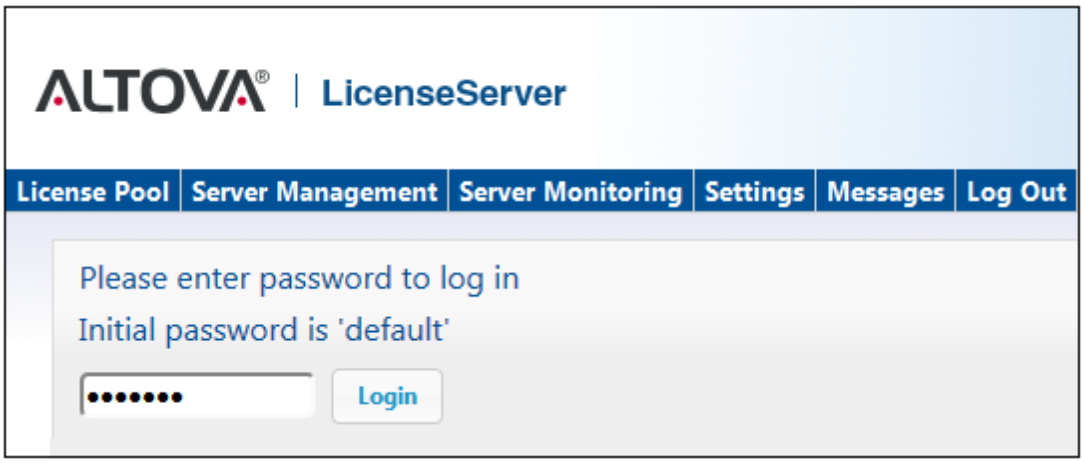
```
C:/ProgramData/Altova/LicenseServer/WebUI.html
```

If you have set the URL of the Configuration page to be generated dynamically (in the Settings tab of the Configuration page), then a new URL is generated each time LicenseServer is started. You will need to check the current version of **`WebUI.html`** to find out the current URL of the Configuration page.

The dynamically generated URL in **`WebUI.html`** will have a form something like: `http://127.0.0.1:55541/optionally-an-additional-string`, and it is located in the function `checkIfServiceRunning()`in a script near the end of the `<head>` element. While the port number in the URL is dynamically assigned, the IP address part identifies the server on which LicenseServer has been installed. If you wish to access the LicenseServer Configuration page from another machine, make sure that the IP address part of the URL has the correct IP address or name of the server on which LicenseServer has been installed. For example, the URL could be something like: `http://MyServer:55541`.

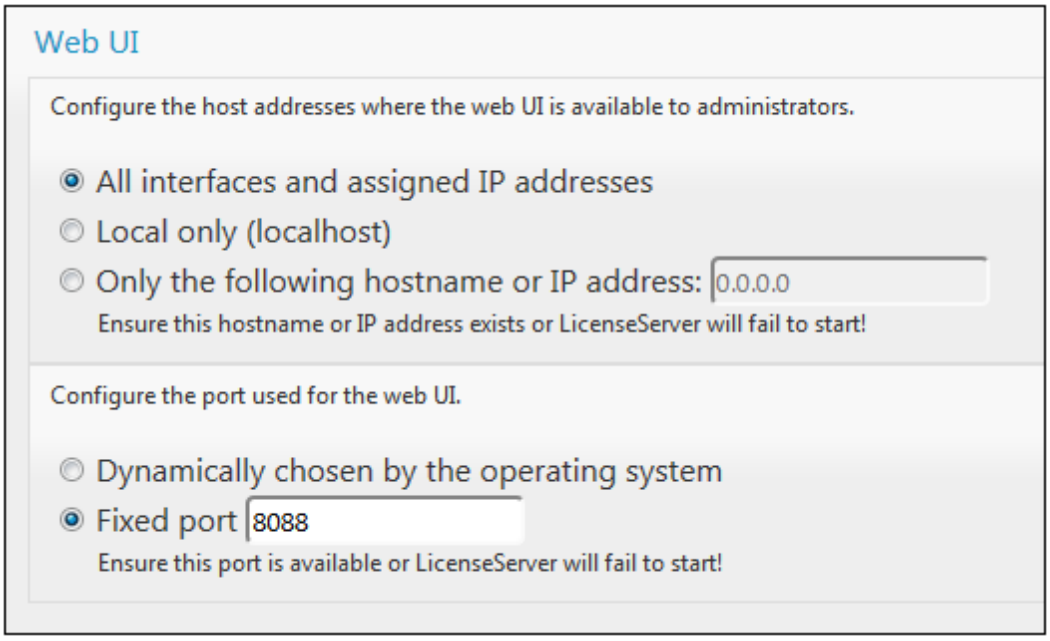
---

**Logging in with the initial password**
After going through the steps above, the Configuration page is opened with the login mask displayed (*screenshot below*). You can log in with the initial password of `default`. After you have logged in, you can change your password in the Settings tab.




**Setting a fixed or dynamic port for the Configuration page**

The port of the Configuration page (and consequently its address) can be specified in the Settings page. By default the port is `8088`. You can set any other port you want for the LicenseServer Configuration page (*see screenshot below*). Alternatively, you allow the port to be selected dynamically each time LicenseServer starts up. In this case, you will need to find out the URL of the Configuration page from the file `WebUI.html` (see Open LicenseServer Config Page (Windows) and Open LicenseServer Config Page (Linux)).




The advantage of a fixed port is that the page URL is known in advance and therefore can be accessed easily. If the port is assigned dynamically, the port part of the URL will have to be looked up in the file `WebUI.html` each time LicenseServer is started.

### Open LicenseServer Config Page (Linux)

*This section:*



---

**Opening the Configuration page for the first time with the returned URL**
On Linux systems, when you register your Altova server product with LicenseServer via the CLI, the URL of the LicenseServer Configuration page is returned. On opening this URL in a browser, you are prompted to read and accept the license agreement. After accepting the license agreement, the Configuration page's login mask is displayed (*screenshot below*).

---

**URL of the LicenseServer Configuration page**
To open the LicenseServer Configuration page at any time, enter its URL in the address bar of a browser and press **Enter**. By default, the URL of the Configuration page will be:

```
http://<serverIPAddressOrName>:8088/
```

The URL is present in the HTML code of the Configuration page itself, which is named **webUI.html** and is located at:

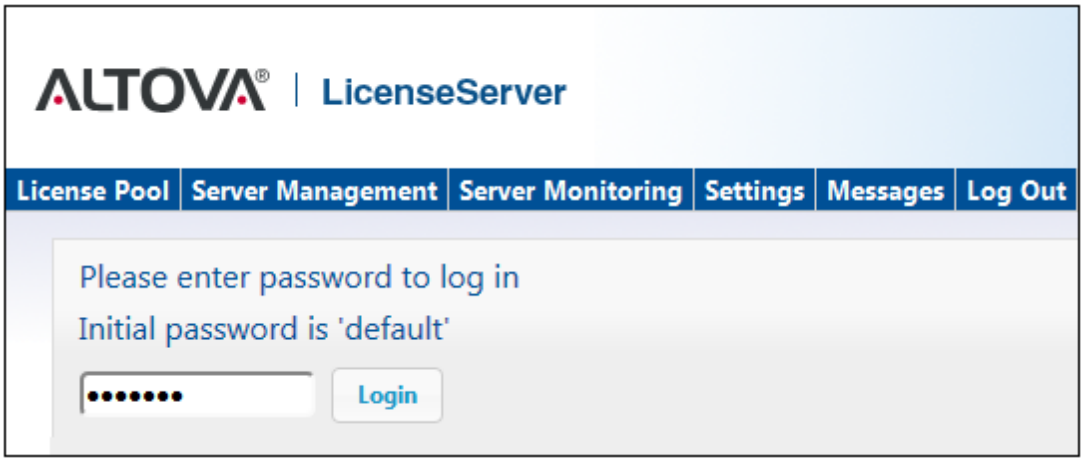
```
/var/opt/Altova/LicenseServer/webUI.html
```

If you have set the URL of the Configuration page to be generated dynamically (in the Settings tab of the Configuration page), then a new URL is generated each time LicenseServer is started. You will need to check the current version of **webUI.html** to find out the current URL of the Configuration page.

The dynamically generated URL in **webUI.html** will have a form something like: `http://127.0.0.1:55541`, and it is located in the function `checkIfServiceRunning()` in a script near the end of the `<head>` element. While the port number in the URL is dynamically assigned, the IP address part identifies the server on which LicenseServer has been installed. If you wish to access the LicenseServer Configuration page from another machine, make sure that the IP address part of the URL has the correct IP address or name of the server on which LicenseServer has been installed. For example, the URL could be something like: `http://MyServer:55541`.

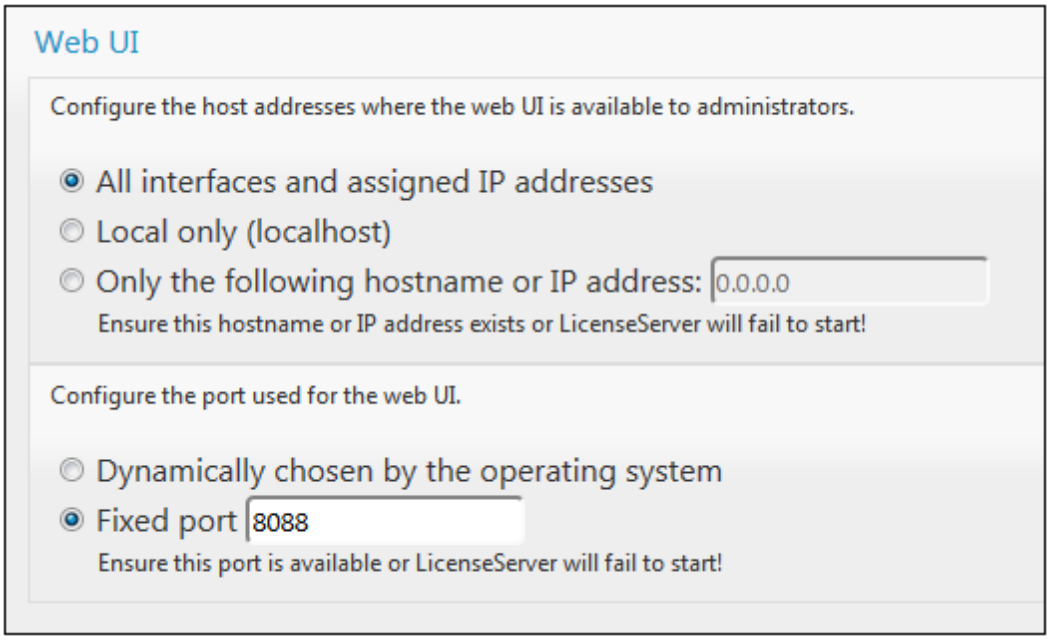
---

**Logging in with the initial password**
After going through the steps above, the Configuration page is opened with the login mask displayed (*screenshot below*). You can log in with the initial password of `default`. After you have logged in, you can change your password in the Settings tab.




**Setting a fixed or dynamic port for the Configuration page**

The port of the Configuration page (and consequently its address) can be specified in the Settings page. By default the port is `8088`. You can set any other port you want for the LicenseServer Configuration page (*see screenshot below*). Alternatively, you allow the port to be selected dynamically each time LicenseServer starts up. In this case, you will need to find out the URL of the Configuration page from the file `WebUI.html` (see Open LicenseServer Config Page (Windows) and Open LicenseServer Config Page (Linux)).




The advantage of a fixed port is that the page URL is known in advance and therefore can be accessed easily. If the port is assigned dynamically, the port part of the URL will have to be looked up in the file `WebUI.html` each time LicenseServer is started.

### Open LicenseServer Config Page (Mac OS X)

*This section:*



---

#### Opening the Configuration page for the first time with the returned URL

On Mac OS X systems, when you register your Altova server product with LicenseServer via the CLI, the URL of the LicenseServer Configuration page is returned. On opening this URL in a browser, you are prompted to read and accept the license agreement. After accepting the license agreement, the Configuration page's login mask is displayed (*screenshot below*).

---

#### URL of the LicenseServer Configuration page

To open the LicenseServer Configuration page at any time, enter its URL in the address bar of a browser and press **Enter**. By default, the URL of the Configuration page will be:

```
http://<serverIPAddressOrName>:8088/
```

The URL is present in the HTML code of the Configuration page itself, which is named **webUI.html** and is located at:

```
/var/Altova/LicenseServer/webUI.html
```

If you have set the URL of the Configuration page to be generated dynamically (in the Settings tab of the Configuration page), then a new URL is generated each time LicenseServer is started. You will need to check the current version of **webUI.html** to find out the current URL of the Configuration page.

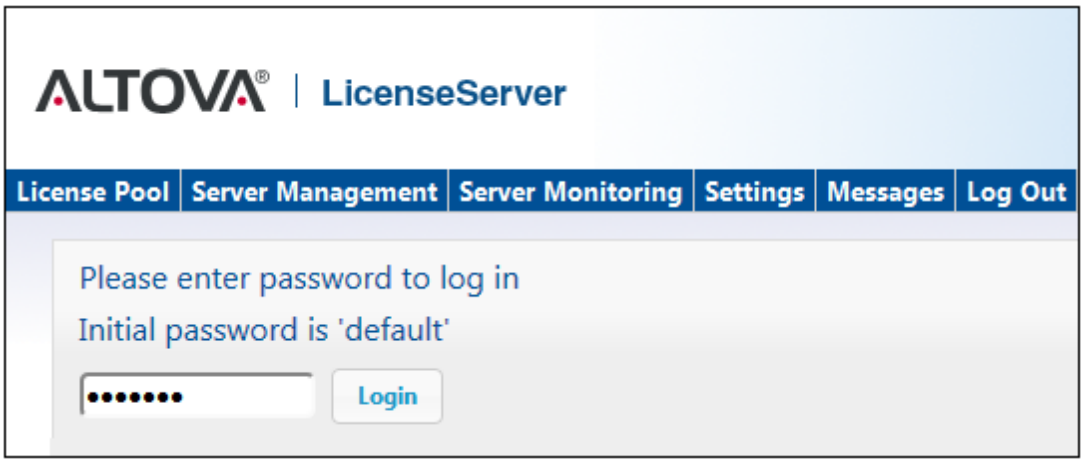
The dynamically generated URL in **webUI.html** will have a form something like: `http://127.0.0.1:55541`, and it is located in the function `checkIfServiceRunning()` in a script near the end of the `<head>` element. While the port number in the URL is dynamically assigned, the IP address part identifies the server on which LicenseServer has been installed. If you wish to access the LicenseServer Configuration page from another machine, make sure that the IP address part of the URL has the correct IP address or name of the server on which LicenseServer has been installed. For example, the URL could be something like: `http://MyServer:55541`.

**Note:** The Configuration page can also be accessed directly via the **Finder | Applications | Altova License Server** icon.

---

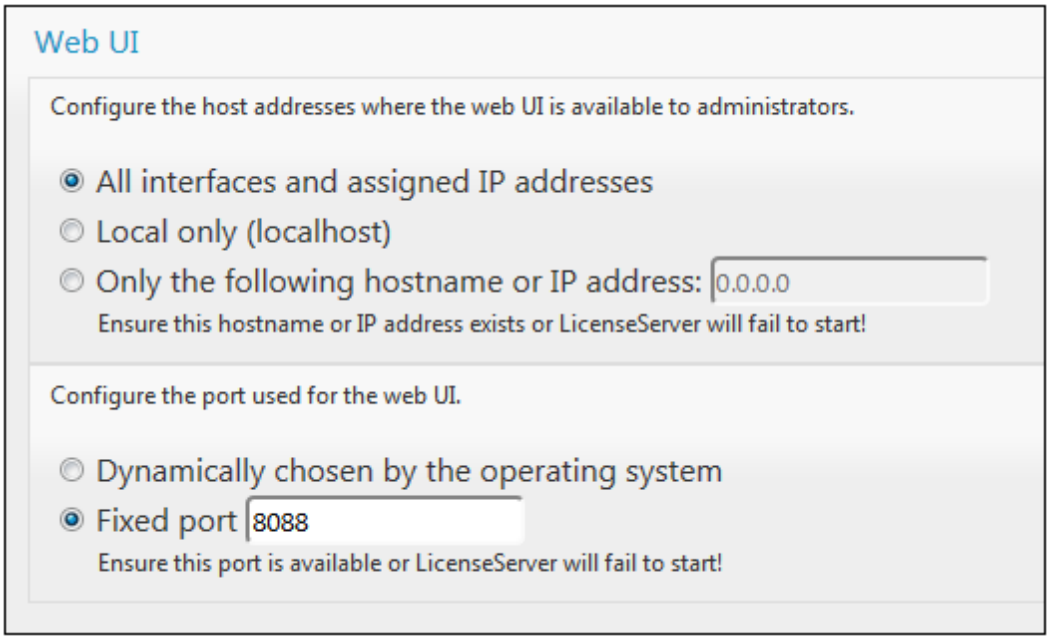
#### Logging in with the initial password

After going through the steps above, the Configuration page is opened with the login mask displayed (*screenshot below*). You can log in with the initial password of `default`. After you have logged in, you can change your password in the Settings tab.




**Setting a fixed or dynamic port for the Configuration page**

The port of the Configuration page (and consequently its address) can be specified in the Settings page. By default the port is `8088`. You can set any other port you want for the LicenseServer Configuration page (*see screenshot below*). Alternatively, you allow the port to be selected dynamically each time LicenseServer starts up. In this case, you will need to find out the URL of the Configuration page from the file `WebUI.html` (see Open LicenseServer Config Page (Windows) and Open LicenseServer Config Page (Linux)).




The advantage of a fixed port is that the page URL is known in advance and therefore can be

accessed easily. If the port is assigned dynamically, the port part of the URL will have to be looked up in the file `WebUI.html` each time LicenseServer is started.

### Upload Licenses to LicenseServer

*This section:*

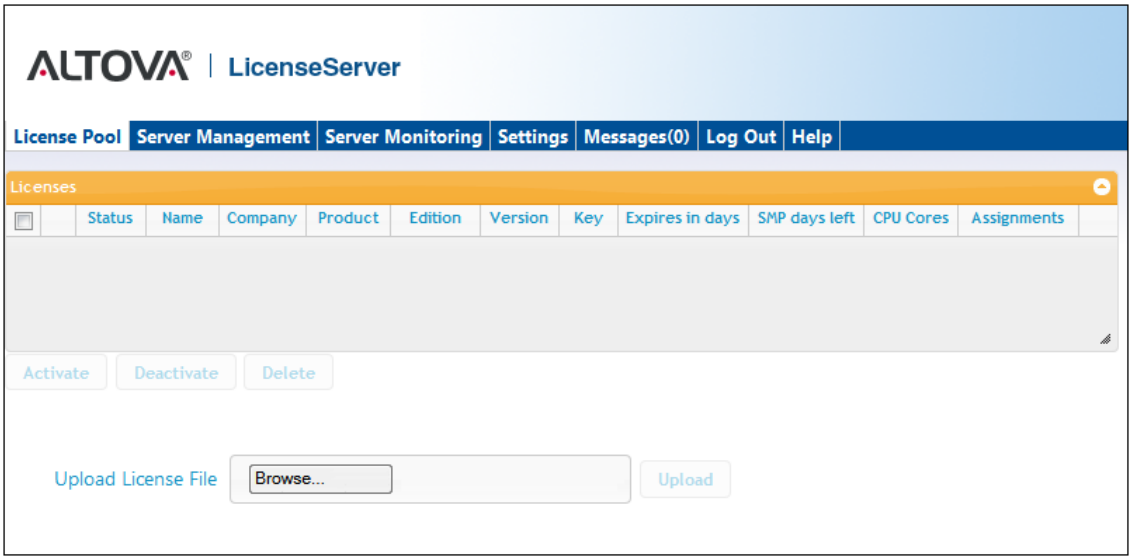


---

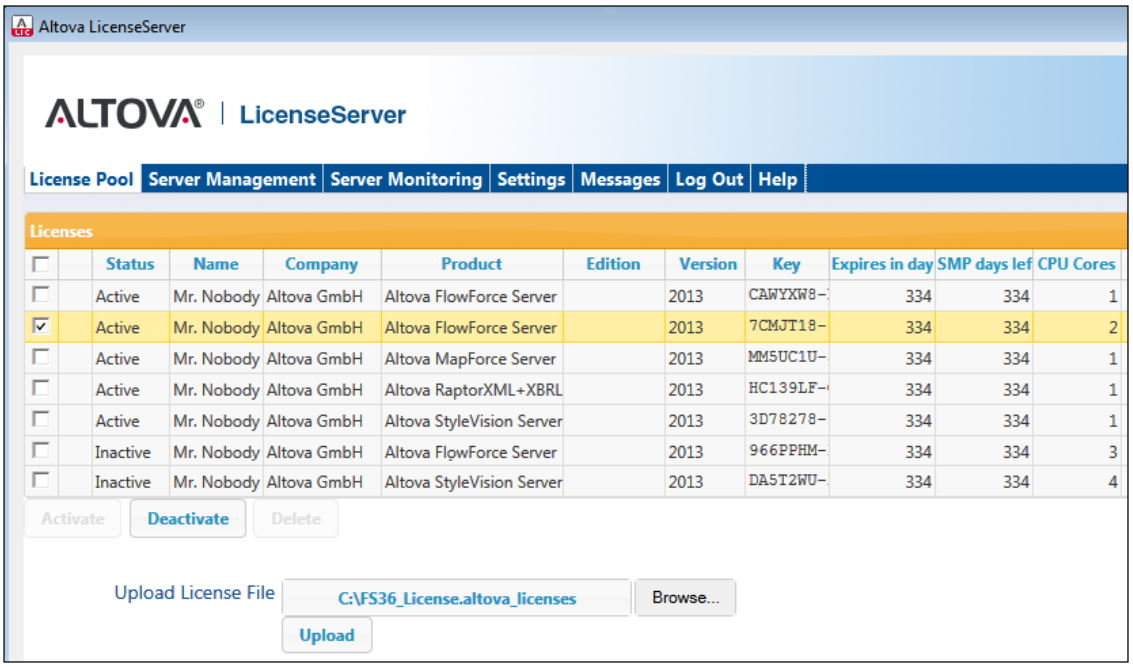
### Uploading a license file to the license pool of LicenseServer

After you have obtained a license file from Altova, you must upload it to the Altova LicenseServer. (How to do this is described below.) Each license file can contain one or more licenses and depends on your purchase. When you upload a license file, all the licenses in it will be uploaded to LicenseServer and can be assigned to an Altova product that has been registered with that LicenseServer. All the uploaded licenses, from one or more license files and for all Altova products, are collected in a license pool on the LicenseServer. The license pool is displayed in the License Pool tab of the LicenseServer Configuration page (*screenshot below*).

License files are uploaded to the LicenseServer using the Upload function of the License Pool tab (*see screenshot below*).




Click the **Browse** button and select the license file you want. The license file will appear in the Upload License File text field and the **Upload** button will be enabled. Click the **Upload** button to upload the license file. All the licenses in the file are uploaded and displayed in the License Pool tab. The screenshot below shows multiple licenses, uploaded from multiple license files.




**License status**
License status values are as follows:

- *Activating:* When a license is uploaded into the license pool of LicenseServer, the server will transmit license-related data to the `altova.com` master licensing server to validate, authenticate, and activate the license that was supplied. This is necessary to ensure compliance with the Altova license agreements. During this initial activation and authentication transaction—which typically lasts between 30 seconds and a couple of minutes, depending on your Internet connection, speed, and overall network traffic—the status of the license will be indicated as *Activating...*.

- *Failed Verification:* If a connection with the `altova.com` master licensing server cannot be made, then the status of the license in the pool will be shown as *Failed Verification*. If this happens, check your Internet connection and firewall rules to ensure that LicenseServer is able to communicate with the `altova.com` master licensing server.

- *Active:* Once the license has been authenticated and activated, the status in the pool will change to *Active*.

- *Inactive:* If a license has been verified, but is present on another LicenseServer on the network, the status in the pool will be shown as *Inactive*. An *Inactive* status also results when a license is manually deactivated in the license pool by the administrator.

- *Blocked:* A license is shown in the license pool as *Blocked* if there was a problem authenticating the license and the `altova.com` master licensing server has not granted permission to the LicenseServer to use this license. This could be the result of a license agreement violation, over-usage of a license, or other compliance issues. Should you see a license showing up as *Blocked*, please contact Altova Support with your license

information and any other relevant data.

These statuses are summarized in the table below:

| Status | Meaning |
|---|---|
| *Activating...* | On upload, license information is sent to `altova.com` for verification. Refresh the browser to view the updated status. Verification and activation can take a few minutes. |
| *Failed Verification* | A connection to `altova.com` could not be made. After establishing a connection, either restart the service or activate the license (with the **Activate** button). |
| *Active* | Verification was successful, the license is active. |
| *Inactive* | Verification was successful, but the license is on another LicenseServer on the network. Licenses can be made inactive with the **Deactivate** button. |
| *Blocked* | Verification was not successful. License is invalid and is blocked. Contact Altova Support. |

**Note:** After a license has been sent to `altova.com` for verification, the browser must be refreshed to see the updated status. Verification and activation can take a few minutes.

**Note:** If a connection to `altova.com` could not be made, the status will be *Failed Verification*. After establishing a connection, either restart the service or try activating the license with the **Activate** button.

**Note:** When a license is given a status of *Inactive* or *Blocked*, a message explaining the status is also added to the Messages log.

Only an active license can be assigned to a product installation. An inactive license can be activated or deleted from the license pool. If a license is deleted from the license pool, it can be uploaded again to the pool by uploading the license file containing it. When a license file is updated, only those licenses in it that are not already in the pool will be uploaded to the pool. To activate, deactivate, or delete a license, select it and then click the **Activate**, **Deactivate**, or **Delete** button, respectively.

---

**Activate the license/s you wish to use**
Before you can assign a license to an Altova product, it must be active. So do ensure it is active. If it is inactive, select it and click **Activate**.

---

**Next Steps**
After you have uploaded the license file to the LicenseServer and checked that the license you want is active, do the following:

1. Register the Altova server product (FlowForce Server, MapForce Server, StyleVision Server) with LicenseServer. (If you have already done this prior to uploading the license file, you can now start assigning licenses.)
2. Assign a license to your Altova product that has been registered with the LicenseServer.

### Register FlowForce Server with LicenseServer

*This section:*



---

### Methods of registering FlowForce Server

FlowForce Server can be registered with LicenseServer using any of the following methods:

- Via the FlowForce Server Setup page (Windows and Linux)
- Via the FlowForce CLI (Windows)
- Via the FlowForce CLI (Linux)

---

### Accessing the FlowForce Server Setup page (Windows)

The FlowForce Server Setup page can be accessed in one of the following ways:

- Via the **Start** menu:
  *Start* | *Altova FlowForce Server 2014* | *FlowForce Server Setup Page*
- Via Altova ServiceController: Click the ServiceController icon in the system tray. In the menu that pops up, select *Altova FlowForce Web* | *Setup*.

This pops up the FlowForce Server Setup page (*screenshot above*).

---

### Accessing the FlowForce Server Setup page (Linux)

After you have installed FlowForce Server on Linux (see the FlowForce Server user documentation for information about how to do this), start FlowForce Web Server as a service with the following command:

```
sudo /etc/init.d/flowforcewebserver start
```

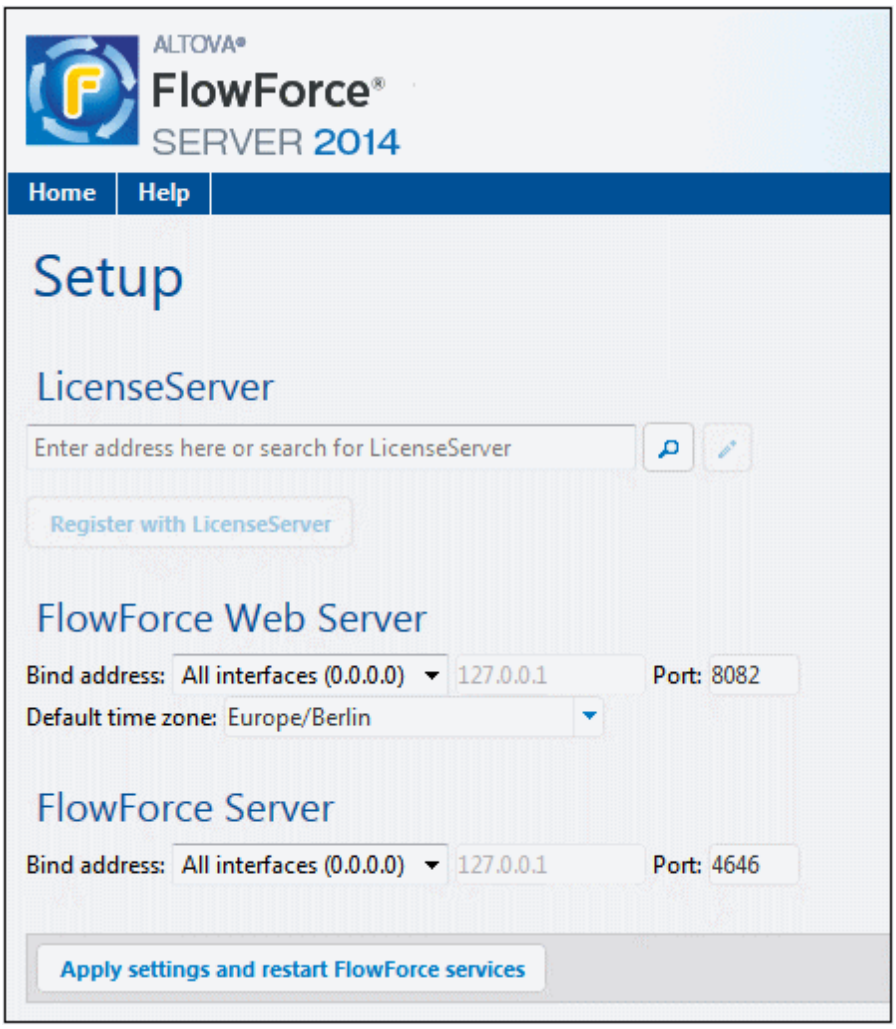
A message containing the URL of the FlowForce Server Setup appears in the terminal window:

```
FlowForceWeb running on http://127.0.1.1:3459/setup?key=52239315203
```

Enter the URL in the address field of a browser and hit **Enter** to access the FlowForce Server Setup page (*screenshot below*).

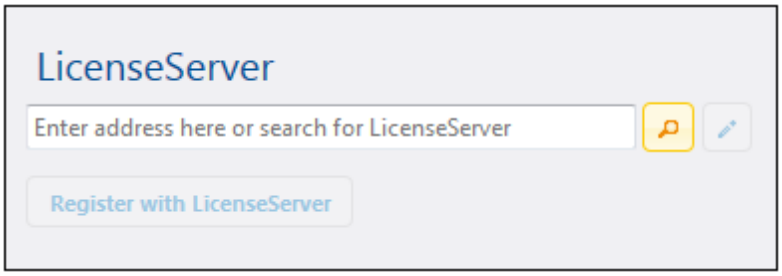
---

**Registering FlowForce Server via the Setup page (Windows and Linux)**
In the Setup page (*screenshot below*)—how to access it is described above—the LicenseServer field specifies the Altova LicenseServer to be used for registration.

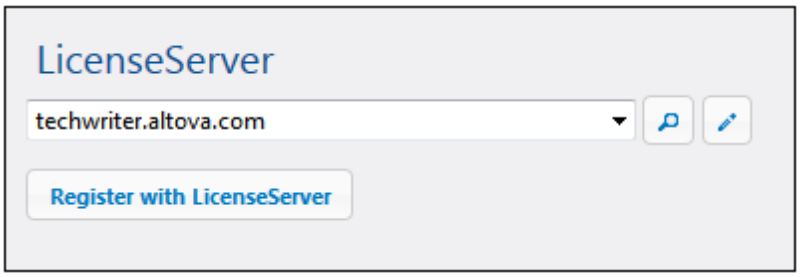



The LicenseServer can be specified in one of two ways.

- You can search for Altova LicenseServers that are currently available on the network—that is, those that are currently running. Do this by clicking the **Search for Altova LicenseServers** button (*highlighted yellow in the screenshot below*).



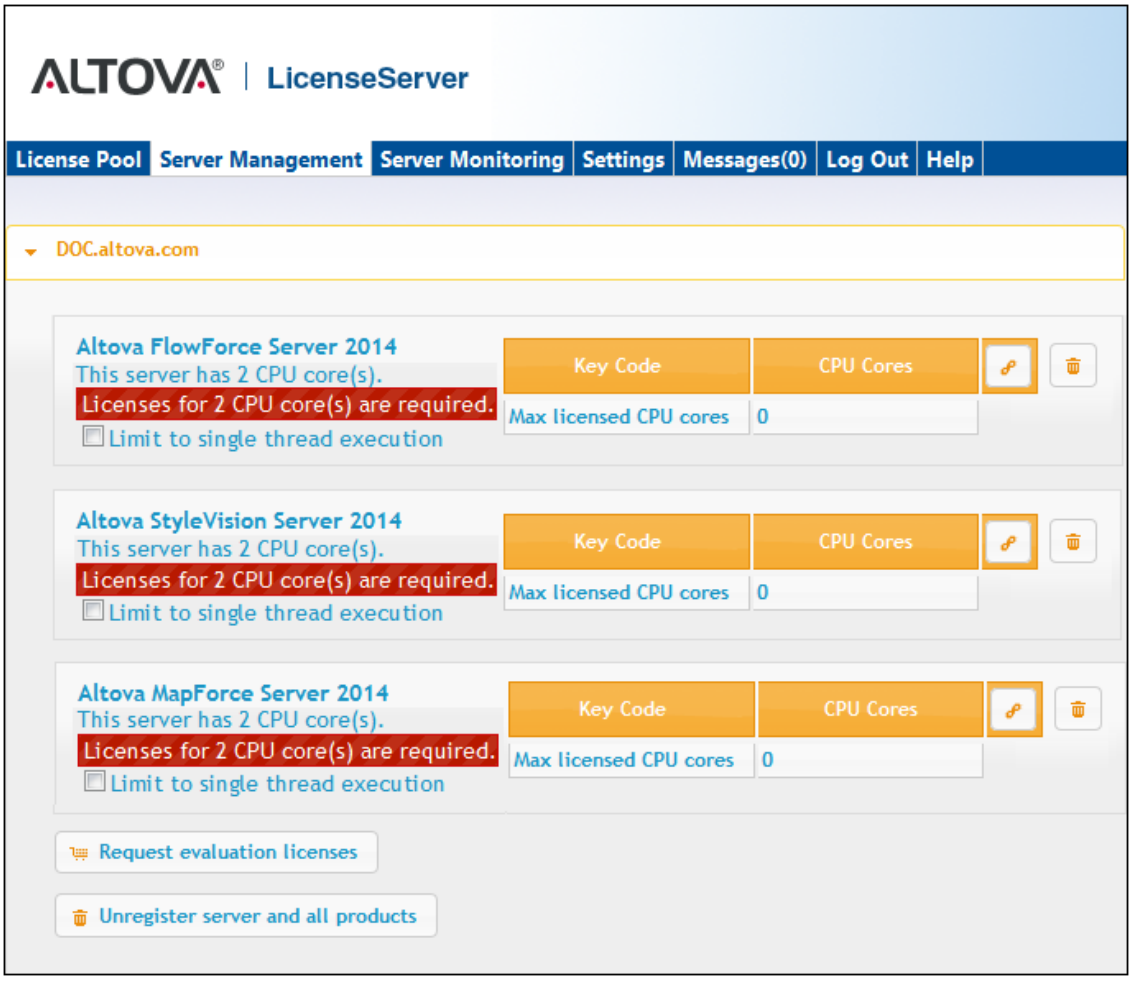

The search returns a list of available Altova LicenseServers on the network. One LicenseServer will be selected (*screenshot below*) and the others will be available in the dropdown list of the combo box. Select the LicenseServer on which your FlowForce license is stored.




- Alternatively, you can enter the address of the LicenseServer in the LicenseServer field. If the currently running LicenseServers are available as a dropdown list, you must click the **Manually Enter Address** button to be able to enter an address in the LicenseServer field.

After you have specified the LicenseServer, click **Register with LicenseServer**. The Altova server application will be registered with the specified LicenseServer, and that LicenseServer's Configuration page will open in a browser with its Server Management tab active (*screenshot below*).

**Note:** You may need to allow pop-ups in order for the LicenseServer Configuration page to be displayed.




In the screenshot below, three Altova products have been registered with the Altova LicenseServer at `DOC.altova.com`. How to assign licenses is described in the next section, Assign Licenses to Registered Products.

---

**Registering FlowForce Server via the FlowForce CLI (Windows)**
On Windows machines, FlowForce Server can also be registered with an Altova LicenseServer on your network via the command line (CLI) by using the `licenseserver` command:

```
FlowForceServer licenseserver Server-Or-IP-Address
```

For example, if LicenseServer is running on `http://localhost:8088`, then register FlowForce Server with:

```
FlowForceServer licenseserver localhost
```

If FlowForce Server was installed with other Altova server products as sub-packages, registering FlowForce Server will automatically also register the Altova server products. After successfully

registering FlowForce Server, you can go to LicenseServer and assign a license to FlowForce Server. How to do this is described in the section Assign Licenses to Registered Products.

---

**Registering FlowForce Server via the FlowForce CLI (Linux)**
On Linux machines, FlowForce Server can be registered with LicenseServer by using the `licenseserver` command of the FlowForce Server CLI. Note that FlowForce Server must be started with root rights.

```
sudo /opt/Altova/FlowForceServer2014/bin/flowforceserver licenseserver
localhost
```

In the command above, `localhost` is the name of the server on which LicenseServer is installed. Notice also that the location of the FlowForce Server executable is:

```
/opt/Altova/MapForceServer2014/bin
```

After successfully registering FlowForce Server, you can go to LicenseServer and assign a license to FlowForce Server. How to do this is described in the section Assign Licenses to Registered Products.

---

**Next Steps**
After you have registered your Altova product with LicenseServer, do the following:

1. If you have not already uploaded your license file/s to the LicenseServer (see previous section, Upload Licenses to LicenseServer), upload the license file now and check that the license you want is active. If you have already done this, carry on to the next step, Assign Licenses.
2. Assign a license to your Altova product that has been registered with the LicenseServer.

**Register MapForce Server with LicenseServer**

*This section:*

- Registering MapForce Server from FlowForce Server (Windows)
- Registering a standalone MapForce Server (Windows)
- Registering MapForce Server (Linux)
- Next steps

---

MapForce Server can be installed as part of the FlowForce Server package or as a standalone server product. In either case, it must be registered with Altova LicenseServer. Only after it has been registered with LicenseServer can a license be assigned to it from LicenseServer. On Windows systems, if MapForce Server was installed as part of the FlowForce Server package, it

will automatically be registered when FlowForce is registered. On Linux systems, only if MapForce Server is installed after FlowForce Server will it be registered automatically when FlowForce Server is registered subsequently.

---

**Registering MapForce Server from FlowForce Server (Windows)**
MapForce Server is packaged with FlowForce Server, so when FlowForce Server is registered with an Altova LicenseServer on your network, MapForce Server will automatically also be registered with LicenseServer. How to register FlowForce Server is described in the FlowForce Server documentation and in the section, Register FlowForce Server with LicenseServer.

After the registration, you can go to LicenseServer and assign a MapForce Server license to MapForce Server. How to do this is described in the section, Assign Licenses to Registered Products.

---

**Registering a standalone MapForce Server (Windows)**
If you have installed MapForce Server as a standalone package, you must register it with an Altova LicenseServer on your network and then license it from the Altova LicenseServer. You can register MapForce Server via its command line interface (CLI) by using the `licenseserver` command:

```
MapForceServer licenseserver Server-Or-IP-Address
```

For example, if LicenseServer is running on `http://localhost:8088`, then register MapForce Server with:

```
MapForceServer licenseserver localhost
```

After successfully registering MapForce Server, you can go to LicenseServer and assign a license to MapForce Server. How to do this is described in the section, Assign Licenses to Registered Products.

---

**Registering MapForce Server (Linux)**
On Linux machines, MapForce Server can be registered with LicenseServer by using the `licenseserver` command of the MapForce Server CLI. Note that MapForce Server must be started with root rights.

```
sudo /opt/Altova/MapForceServer2014/bin/mapforceserver licenseserver localhost
```

In the command above, `localhost` is the name of the server on which LicenseServer is installed. Notice also that the location of the MapForce Server executable is:

```
/opt/Altova/MapForceServer2014/bin
```

After successfully registering MapForce Server, you can go to LicenseServer and assign a license to MapForce Server. How to do this is described in the section Assign Licenses to Registered Products.

---

**Next Steps**
After you have registered your Altova product with LicenseServer, do the following:

1. If you have not already uploaded your license file/s to the LicenseServer (see previous section, Upload Licenses to LicenseServer), upload the license file now and check that the license you want is active. If you have already done this, carry on to the next step, Assign Licenses.
2. Assign a license to your Altova product that has been registered with the LicenseServer.

### Register StyleVision Server with LicenseServer

*This section:*

- Registering StyleVision Server from FlowForce Server (Windows)
- Registering a standalone StyleVision Server (Windows)
- Registering StyleVision Server (Linux)
- Next steps

---

StyleVision Server can be installed as part of the FlowForce Server package or as a standalone server product. In either case, it must be registered with Altova LicenseServer. Only after it has been registered with LicenseServer can a license be assigned to it from LicenseServer. On Windows systems, if StyleVision Server was installed as part of the FlowForce Server package, it will automatically be registered when FlowForce is registered. On Linux systems, only if StyleVision Server is installed after FlowForce Server will it be registered automatically when FlowForce Server is registered subsequently.

---

**Registering StyleVision Server from FlowForce (Windows)**
StyleVision Server is packaged with FlowForce Server, so when FlowForce Server is registered with an Altova LicenseServer on your network, StyleVision Server will automatically also be registered with LicenseServer. How to register FlowForce Server is described in the FlowForce Server documentation and in the section, Register FlowForce Server with LicenseServer.

After the registration, you can go to LicenseServer and assign a StyleVision Server license to StyleVision Server. How to do this is described in the section Assign Licenses to Registered Products.

---

**Registering a standalone StyleVision Server (Windows)**
If you have installed StyleVision Server as a standalone package on Windows, you must register it with an Altova LicenseServer on your network and then license it from the Altova LicenseServer. You can register StyleVision Server via its command line interface (CLI) by using the `licenseserver` command:

```
StyleVisionServer licenseserver Server-Or-IP-Address
```

For example, if LicenseServer is running on `http://localhost:8088`, then register StyleVision Server with:

```
StyleVisionServer licenseserver localhost
```

After successfully registering StyleVision Server, you can go to LicenseServer and assign a license to StyleVision Server. How to do this is described in the section Assign Licenses to Registered Products.

---

**Registering StyleVision Server (Linux)**
On Linux machines, StyleVision Server can be registered with LicenseServer by using the `licenseserver` command of the StyleVision Server CLI. Note that StyleVision Server must be started with root rights.

```
sudo /opt/Altova/StyleVisionServer2014/bin/stylevisionserver licenseserver
localhost
```

In the command above, `localhost` is the name of the server on which LicenseServer is installed. Notice also that the location of the StyleVision Server executable is:

```
/opt/Altova/StyleVisionServer2014/bin
```

After successfully registering StyleVision Server, you can go to LicenseServer and assign a license to StyleVision Server. How to do this is described in the section Assign Licenses to Registered Products.

---

**Next Steps**
After you have registered your Altova product with LicenseServer, do the following:

1. If you have not already uploaded your license file/s to the LicenseServer (see previous section, Upload Licenses to LicenseServer), upload the license file now and check that the license you want is active. If you have already done this, carry on to the next step,

Assign Licenses.
2. Assign a license to your Altova product that has been registered with the LicenseServer.

**Register RaptorXML(+XBRL) Server with LicenseServer**

*This section:*

- Registering RaptorXML(+XBRL) Server (Windows)
- Registering RaptorXML(+XBRL) Server (Linux)
- Next steps

---

RaptorXML(+XBRL) Server must be installed on the server machine or network to which LicenseServer is connected and then be started as a service. It must then be registered with LicenseServer. Only after registration can a license be assigned to it from LicenseServer. This section describes how to register RaptorXML(+XBRL) Server with LicenseServer.

---

**Registering RaptorXML(+XBRL) Server (Windows)**
You can register RaptorXML(+XBRL) Server via its command line interface (CLI) by using the `licenseserver` command:

| | |
|---|---|
| *RaptorXML Server:* | **`RaptorXML licenseserver Server-Or-IP-Address`** |
| *RaptorXML+XBRL Server:* | **`RaptorXMLXBRL licenseserver Server-Or-IP-Address`** |

For example, if LicenseServer is running on `http://localhost:8088`, then register RaptorXML(+XBRL) Server with:

| | |
|---|---|
| *RaptorXML Server:* | **`RaptorXML licenseserver localhost`** |
| *RaptorXML+XBRL Server:* | **`RaptorXMLXBRL licenseserver localhost`** |

After successfully registering RaptorXML(+XBRL) Server, you can go to LicenseServer and assign a license to RaptorXML(+XBRL) Server. How to do this is described in the section Assign Licenses to Registered Products.

---

**Registering RaptorXML(+XBRL) Server (Linux)**
On Linux machines, RaptorXML(+XBRL) Server can be registered with LicenseServer by using the `licenseserver` command of the RaptorXML(+XBRL) Server CLI. Note that RaptorXML(+XBRL) Server must be started with root rights.

```
sudo /opt/Altova/RaptorXMLServer2014/bin/raptorxmlserver licenseserver
localhost
sudo /opt/Altova/RaptorXMLXBRLServer2014/bin/raptorxmlxbrlserver licenseserver
localhost
```

In the command above, `localhost` is the name of the server on which LicenseServer is installed. Notice also that the location of the RaptorXML(+XBRL) Server executable is:

```
/opt/Altova/RaptorXMLServer2014/bin
/opt/Altova/RaptorXMLXBRLServer2014/bin
```

After successfully registering RaptorXML(+XBRL) Server, you can go to LicenseServer and assign a license to RaptorXML(+XBRL) Server. How to do this is described in the section Assign Licenses to Registered Products.

---

**Next Steps**
After you have registered your Altova product with LicenseServer, do the following:

1. If you have not already uploaded your license file/s to the LicenseServer (see previous section, Upload Licenses to LicenseServer), upload the license file now and check that the license you want is active. If you have already done this, carry on to the next step, Assign Licenses.
2. Assign a license to your Altova product that has been registered with the LicenseServer.

**Assign Licenses to Registered Products**

*This section:*



---

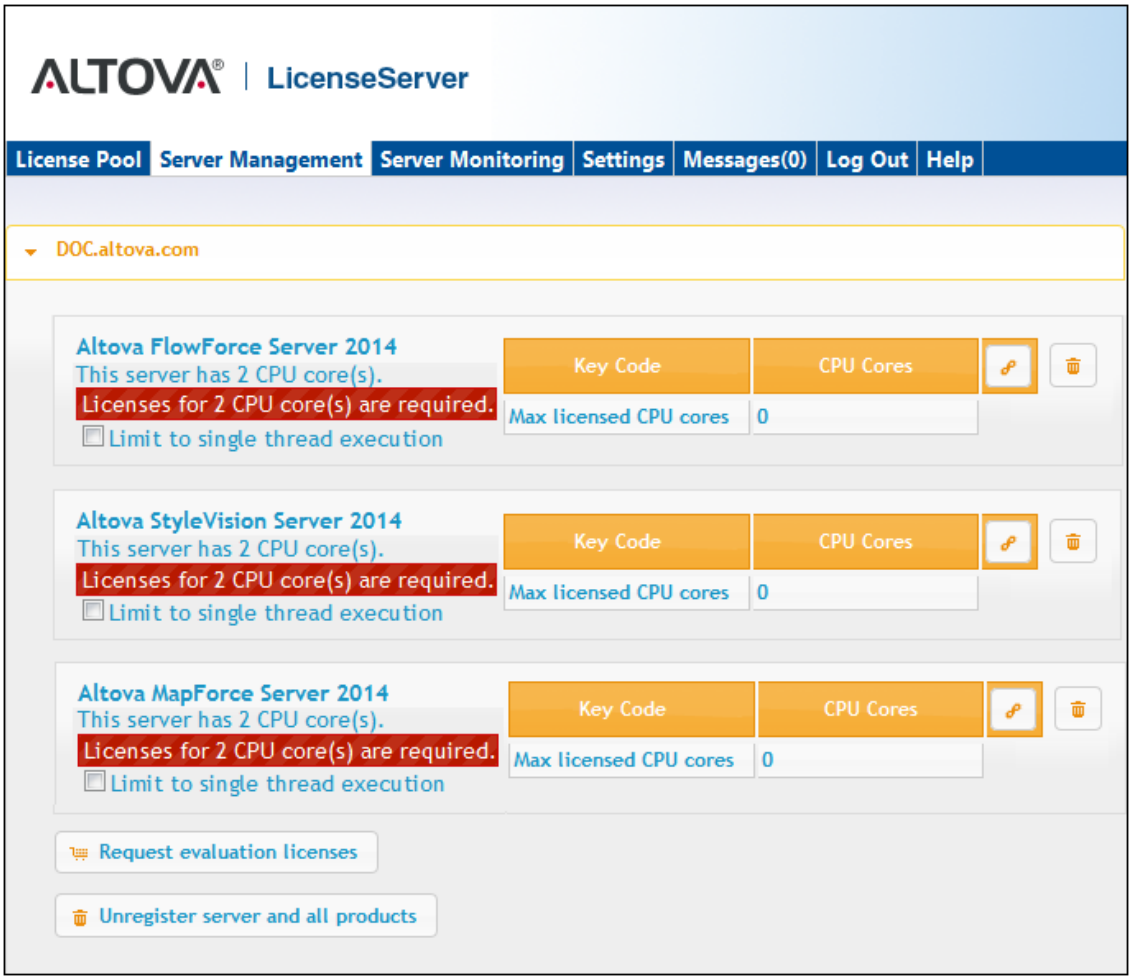
**Before assigning a license**
Before you assign a license to an Altova product, make sure that:

- The relevant license has been uploaded to the license pool of LicenseServer and that the license is active.
- Your Altova product has been registered with LicenseServer.

---

**The Server Management tab**

Licenses are assigned in the Server Management tab of the LicenseServer Configuration page (*screenshot below*). The screenshot shows that three Altova products have been registered with LicenseServer. (Since MapForce Server and StyleVision Server are bundled with FlowForce Server, registering FlowForce Server with LicenseServer automatically also registers MapForce Server and StyleVision Server. No additional registration of the latter two products are required if FlowForce Server is registered.)




Note the following points about the Server Management tab:

- Each product is listed under the name of its client machine. In the screenshot above, one client machine, named `Doc.altova.com`, is listed. This client machine (`Doc.altova.com`) has three Altova products registered with the LicenseServer. If an Altova product on a different client machine is registered with this LicenseServer, then that client machine, with its registered products, will also be listed in the Server Management tab.
- Each registered Altova product on a client machine has its own *Key Code* entry, which takes the key code of a license. A registered product's key code is assigned by clicking its **Edit Assigned Licenses** button (*see icon list below*) and selecting the required license from those available for that product (for example, FlowForce Server) in the license pool. This procedure is explained in more detail below.
- Each product also has a line stating how many CPU cores need to be licensed to run

that product on that client. If the number of licensed cores is less than the number required, then the information is marked in red (*see screenshot above*). (The number of CPU cores that need to be licensed is the number of CPU cores on that client and is obtained from the client machine by LicenseServer.)

- If **multiple versions** of a single product (for example, StyleVision Server 2013 and StyleVision Server 2014) have been installed on one machine and if each of these installations has been registered with a single LicenseServer, then the multiple registrations are consolidated in a single registration in the Server Management tab and displayed as a single registration. When a license is assigned to this single registration, all the installations indicated by that registration will be licensed. However, multiple instances of only one installation can be run simultaneously on the client machine. For example, multiple instances of StyleVision Server 2013 or multiple instances of StyleVision Server 2014 can be run simultaneously, but not one instance of StyleVision Server 2013 and one instance of StyleVision Server 2014. Note that newly installed versions must be registered for them to run.
- New versions of Altova server products can only be licensed with the latest version of LicenseServer at the time of the product's release. Older Altova server products will work with newer versions of LicenseServer. So, if you are installing a new version of an Altova server product and if your current LicenseServer version is not the latest, de-install the older version of LicenseServer and install the latest version. All registration and licensing information held in your older version of LicenseServer will be saved, at the time of de-installation, to a database on the server, and will be imported automatically into the newer version. (The version number of the LicenseServer that is appropriate for any particular version of a server product is displayed during the installation of that server product. You can choose to install this version along with the server product. The version of the currently installed LicenseServer is given at the bottom of the LicenseServer configuration page.)

---

**Icons in the Server Management tab**

*Edit Assigned Licenses*. Available with each product. Pops up the Manage Licenses dialog, in which new licenses can be assigned to the product and already assigned licenses can be edited.

*Show Licenses*. Appears with each license. Switches to the License Pool tab and highlights the selected license, so that license details can be read.

*Unregister This Product*. Available with each product. The selected product (on the selected client machine) will be unregistered from LicenseServer.

---

**Note on cores and licenses**

The licensing of Altova server products is based on the number of processor cores available on the product machine. For example, a dual-core processor has two cores, a quad-core processor four cores, a hexa-core processor six cores, and so on. The number of cores licensed for a product on a particular server machine must be greater than or equal to the number of cores available on that server, whether it's a physical or virtual machine.

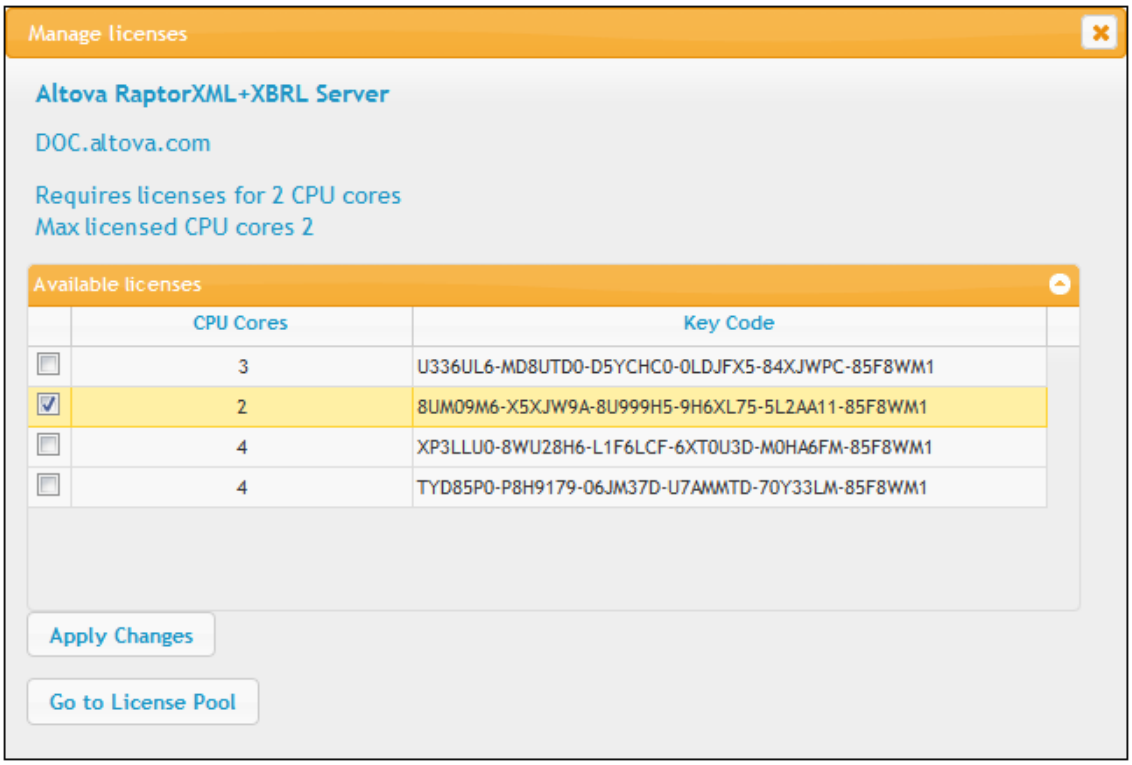
For example, if a server has eight cores (an octa-core processor), you must purchase at least an 8-core license. You can also combine licenses to achieve the core count. So, two 4-core licenses can also be used for an octa-core server instead of an 8-core license.

If you are using a computer server with a large number of CPU cores but only have a low volume to process, you may also create a virtual machine that is allocated a smaller number of cores, and purchase a license for that number. Such a deployment, of course, will have less processing speed than if all available cores on the server were utilized.

**Note:** Each license can be used for only one client machine at a time, even if it has unused licensing capacity. For example, if a 10-core license is used for a client machine that has 6 CPU cores, then the remaining 4 cores of the license cannot be used simultaneously for another client machine.

---

**Assigning a license**
To assign a license to a registered product, click the **Edit Assigned Licenses** button of that product. This pops up the Manage Licenses dialog (*screenshot below*).




Note the following points about the licenses displayed in the Manage Licenses dialog:

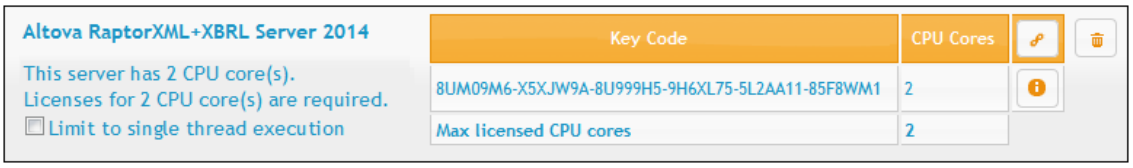
- The product to be licensed is listed at the top left of the dialog. In the screenshot above the product is Altova FlowForce Server 2013.
- The dialog displays all the currently active licenses for that product in the license pool. In our screenshot, four currently active FlowForce Server licenses are in the license pool.

LicenseServer will automatically detect from each license in the pool the product for which it has been issued.

- The licenses in the screenshot above have been licensed, respectively, for 3 CPU cores, 2 CPU cores, 4 CPU cores, and 4 CPU cores.
- You need to know the number of processor cores on the server on which the Altova server product has been installed. If the machine has a dual-core processor, you need a two-core (the CPU Cores count) license. This license could be, for example, the second license in the list shown in the screenshot above. You can also combine licenses. So, if the machine's processor is octa-core (eight-core), you can combine two 4-core licenses; for example, the third and fourth licenses in the list shown in the screenshot above.
- The Manage Licenses dialog will list only currently active licenses for that product. Licenses for other Altova products will not be listed.
- Licenses that have been assigned already—for example, to another installation of the product on the network—will have their check boxes checked. So only unchecked licenses may be selected.
- CPU cores indicates for how many CPU cores a license is valid.
- If you wish to make modifications to the license pool—for example, to upload, activate, deactivate, or delete a license—click the **Go to License Pool** button.

Select the license you wish to assign. The license's check box will be checked. Also, the total number of CPU cores licensed for that product on that client is listed near the top left of the dialog as *Max licensed CPU cores (see screenshot above)*. You can select more licenses if you wish to increase the number of licensed CPU cores for that product on that client. The *Max licensed CPU cores* in this case will be the sum of the CPU cores of all the selected licenses.

After selecting the license/s, click **Apply Changes**. The license/s will be assigned to that product and displayed in the Server Management tab (*see screenshot below*). The screenshot below shows that a 2-CPU-core license for Altova FlowForce Server has been assigned (to the client machine `Doc.altova.com`).

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**Unregistering products**

Each Altova product registered with LicenseServer is listed in the Server Management tab under its client machine name and has an **Unregister** icon to its right. Click this icon to unregister the product. If a license was assigned to the product, the assignment will be terminated when the product is unregistered. To unregister all products, click the **Unregister Server and All Products** button at the bottom of the Server Management tab (*see first screenshot in this section*).

To re-register a product, go to the product's pre-configuration page.

### 2.5.7 Configuration Page Reference

The LicenseServer Configuration page is the administrator's interface with LicenseServer. It allows the management of LicenseServer and the licensing of Altova products that have been registered with LicenseServer (FlowForce Server, MapForce Server, StyleVision Server, RaptorXML(+XBRL) Server).

The LicenseServer Configuration page is opened via a web browser. How to open the Configuration page is described in the sections, Open LicenseServer Config Page (Windows) and Open LicenseServer Config Page (Linux).

This section is a user's reference for the Configuration page and is organized by the tabs of the Configuration page:

- License Pool
- Server Management
- Server Monitoring
- Settings
- Messages, Log Out

For a step-by-step guide of how to assign licenses with LicenseServer, see the section How to Assign Licenses.

#### License Pool

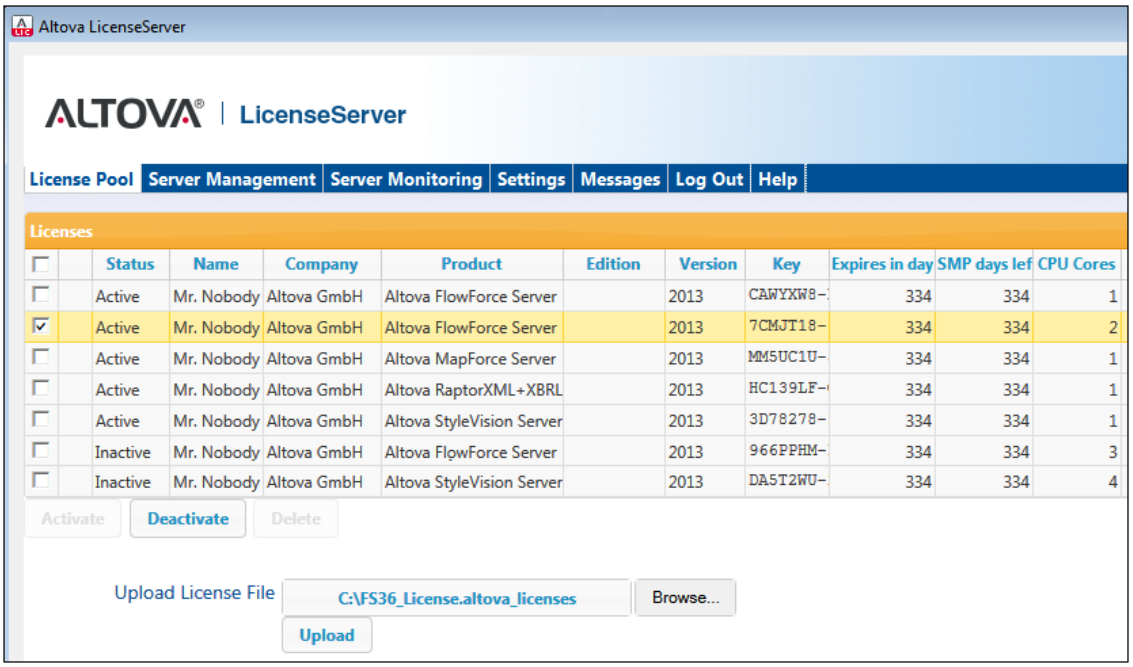
*This section:*

- Uploading a license
- License status
- Activating, de-activating, and deleting a license
- Icons in the License Pool tab
- License information
- Note on cores and licenses

---

The **License Pool** tab displays all the licenses that are currently on the LicenseServer (*see screenshot below*). When a license file is uploaded to the LicenseServer with the **Upload** button on this page, all the licenses contained in the license file are placed in the license pool on the server and are displayed on the License Pool page.

The License Pool page displays information about all the licenses currently on the LicenseServer and thus provides a convenient overview of all Altova product licenses. On this page you can also activate, deactivate, and delete selected licenses.

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**Uploading a license**
To upload a license file (which you receive from Altova GmbH for your Altova product), click the **Browse** button, browse for the license file and select it. On clicking **Upload**, all the licenses contained in the license file are placed in the license pool and displayed on the License Pool page (*screenshot above*).

---

**License status**
License status values are as follows:

- *Activating:* When a license is uploaded into the license pool of LicenseServer, the server will transmit license-related data to the `altova.com` master licensing server to validate, authenticate, and activate the license that was supplied. This is necessary to ensure compliance with the Altova license agreements. During this initial activation and authentication transaction—which typically lasts between 30 seconds and a couple of minutes, depending on your Internet connection, speed, and overall network traffic—the status of the license will be indicated as *Activating...*.

- *Failed Verification:* If a connection with the `altova.com` master licensing server cannot be made, then the status of the license in the pool will be shown as *Failed Verification*. If this happens, check your Internet connection and firewall rules to ensure that LicenseServer is able to communicate with the `altova.com` master licensing server.

- *Active:* Once the license has been authenticated and activated, the status in the pool will

change to *Active*.

- *Inactive:* If a license has been verified, but is present on another LicenseServer on the network, the status in the pool will be shown as *Inactive*. An *Inactive* status also results when a license is manually deactivated in the license pool by the administrator.

- *Blocked:* A license is shown in the license pool as *Blocked* if there was a problem authenticating the license and the `altova.com` master licensing server has not granted permission to the LicenseServer to use this license. This could be the result of a license agreement violation, over-usage of a license, or other compliance issues. Should you see a license showing up as *Blocked*, please contact Altova Support with your license information and any other relevant data.

These statuses are summarized in the table below:

| Status | Meaning |
|---|---|
| *Activating...* | On upload, license information is sent to `altova.com` for verification. Refresh the browser to view the updated status. Verification and activation can take a few minutes. |
| *Failed Verification* | A connection to `altova.com` could not be made. After establishing a connection, either restart the service or activate the license (with the **Activate** button). |
| *Active* | Verification was successful, the license is active. |
| *Inactive* | Verification was successful, but the license is on another LicenseServer on the network. Licenses can be made inactive with the **Deactivate** button. |
| *Blocked* | Verification was not successful. License is invalid and is blocked. Contact Altova Support. |

**Note:** After a license has been sent to `altova.com` for verification, the browser must be refreshed to see the updated status. Verification and activation can take a few minutes.

**Note:** If a connection to `altova.com` could not be made, the status will be *Failed Verification*. After establishing a connection, either restart the service or try activating the license with the **Activate** button.

**Note:** When a license is given a status of *Inactive* or *Blocked*, a message explaining the status is also added to the Messages log.

Only an active license can be assigned to a product installation. An inactive license can be activated or deleted from the license pool. If a license is deleted from the license pool, it can be uploaded again to the pool by uploading the license file containing it. When a license file is updated, only those licenses in it that are not already in the pool will be uploaded to the pool. To activate, deactivate, or delete a license, select it and then click the **Activate**, **Deactivate**, or **Delete** button, respectively.

**Connection to the Master Licensing Server at altova.com**

The Altova LicenseServer needs to be able to communicate with the Master Licensing Server at `altova.com` to validate and authenticate license-related data and to ensure continuous compliance with the Altova license agreements. This communication occurs over HTTPS using port 443. If the Altova LicenseServer, after making the initial verification with the `altova.com` Master Licensing Server, is unable to again connect with `altova.com` for a duration of more than 5 days (= 120 hours), then the Altova LicenseServer will no longer permit the usage of any Altova software products connected to the Altova LicenseServer.

Any such loss of connection with the `altova.com` master servers will be logged in the Messages tab of the Configuration page of the Altova LicenseServer. In addition, the administrator can configure the Altova LicenseServer to automatically send an alert email when the connection to `altova.com` is lost. Alert Mail settings are available in the Settings tab of the Configuration page.

---

**Activating, deactivating, and deleting a license**
An active license can be deactivated by selecting the license and clicking **Deactivate**. An inactive license can be activated (**Activate** button) or deleted (**Delete** button). When a license is deleted it is removed from the license pool. A deleted license can be added again to the license pool by uploading the license file containing it. If a license file is re-uploaded, only licenses that are not already in the license pool will be added to the license pool; licenses that are already in the pool will not be re-added.

---

**Icons in the License Pool tab**

*Edit Assigned Licenses*. Appears with each license (in the Assignments column). Pops up the Manage Licenses dialog, in which new licenses can be assigned to the product and already assigned licenses can be edited.

*Show License Information*. Appears with each license (in the Assignments column). Provides information about the currently active clients.

---

**License information**
The following license information is displayed:

- *Status:* There are five values: *Failed Verification* | *Activating* | *Active* | *Inactive* | *Blocked*. See License status above.
- *Name, Company:* The name and company of the licensee. This information was submitted at the time of purchase.
- *Product, Edition, Version:* The version and edition of the licensed products.
- *Key, Expires in days, SMP (days left):* The license key to unlock the product, and the number of days left before the license expires. Each licensed purchase comes with a

Support & Maintenance Package, which is valid for a certain number of days. The *SMP* column notes how many SMP days are still left.
- *CPU Cores:* The number of CPU cores that the license allows.
- *Assignments:* Access to editing dialogs and information of individual licenses.

---

**Note on cores and licenses**
The licensing of Altova server products is based on the number of processor cores available on the product machine. For example, a dual-core processor has two cores, a quad-core processor four cores, a hexa-core processor six cores, and so on. The number of cores licensed for a product on a particular server machine must be greater than or equal to the number of cores available on that server, whether it's a physical or virtual machine.

For example, if a server has eight cores (an octa-core processor), you must purchase at least an 8-core license. You can also combine licenses to achieve the core count. So, two 4-core licenses can also be used for an octa-core server instead of an 8-core license.

If you are using a computer server with a large number of CPU cores but only have a low volume to process, you may also create a virtual machine that is allocated a smaller number of cores, and purchase a license for that number. Such a deployment, of course, will have less processing speed than if all available cores on the server were utilized.

**Note:** Each license can be used for only one client machine at a time, even if it has unused licensing capacity. For example, if a 10-core license is used for a client machine that has 6 CPU cores, then the remaining 4 cores of the license cannot be used simultaneously for another client machine.

**Server Management**

*This section:*



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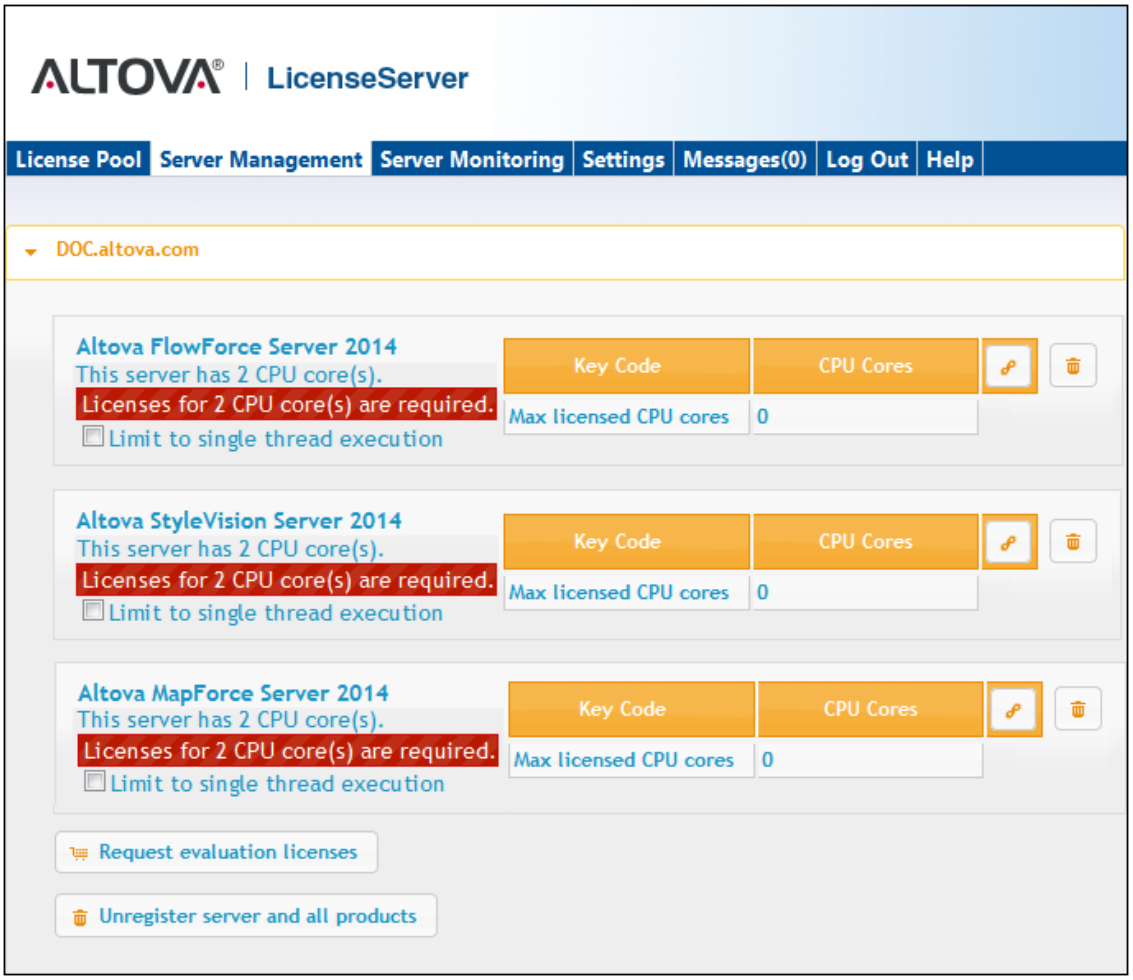
In the **Server Management** tab (*screenshot below*), you can assign licenses to registered products.




Note the following points about the Server Management tab:

- Each product is listed under the name of its client machine. In the screenshot above, one client machine, named `Doc.altova.com`, has three Altova products registered with the LicenseServer. If an Altova product on a different client machine is registered with this LicenseServer, then that client machine, with its registered products, will also be listed in the Server Management tab.
- Each registered Altova product on a client machine has its own *Key Code* entry, which takes the key code of a license. A registered product's key code is assigned by clicking its **Edit Assigned Licenses** button and selecting the required license from those available for that product (for example, FlowForce Server) in the license pool. This procedure is explained in more detail below.
- Each product also has a line stating how many CPU cores need to be licensed to run that product on that client. If the number of licensed cores is less than the number required, then the information is marked in red (*see screenshot above*). (The number of CPU cores that need to be licensed is the number of CPU cores on that client and is obtained from the client machine by LicenseServer.)

**Single thread execution**

If a product license for only one core is available in the license pool, a machine with multiple cores can be assigned this one-core license. In such a case, the machine will run that product on a single core. Processing will therefore be slower as multi-threading (which is possible on multiple cores) will not be available. The product will be executed in single thread mode on that machine.

To assign a single-core license to a multiple-core machine, select the *Limit to single thread execution* check box for that product.

---

**Icons in the Server Management tab**

*Edit Assigned Licenses*. Available with each product. Pops up the Manage Licenses dialog, in which new licenses can be assigned to the product and already assigned licenses can be edited.

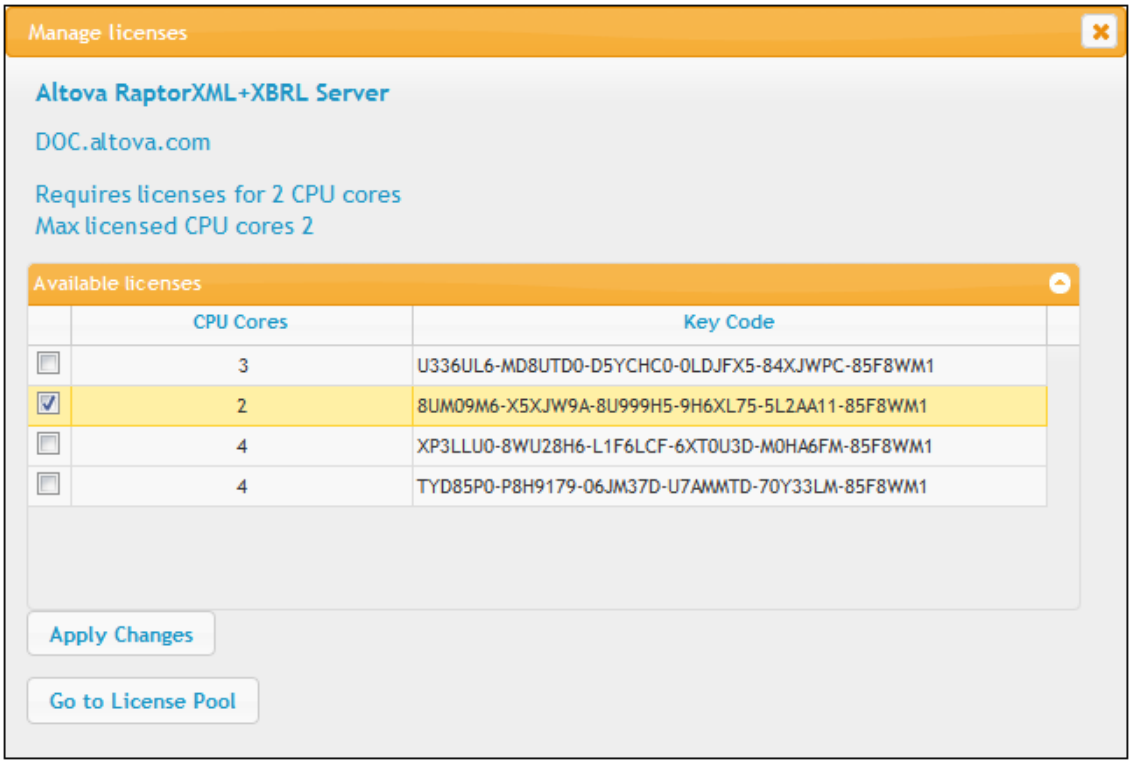
*Show Licenses*. Appears with each license. Switches to the License Pool tab and highlights the selected license, so that license details can be read.

*Unregister This Product*. Available with each product. The selected product (on the selected client machine) will be unregistered from LicenseServer.

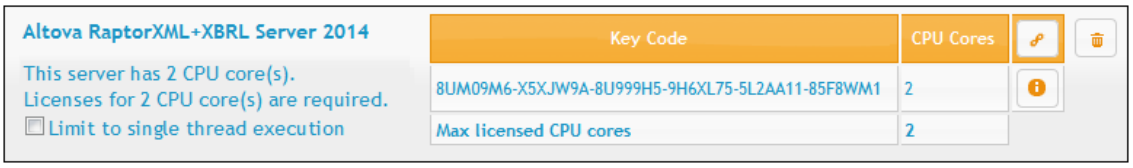
---

**Assigning a license**

To assign a license to a registered product, click the **Edit Assigned Licenses** button of that product. This pops up the Manage Licenses dialog (*screenshot below*).




Select the license you wish to assign. After selecting the license/s, click **Apply Changes**. The license/s will be assigned to that product and displayed in the Server Management tab (*see screenshot below*).

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**One client machine under different names**

If a client machine is registered more than once with LicenseServer, it might appear in the Server Management tab under multiple names, that is, with multiple entries. This could happen, for example, if a machine is re-registered with the host name given in a different form.

To ensure that additional licenses are not redundantly assigned to the same machine under its different names, you should unregister redundant client machine entries by clicking the **Unregister server and all products** button of these machines. *(Note: While the client machines are considered for the purposes of this documentation to be clients of LicenseServer, they are in effect servers of their own products.)* Also, if the same license is assigned multiple times to the same machine under its different names, licensing conflicts could arise. So, to avoid these two situations (redundant licensing and multiple assignments of a single license), it is recommended that redundant entries of a single client machine be unregistered.

Given below are forms a machine name might take in the Server Management tab:

- *Host name with domain name (the fully qualified domain name, FQDN), such as: "win80-x64_1.my.domain.com" or "Doc3.my.domain.com".* This happens when the host name of the machine (with or without the domain information) is passed as the argument of the `licenseserver` CLI command that is used to register the server product with LicenseServer. For example: `<AltovaServerProduct> licenseserver Doc3`. This produces an FQDN such as: `Doc3.my.domain.com`.

  An FQDN is also produced when `localhost` is supplied on Windows 7 systems as the host name.

- *Host name without domain name. For example: "win80-x64_1" or "Doc3".* This happens on Windows 8 systems when `localhost` is given as the machine name.

- *localhost*. In some cases, `localhost` is also displayed as a machine name.

**Note:** If, during installation of the Altova server product on Windows machines, the machine is automatically registered with LicenseServer, `localhost` is used by the installer as the machine name.

---

**Requesting an evaluation license**
You can obtain a 30-day free evaluation license for each of a client's installed Altova products that have been registered with LicenseServer. Click the **Request Evaluation Licenses** button near the bottom of the Server Management tab. A dialog pops up containing a list of the Altova server products (on that client machine) which have been registered with LicenseServer. Make sure that the products for which you want an evaluation license are checked, then fill in the registration fields, and send the request. You will receive an e-mail from Altova containing the 30-day evaluation license/s. The number of cores for which the license will be valid per product will be exactly the number required by the product at the time the request is sent. Save the license/s to disk and upload to the license pool.

---

**Unregistering products**
Each Altova product registered with LicenseServer is listed in the Server Management tab under its client machine name and has an **Unregister** icon to its right. Click this icon to unregister the product. If a license was assigned to the product, the assignment will be terminated when the product is unregistered. To unregister all products, click the **Unregister Server and All Products** button at the bottom of the Server Management tab (*see first screenshot in this section*).

To re-register a product with LicenseServer, go to the product's Setup page or its CLI and register it. *See:* Register FlowForce Server, Register MapForce Server, Register StyleVision Server, and Register RaptorXML(+XBRL) Server.

For more information, see the section, Assigning Licenses to Registered Products.

### Server Monitoring

The **Server Monitoring** tab provides an overview of servers currently running licensed Altova products. It contains product information along with information about users and licenses.

### Settings

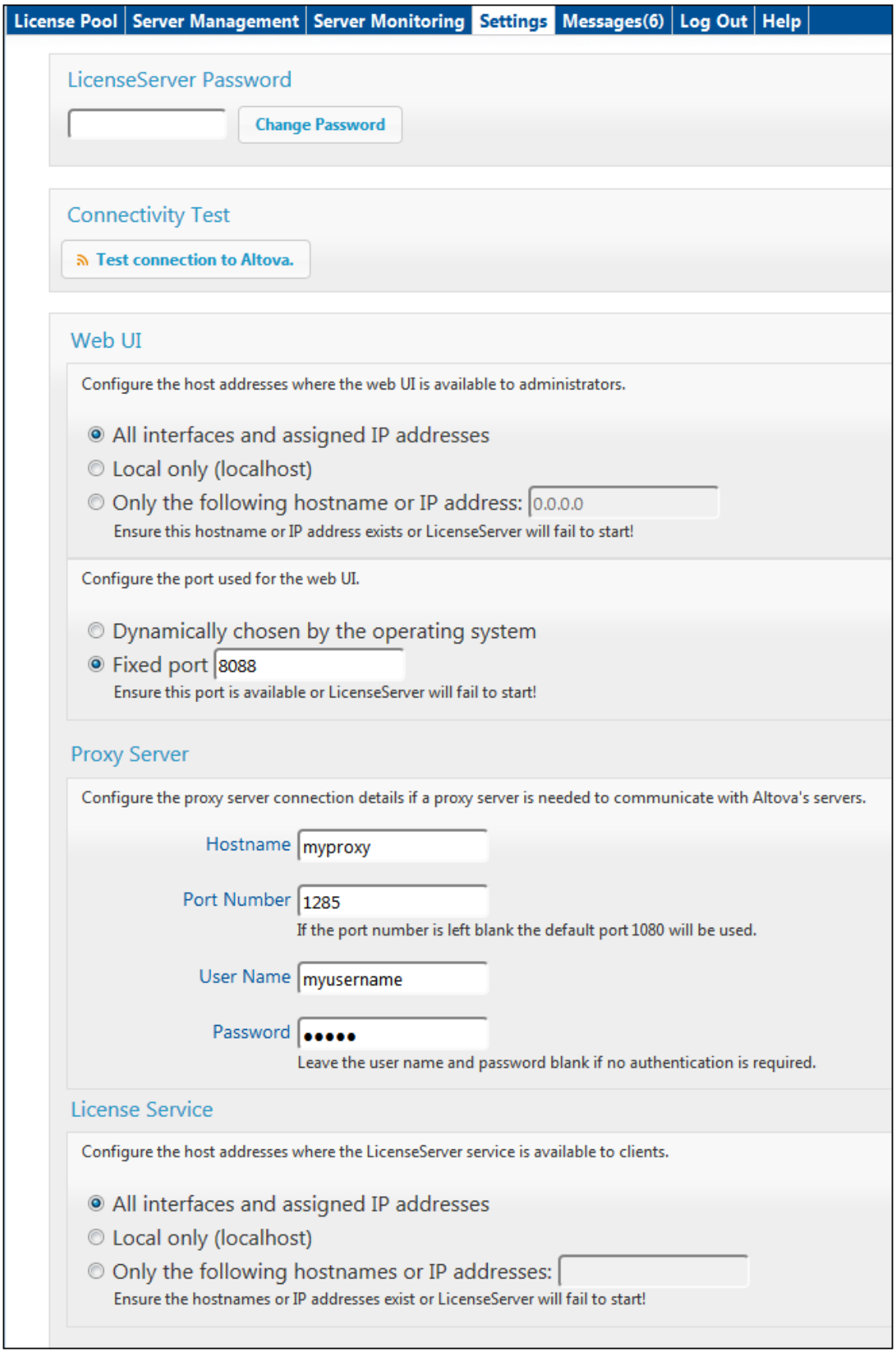
*This section:*

- Network settings
- Alert Mail settings
- Show hints for receiving and deploying evaluation licenses

---

The **Settings** tab is as shown below. You can set the following:

- The password for logging in to LicenseServer. Enter the desired password and click **Change Password**.
- Network settings for the web-based configuration page (Web UI), the proxy server used to connect to the Internet (if any), for and for LicenseServer (License Service). These settings are described below the screenshot.
- Email server settings and the alert mail recipient to contact in the event of a significant LicenseServer occurrence. These settings are described below the screenshot.
- Test the settings by clicking **Test Connection to Altova**. Note that you must save new settings (by clicking the **Save** button at the bottom of the pane) before testing the connection. The **Test Connection to Altova** button is disabled while the test is in progress, and becomes enabled again when the test has been completed.



**Network settings**
Administrators can specify network access points to the LicenseServer configuration page and to LicenseServer:

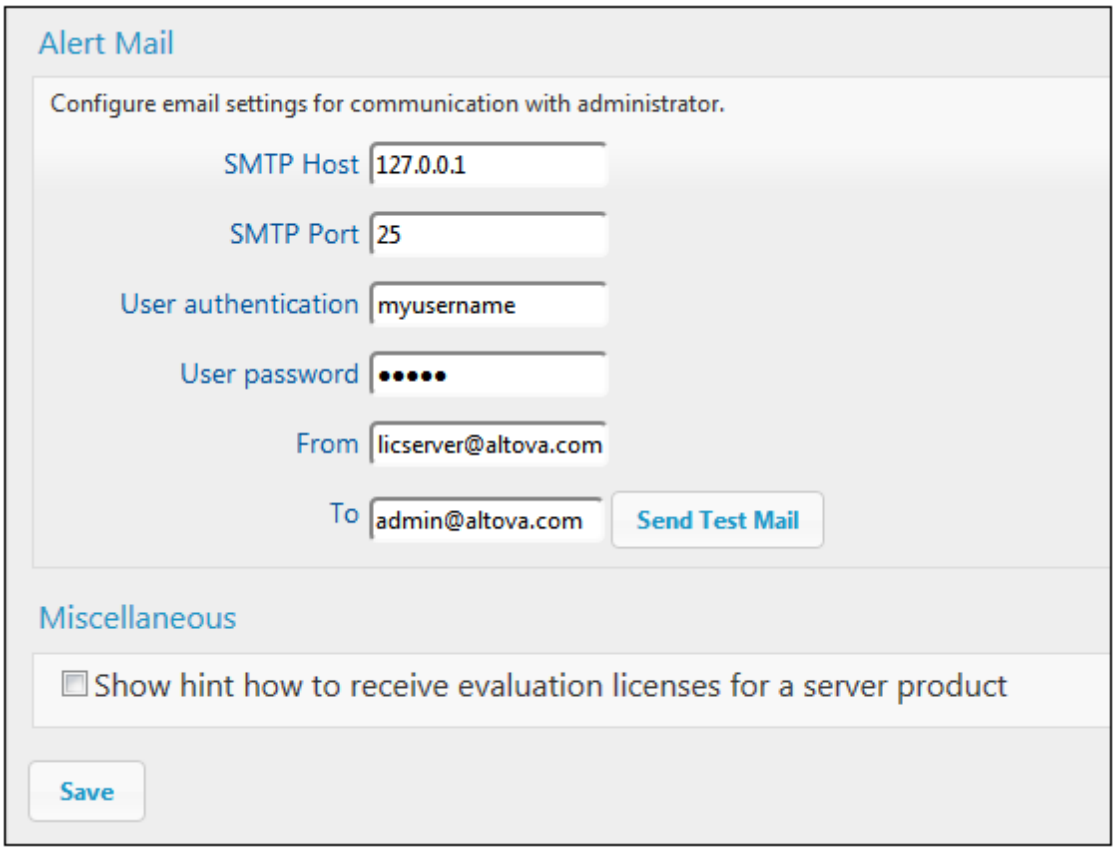
- *Web UI:* Allowed IP addresses can vary from all interfaces and IP addresses on that machine to a fixed address, and ports can be either dynamically calculated or fixed. This allows a wide range of allowed IP-Address:Port settings. The default port setting is **8088**.
- *Proxy Server (available from v1.3 onwards):* If a proxy server is being used to connect to the Internet, the details of the proxy server must be entered in the Proxy Server pane (*see screenshot above*). These fields need to be filled in only if a proxy server is being used. Also, proxy servers often do not need authentication (a user-name and password), in which case these two fields can be left blank. To configure LicenseServer for the proxy server, enter the proxy server's host name, and, if required, a port number.
- *License Service:* IP addresses can vary from all interfaces and IP addresses on that machine to a fixed address. If you list hostnames and/or IP addresses, use a comma-separated list without any spaces (for example: `hostname1,IPAddress1,hostname2`).The port number is fixed at **35355**.

By default, these settings allow unrestricted access to LicenseServer and its configuration page from within the networks to which LicenseServer is connected. If you wish to restrict access to either LicenseServer or its configuration page, enter the appropriate settings and click **Save**.

Run a connectivity test (*see above*) to check that the settings are correct.

**Alert Mail settings**
Altova LicenseServer needs to be connected to the `altova.com` server. If the connection is broken for more than 24*5 hours (5 days), LicenseServer will not allow licenses. As a result, work sessions with Altova products licensed by LicenseServer could be disrupted.

In order to alert the administrator that a connection is broken, an alert mail can be sent to an email address. The Alert Mail pane (*see screenshot below*) is where you enter settings for sending alert mails to an administrator's email address.




*SMTP Host* and *SMTP Port* are the access details of the email server from which the email alert will be sent. *User Authentication* and *User Password* are the user's credentials for accessing the email server. The *From* field takes the address of the email account from which the email will be sent. The *To* field takes the recipient's email address.

Click **Save** when done. After saving the Alert Mail settings, email alerts will be sent to the address specified whenever a significant event occurs, such as when connection to `altova.com` is lost. Note that such events are also recorded in the Messages tab, and can be looked up there.

---

**Show hints for receiving and deploying evaluation licenses**
Checking this box (*see secreenshot above*) displays, at the top of the configuration page, brief instructions about how to evaluate and deploy evaluation licenses.

**Messages, Log Out**

The **Messages** tab displays all messages relevant to licenses in the license pool of the LicenseServer. Each message has a **Delete** button that allows you to delete that particular message.

The **Log Out** tab serves as the Log Out button. Clicking the tab logs you out immediately and then displays the Login mask.

## 2.6 FlowForce Server data storage

FlowForce Server is a background service/daemon that stores all configuration and other important data in a database. Configuration data can consist of: user profiles, roles, triggers and jobs. FlowForce Server has no user interface and is configured via FlowForce Administration Interface.

FlowForce Server stores all data in the following locations:

| | |
|---|---|
| Windows XP | `C:\Documents and Settings\All Users \Application Data\Altova\FlowForceServer2014` |
| Windows Vista, Windows 7/8 | `C:\ProgramData\Altova\FlowForceServer2014` |
| Linux | `/var/opt/Altova/FlowForceServer2014` |

**Global settings**

- **flowforceserver.ini**: global configuration settings for FlowForce Server (e.g. language)
- **flowforceweb.ini**: global configuration settings for FlowForce Web Server (e.g. language)
- **flowforceweb.html**: the Setup page page used to register FlowForce with LicenseServer and to start the servers. Note: This page is regenerated every time you start FlowForce Web Server.

**Data directory**

- **ffweb.log / flowforce.log:** log files for FlowForce Web Server and FlowForce Server
- **flowforce.db**: the main database file storing the FlowForce Server object system, user data, active jobs, roles, etc.
- **flowforcelog.db**: the database that stores all FlowForce Server logs
- **flowforce.ini**: the configuration file defining the port and listening interfaces of FlowForce Server
- **flowforceweb.ini**: the configuration file defining the port and listening interfaces of FlowForce Web Server
- "**files**" subdirectory: stores files associated with deployed functions
- "**logs**" subdirectory: contains captured output from job execution steps
- "**tmp**" subdirectory: stores temporary files
- "**tools**" subdirectory: can be used to override tool selection, usually empty

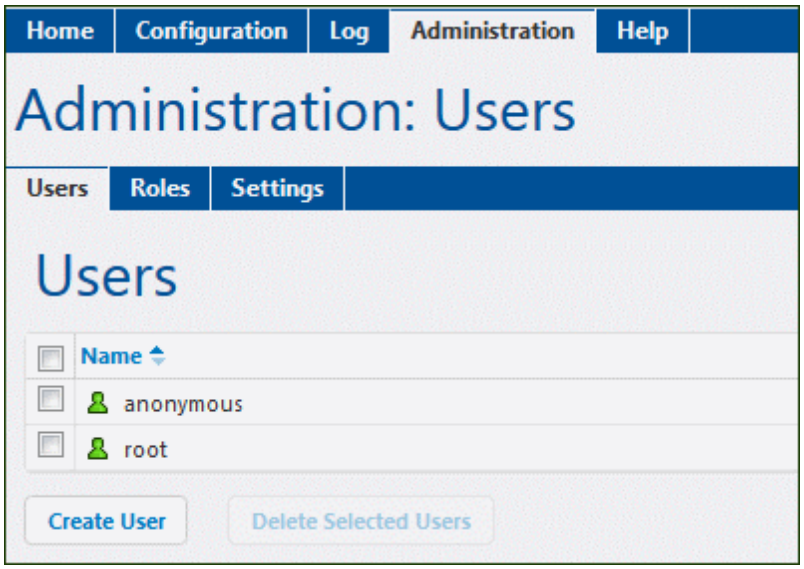
Both FlowForceServer and FlowForceWebServer use ini style configuration files. Administrators can edit the files with a text editor, or use the web-based Setup page.

## 2.7 FlowForce Administration Interface

FlowForce Server Administration Interface is the module that acts as the front-end of FlowForce Server. FlowForce Server Administration Interface can be accessed using an internet browser and allows you to configure the specific server actions such as: jobs, triggers, etc.

FlowForce Server supports the current versions of Mozilla Firefox, Google Chrome, and Microsoft Internet Explorer 9 and 8. Note: When using Internet Explorer 9 as your browser, please disable the "Show friendly HTTP error messages" in the Advanced tab, to view the HTML form.

There are several menu items available in the browser window:




**Home**
Displays the connection details as well as a list of currently running/aborted jobs and active triggers.

**Configuration**
Displays the contents of the container hierarchy, and allows you to access containers, jobs, credentials, and functions by clicking them in the list. New containers, jobs, and credentials, are added using the "Create " button. See the User Guide for more details.

**Log**
Displays the log table. Can be filtered by time, job name and severity.

**Administration**
Lets you view and edit/access server-wide configuration, such as user accounts, roles and other settings.

**Users**
Allows you to create, remove, and maintain users.

**Roles**
Allows you to create, remove, and maintain access control roles.

**Settings**

Allows you to define the global settings of FlowForce, i.e. the default time zone and the default mail server settings.

**Help**
Opens the FlowForce Server documentation in a separate browser tab or window.

## 2.8 FlowForce access control

FlowForce Server grants access control to containers and configurations. Logged-in users are granted privileges and permissions based on explicit assignments to their user account, as well as the roles the user is a member of.

Privileges are global rights, independent of the FlowForce Server container hierarchy, whereas permissions are inherited down the hierarchy and can be refined at each level.

**Users and Roles:**
Users are persons that have been added to FlowForce Server by the FlowForce Server administrator. Depending on the assigned rights and privileges, users can define or run FlowForce Server jobs.

Roles are used to manage privileges and object permissions for user groups as opposed to individual users.

**Privileges:**
Privileges control user rights globally and can be defined in the Users and Roles pages.

**Permissions:**
Permissions control access to containers and configurations. Unlike privileges they can be redefined on every level of the container hierarchy, and are by default inherited from parent containers.

**Credentials:**
Credentials are stored login data used to execute FlowForce jobs.

The same system used for Linux.

### 2.8.1 Users and Roles

A user account defines a log-in name and has a set of roles the user is a member of. A role can be a member of another, broader role, which makes all members of the narrower role also members of the broader role.

This enables the definition of hierarchical access rights, the role Director of Marketing may be a member of Marketing, which in turn may be a member of Employees. Assigning a user, e.g. Bob, the role Director of Marketing, automatically makes him a member of Marketing and of Employees as well. When Bob logs into FlowForce Server he will be granted all privileges and permissions granted to any of his roles.

Two special users are predefined by FlowForce:

- **root** is the initial administrator user. It is by default all-powerful and allows tasks such as adding other users and roles, as well as setting up privileges and permissions.
- **anonymous** is a special user account for users that do not explicitly log in. Anonymous access to the FlowForce Server Administration Interface is not possible, but you can enable anonymous access for certain services exposed via the HTTP service interface.

Two special roles are also predefined by FlowForce:

- **authenticated** is the role automatically assigned to every user **except** anonymous. It therefore includes every user who is authenticated using an existing user name and password.
- **all** is the role automatically assigned to every user including anonymous.

While any users you create will be members of both all and authenticated, any roles you create are not by default members of any other role.

See also:
Privileges
Permissions
Credentials

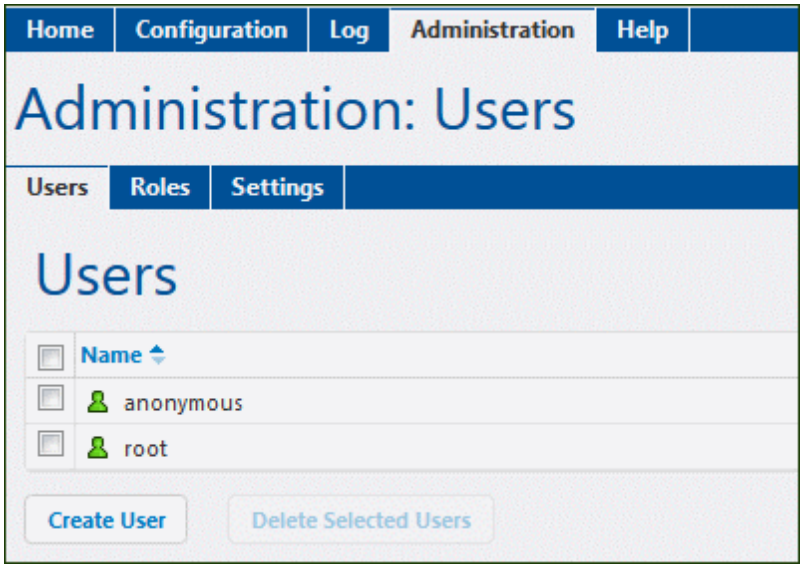
Defining restricted user rights

**How to add Users**

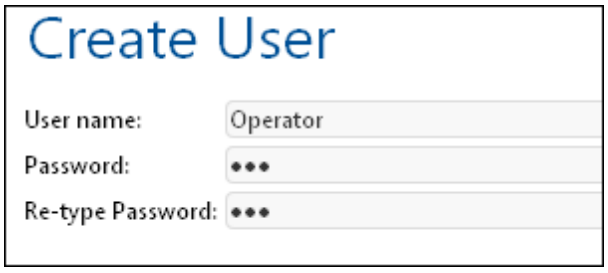
This page allows Administrators to define users and assign them user roles. The user name and password needed to access the web administration interface, or to deploy MapForce mappings, are defined here.

**To add a user to FlowForce:**

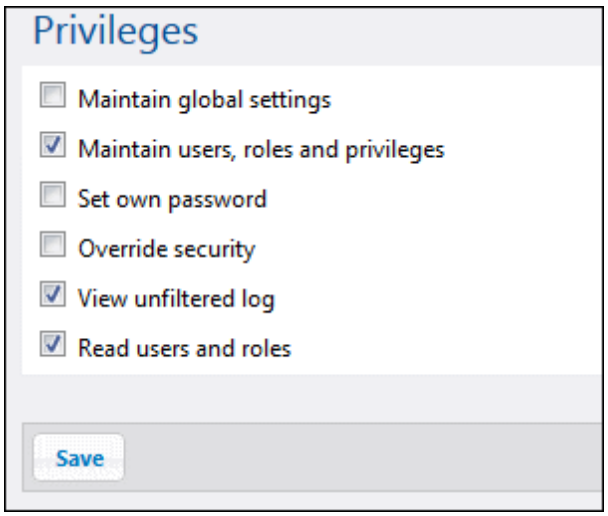
1. Click the "Create User" button on the Users page (of the Administration tab).




2. Enter the User name and password.




3. Define the privileges of this user (on the same browser page) by activating the Privileges check boxes. Note users inherit all privileges of their assigned roles; we therefore recommend assigning privileges to roles only to simplify maintenance.

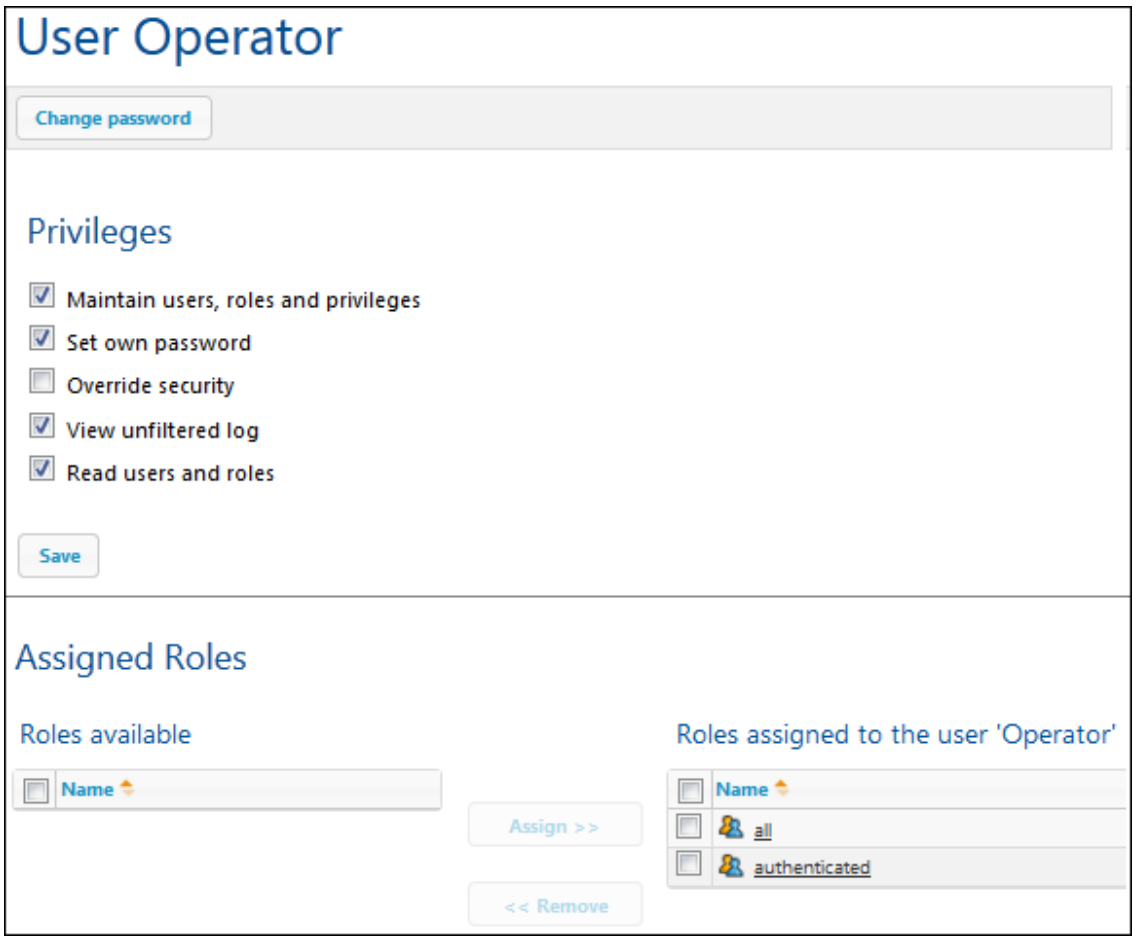



4. Click Save to save the user.

### Users and Roles

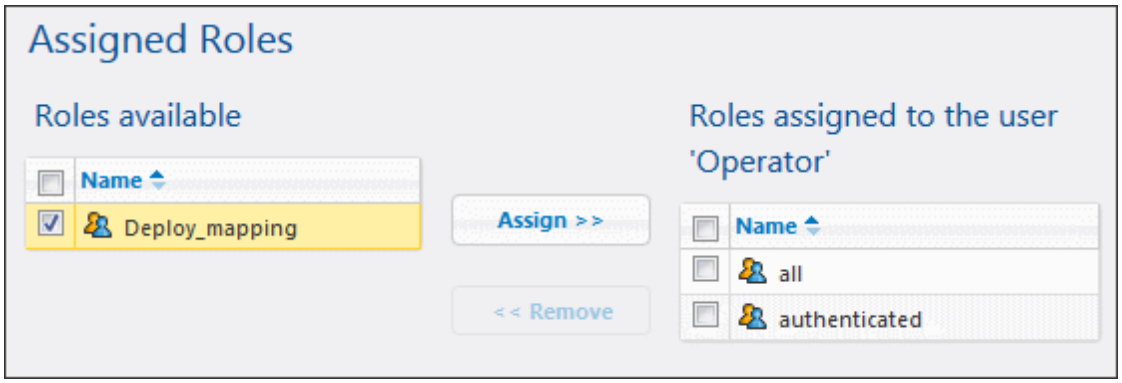
Roles make it easy to define user groups such as project teams, branch offices etc. To assign roles to a user on **this** page, roles must have been previously defined on the Roles page. Note that two default roles have already been assigned to this user, i.e. "all" and "authenticated".



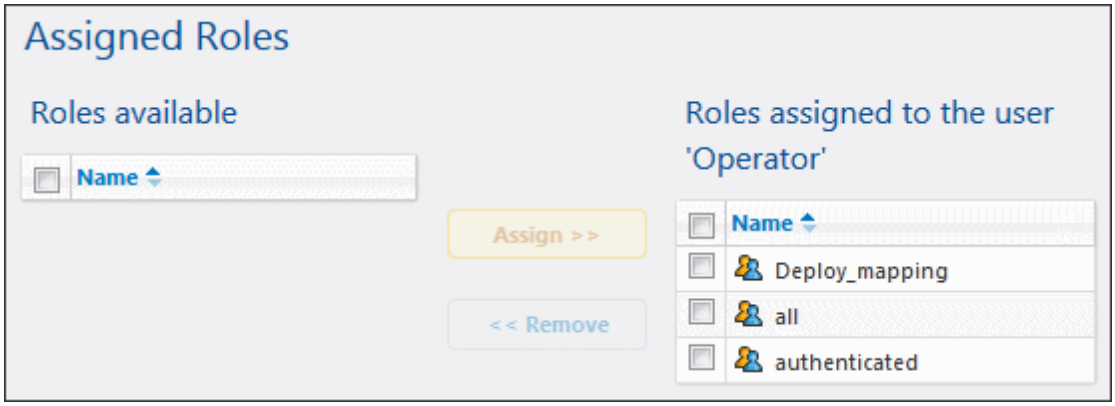

You can however assign a user to a role on the Roles page if you want to.

**To assign one or more roles to a user:**

1. Click the role name check box(es) of the role(s) you want to assign (e.g. Deploy_mapping which is added in the following Roles topic).
2. Click the "Assign" button to assign the role(s) to this user.
   Role assignments are saved immediately.



The Deploy_mapping role has now been assigned to the user "Operator".



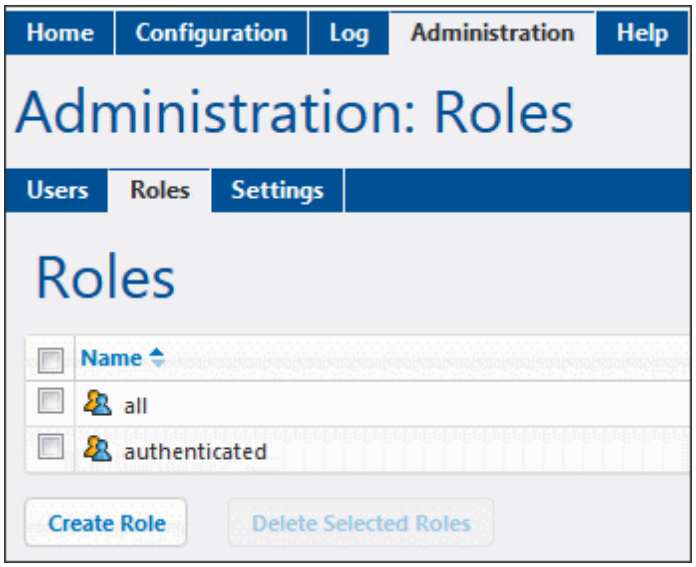

Note that the roles "all" and "authenticated" are default roles supplied with FlowForce.

See also: How to add Roles

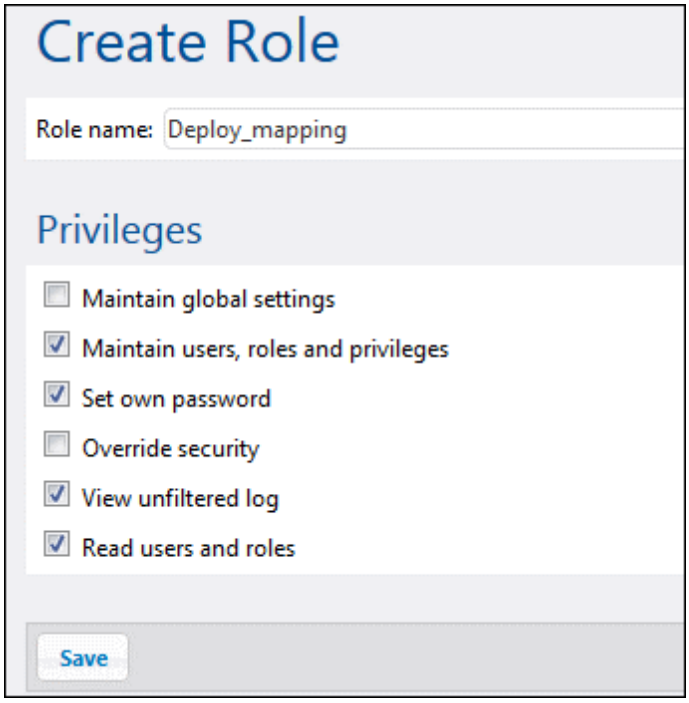
**How to add Roles**

**To add a role to FlowForce:**

1. Click the "Create Role" button on the Roles page.




2. Enter the Role name (e.g. Deploy_mapping) and define the privileges the members of this role should have, by activating the Privileges check boxes, then click Save to save the role.

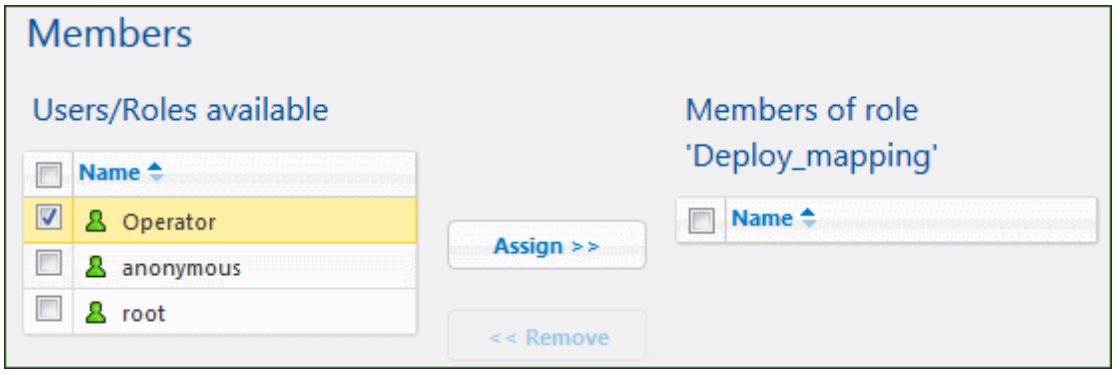



Note: Users and roles cannot have the same names in FlowForce.

**Roles and Users**
To assign a user to a role on **this** page (Role Deploy_mapping), users must have been previously defined on the Users page.

**To assign a user to a role:**

1. Click the user (or role) check box that you want to assign the role to, in the "Users/Roles available" table.
2. Click the "Assign" button to assign the user(s) to this role.




The user "Operator" has now been added to the Deploy_mapping role.


**Assigning roles to roles**
FlowForce Server makes it possible for you to assign roles to roles. What this does is allow indirect inheritance of permissions/privileges.

- If user A is a member of role B, and role B is a member of role C, then user A is also an indirect member of C.

See also: Defining restricted user rights

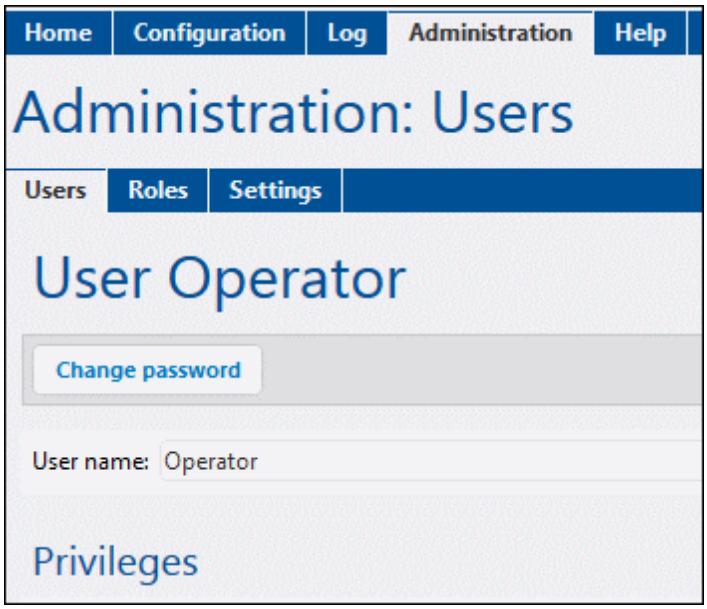
**Renaming Users and Roles**

Users and Roles can now be renamed/edited at any time by the "root" user and by other users that have been given the privileges to do so by the root user. Please see Privileges for more information on the specific privileges.

The user name "root" cannot be changed.

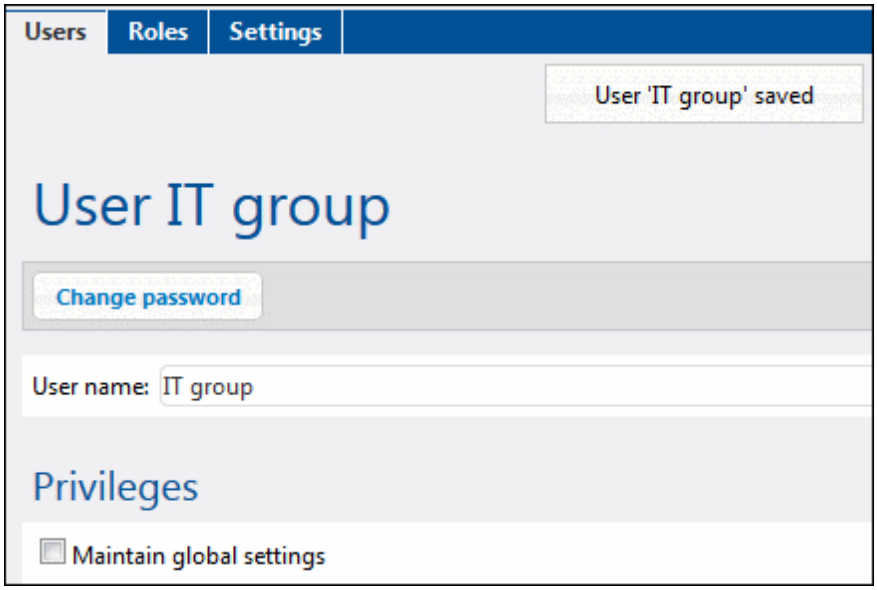
**To rename a user:**

1. Click Administration | Users, then click the User name you want to change, e.g. Operator.




2. Click in the "User name" field and change the name of the user, e.g. IT group, then click Save.

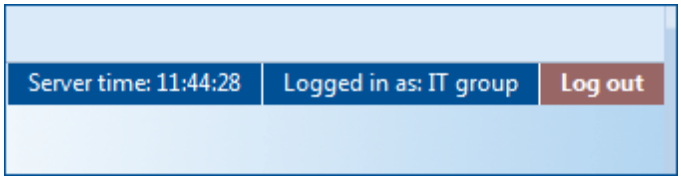
 




Note: you can still change the privileges assigned to the user before you click Save.

Notes:

- When a user name is changed, the currently assigned user password is retained.
- If a user changes their own name, (providing the correct privileges were assigned) there is no need to log in to the session again. The changed name will automatically be visible in the "logged-in as:" field.




**To rename a role:**

1. Click Administration | Roles, then click the Role name you want to change, e.g. Deploy_mapping.
2. Click in the "Role name" field and change the name of the role, e.g. ProductionDeploy, then click Save.

Notes:

- The members of the renamed role are retained. The "Members of role" entry is updated to the new name of the role.
- The default roles "all" and "authenticated" cannot be changed.

### Renaming containers/objects

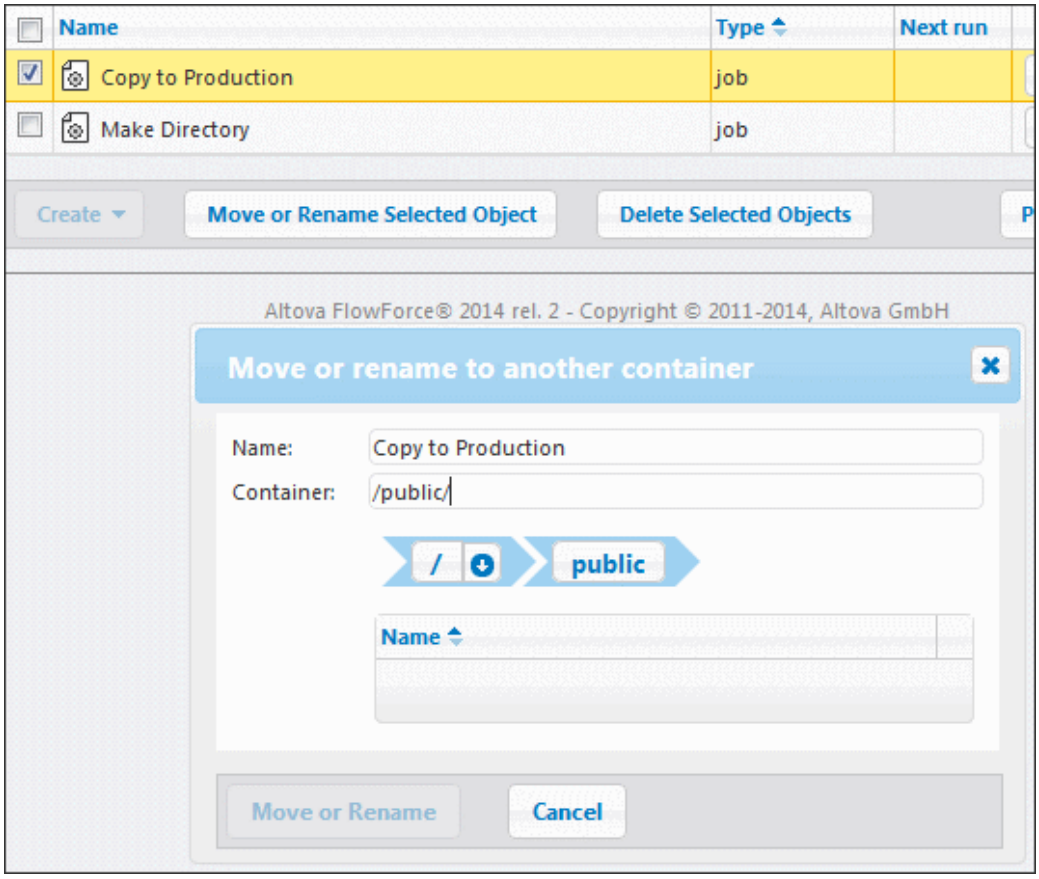
Containers and the objects they contain (jobs etc.) can now be renamed/edited at any time by the "root" user and by other users that have been given the privileges to do so by the root user. Please see Privileges for more information on the specific privileges.

Containers at the root level, i.e. at the level of /public and /system can only be added, deleted, or moved by the "root" user. Containers below this hierarchical level, can be manipulated by other users if they have been given the privileges to do so by user "root".

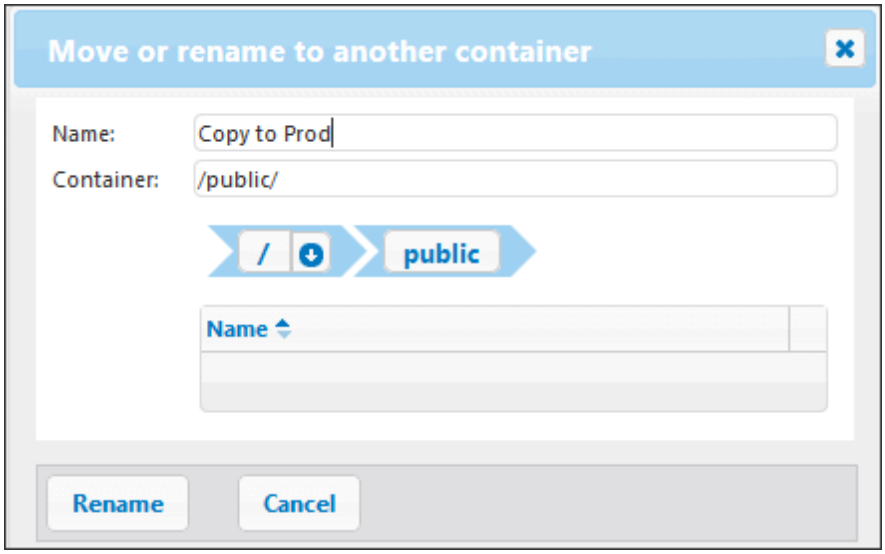
**To rename a container or job:**

1. Click the Configuration button, then navigate to the container/job that you want to rename, e.g. /public.
2. Click the check box next to the container, or job name, e.g. Copy to Production. The "Move **or Rename Selected Object**" button becomes active at this point.
3. Clicking the button allows you to choose between two options at this point.

To **rename** the job:



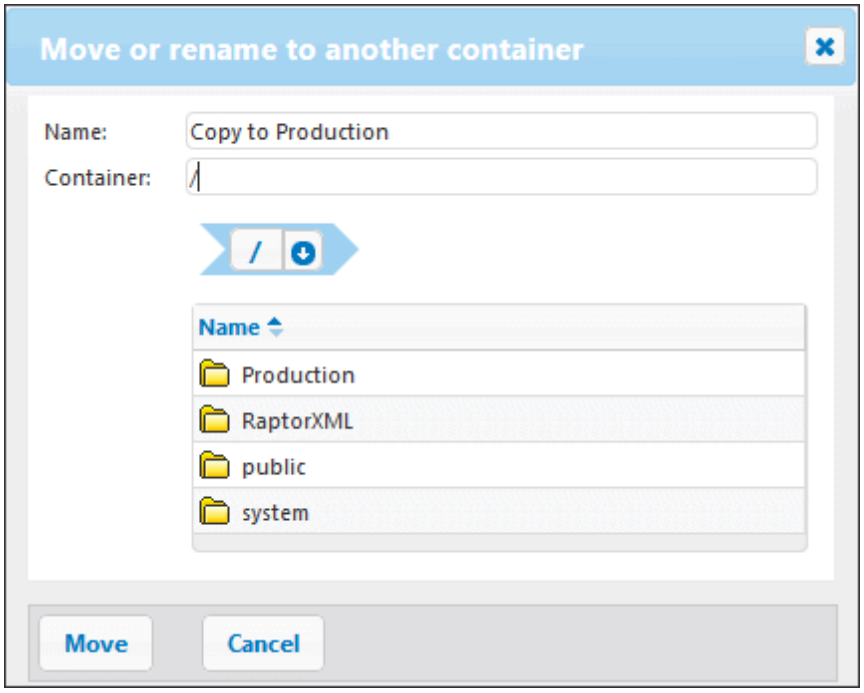

- Click in the "Name" field and edit the name of the object, e.g. Copy to Prod. The currently inactive "Move or Rename" button, changes into "Rename" at this point.



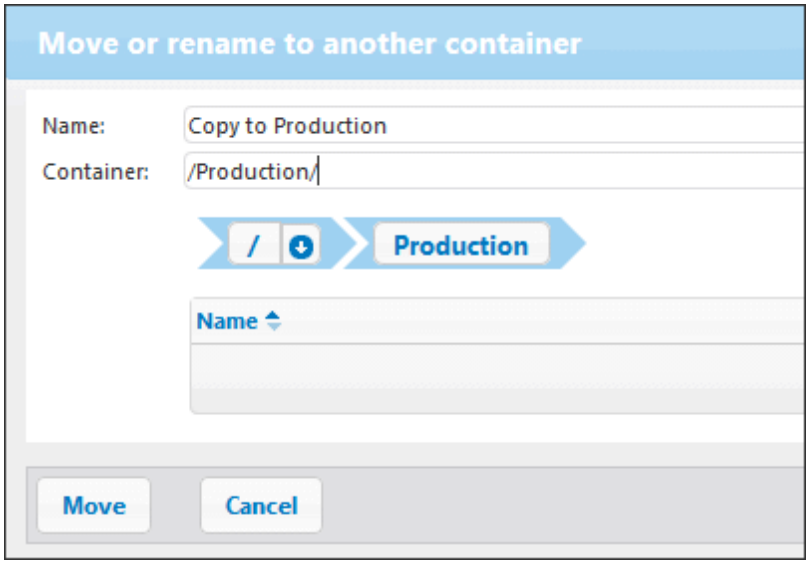

- Click the "Rename" button to rename the job.

To **move** the job:

- Click the "Root" icon  and select the container you want to move the object to, in the drop-down list, e.g. Production.



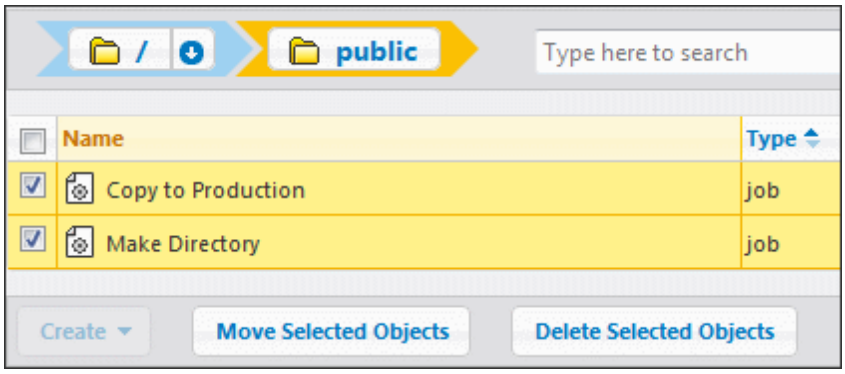

The inactive button turns into "Move" at this point. Selecting the container causes its name to appear in the container navigator.




- Click Move the job to its destination.

**To move multiple objects:**

1. Click the check boxes next to the object/job names you want to move.
   The button changes to "**Move Selected Objects**" at this point.




2. Click the button and use the container navigator to select the destination of the objects, then click the Move button to move them.

Note:
The top-most check box, next to the Name text, lets you select/deselect all the objects in the container.

### Defining restricted user rights

To restrict access to the FlowForce Server /public container, it is recommended to perform the following steps:

- Take away permissions and privileges from the authenticated role.
- Group users requiring extra permissions in a new role.
- Assign extra permissions to the new role.

**To take away permissions and privileges from the authenticated role:**

1. Go to the Configuration page.
2. Click the "Permissions" button to the right of the /public container.
3. Click the "Change" button for authenticated.
4. Define the permissions that should apply to all users.
5. Click "Save Changes" to commit your changes.

**To group users requiring extra permissions in a new role:**

1. Go to the Administration page.
2. Click Roles to go to see the roles list.
3. Click the "Create Role" button to create a new role.
4. Enter a descriptive role name, e.g. Operators.
5. Click "Save" to save your changes.
6. Select the users you want to assign to the role from the list on the left (Users/Roles available).
7. Click "Assign" to assign them to the new role.

**To assign extra permissions to the new role:**

1. Go to Configuration page.
2. Click the "Permissions" button next to the /public container.
3. Click "Add Permissions".
4. Select the role from the combo box.
5. Define the extra permissions for this role.
6. Click "Save Changes" to commit your changes.

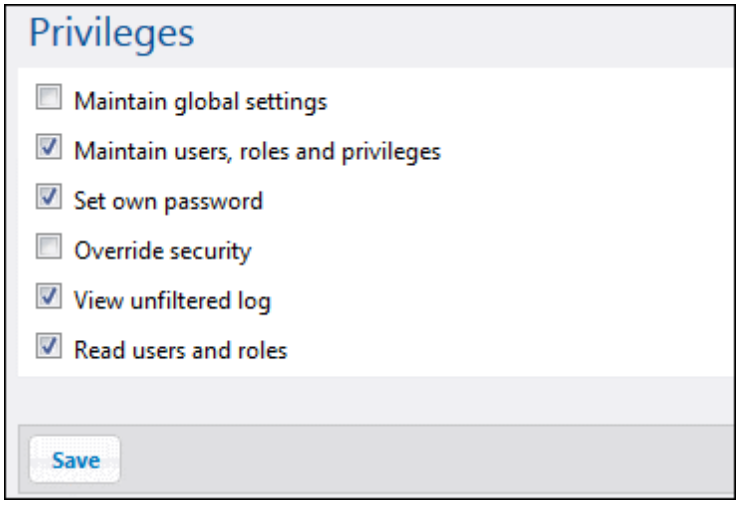
See also:
Privileges

### 2.8.2 Privileges

Privileges control several user rights **globally**. This means privilege settings cannot be overridden in the container hierarchy of FlowForce. When a user logs into FlowForce, the set of effective privileges is determined by the user privileges and all role privileges the user is member of.

It is recommended to assign privileges only to roles, and have the assignment to users take place via role membership.

Privileges are assigned on the user and role pages of the FlowForce Server Administration Interface.




**Maintain global settings**
A user having this privilege can change the global settings of FlowForce Server that are to be found on the Administration | Settings page. These are the time zone and SMTP settings set up by the administrator.

**Maintain users, roles and privileges**
Any user having this privilege can create, delete and edit users and roles, their privilege assignments and passwords.

This is an administrative privilege and should only be assigned to FlowForce Server administrators.

By default, only the user "root" possesses this privilege.

**Set own password**
Any user having this privilege can change his own password. Users who do not have this privilege need to have their password set by a FlowForce Server administrator.

By default the "authenticated" role, and hence every user account except "anonymous", possesses this privilege.

**Override security**
Any user having this privilege can change permissions in the container hierarchy without needing "write" security permission. This allows FlowForce Server administrators to regain access to

resources accidentally rendered inaccessible.

This is an administrative privilege and should only be assigned to FlowForce Server administrators.

By default, only "root" possesses this privilege.

**View unfiltered log**
By default users can only see log entries related to Configurations they have "read" access to. By granting this privilege a user can read all log entries, including those not associated with a specific configuration.

By default, only "root" possesses this privilege.

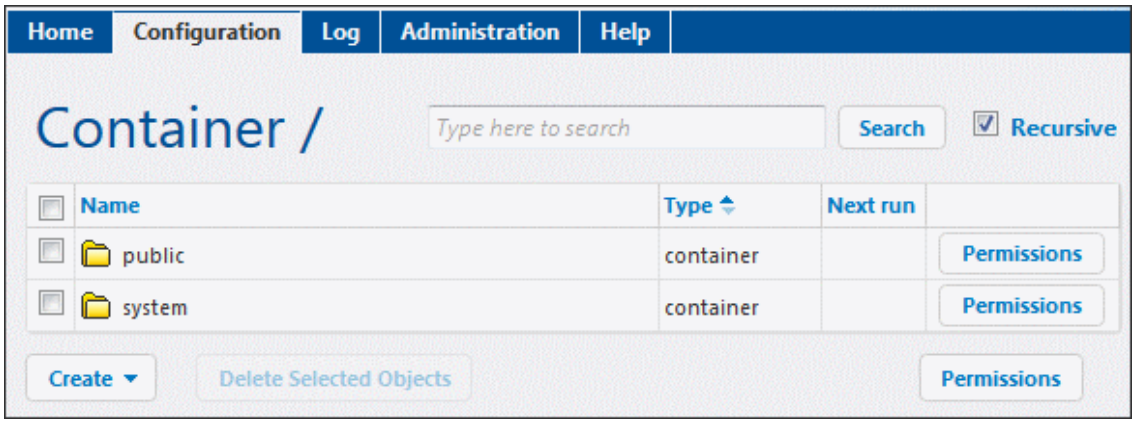
**Read users and roles**
By default users will only see their own user account and any roles they are member of. By granting this privilege a user can read all defined users and roles.

By default, only "root" possesses this privilege.

See also:
Permissions

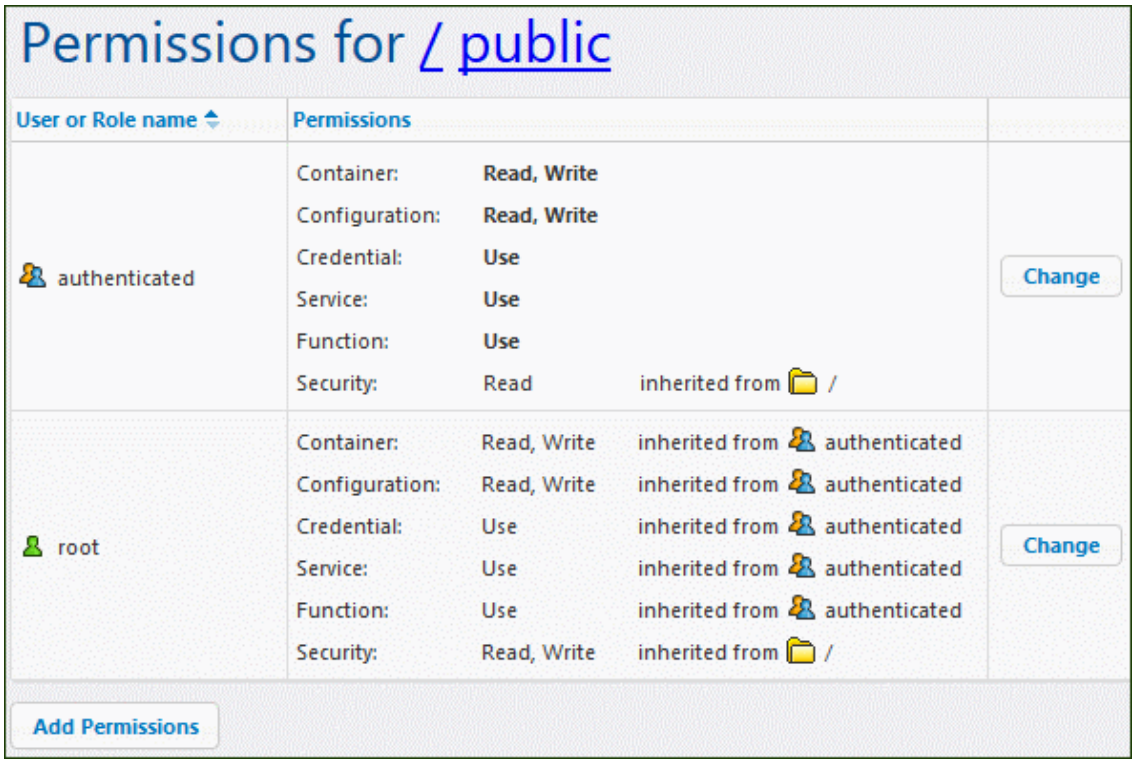
### 2.8.3 Permissions

Permissions control access to containers and configurations. Unlike privileges they can be redefined on every level of the container hierarchy, and are by default inherited from parent containers. Click the Configuration tab and the Permissions button (of that row, e.g. public) to see the container permissions.




Permissions, like privileges, are inherited from all roles the user is a member of, as well as from permissions directly assigned to the user.

This inheritance takes precedence over container hierarchy inheritance. If a permission is redefined for any role the user is a member of, container hierarchy inheritance for this particular permission is overridden.




Permission checks are performed on every user interaction. A user can only successfully edit a

Configuration when all required permissions are granted. Permissions are not evaluated upon job execution, therefore any permission changes will not retroactively apply to already previously jobs.

FlowForce Server assigns permissions in several groups:

**Container**
The container permissions define what a user can do with objects in a container.

If the container has "read" access, the user can list the contents and find an object in the container.

If the container has "read"/"write" access, the user can additionally create new (and delete existing) objects within the container, depending on other permissions that may apply.

**Configuration**
The configuration permissions define what a user can do with a configuration (job, credential).

If the configuration has "read" access, the user can look at the details of that configuration, such as the defined execution steps or the defined triggers.

If the configuration has "read"/"write" access, the user can additionally modify that configuration. To successfully create a new configuration, or delete an existing one, the user must be permitted "write" access for the container and the configuration.

**Credential**
The credential permission defines what a user can do with a credential. This makes it possible to supply credentials for reuse.

If the credential has "use" access, the user is permitted to refer to this credential from another configuration.

**Service**
The service permission defines access to a job via the HTTP request interface.

If the service has "use" access, the user is permitted to access the service and thus execute the job via the request interface.

Note that service permission checks skip any container hierarchy checks. If a user is permitted to use a service he may do so without having "read" access to the container the corresponding job is defined in.

Also note that by granting service use to "anonymous", it becomes possible to use that service without any authentication.

**Function**
The function permission defines whether a user can invoke a function as an execution step in another function.

If the function has "use" access, it is permitted to call this function from another function.

**Security**
The security permission controls access to the container's child permission lists.

If security has "read" access, the user is permitted to read the permission list of any child of the container.

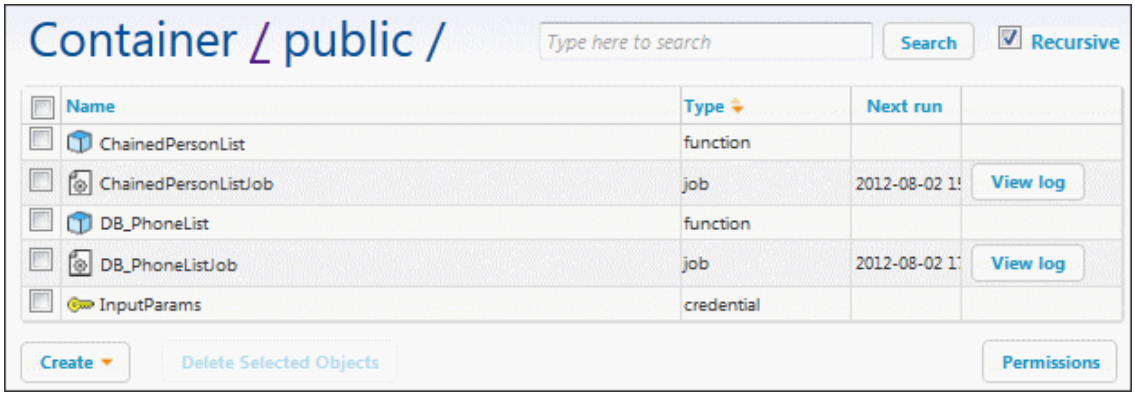
If security has "read"/"write" access, the user can additionally change the permission list of any child of the container.

By default users are permitted to read only permissions applicable to them. That means any permissions assigned to themselves or any role they are a member of. If the "Read Users and Roles" privilege is granted, users can read all permission entries.

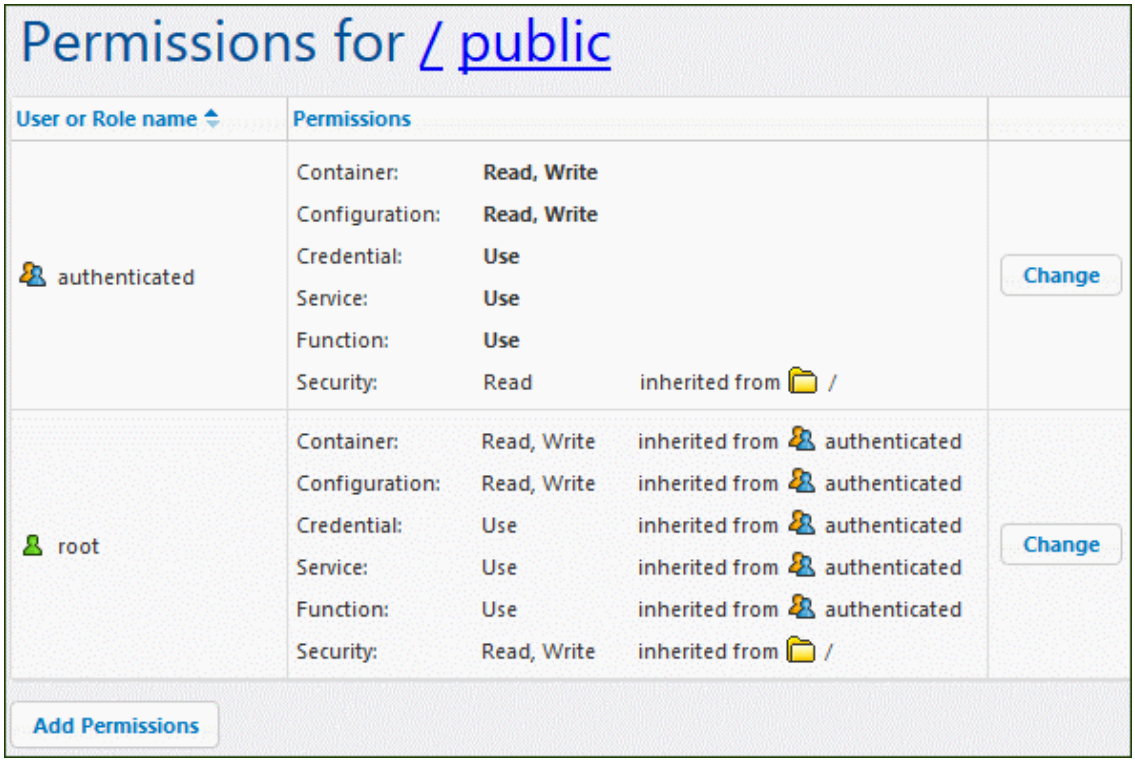
See also:
How to add Permissions

### How to add Permissions

Permissions can be assigned to both a user and a role. Read/Write/Use permissions should generally only be assigned to **roles** and not to individual users, to simplify maintenance.




Permissions are accessed by clicking the "Permissions" button at the bottom of the right of the page, or next to the container that you want to define the permissions for. The screenshot below shows the permissions overview for the /public container.

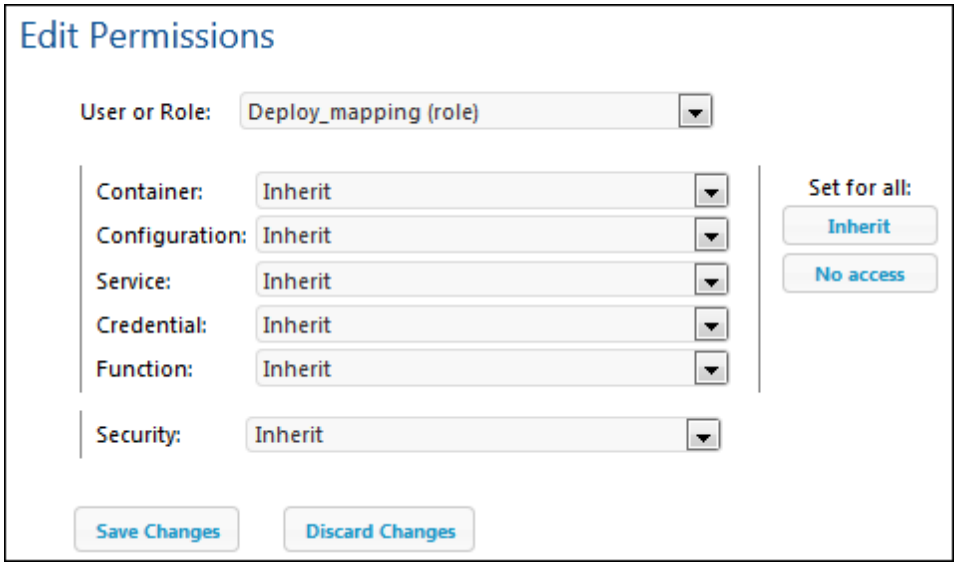



Permissions can be inherited from containers above the current container, if "Inherit" is selected (shown as the forward slash character **/** for the root container) on the Permissions overview page shown above.

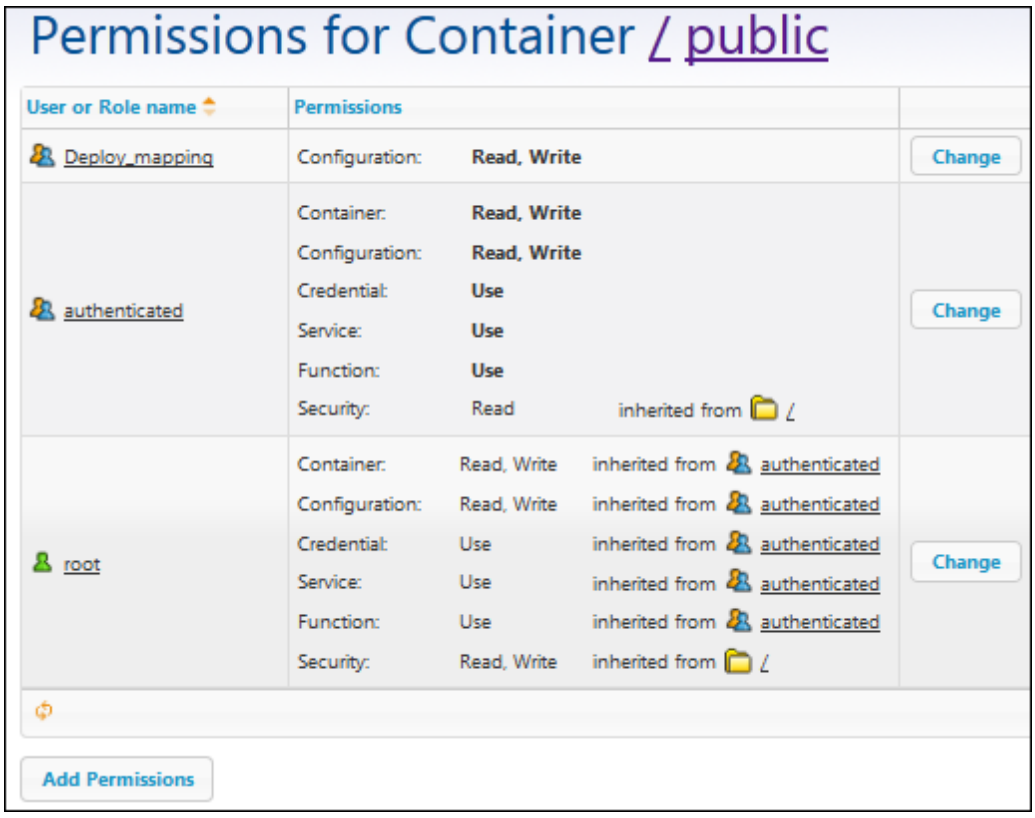
### To add a new Permission to a user or role:

Having clicked the "Permissions" button on the Container page:

1. Click the "Add Permissions" button on the Permission overview page of the container you want the permission to be added to, e.g. Container /public.
2. Select a previously defined role (or user) from the "User or Role" combo box e.g. "Deploy_mapping (role)".




3. Change the "Configuration" permission to "Read/Write" and leave the other permissions as they are currently defined (Inherit for all), then click "Save Changes".




The Deploy_mapping permission list has now been added to the container "/public".

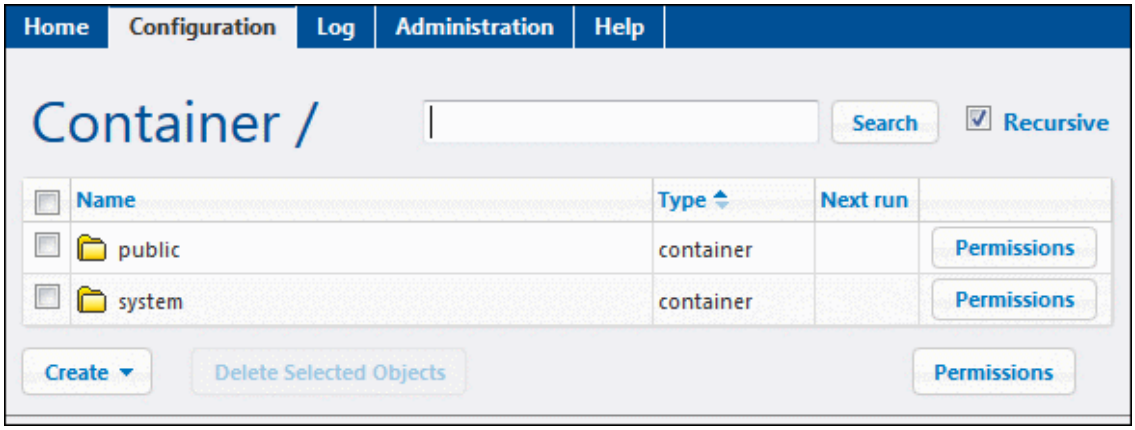
### 2.8.4 Credentials

Credentials are stored login data used to execute FlowForce Server jobs. Credentials can be defined as standalone "objects" and be assigned to various jobs, or they can be manually entered for a specific job.

Jobs are started automatically by FlowForce Server when the defined trigger conditions are met. FlowForce Server then runs these jobs using a specific operating system user account, ensuring that job steps do not access unauthorized data. Note that file watch triggers are also assigned credentials.

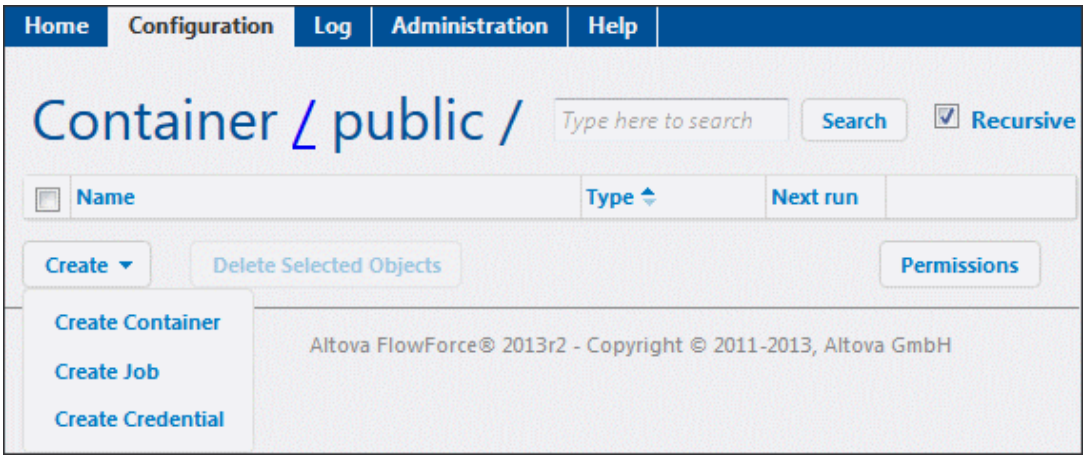
Credentials can be created, or deleted, on the Configuration (Container) page. Note that job credentials, i.e. username and password, can also be entered for individual jobs on the Job page.

Any user that has "write" access to the "Configuration" permission, can edit or remove credentials.



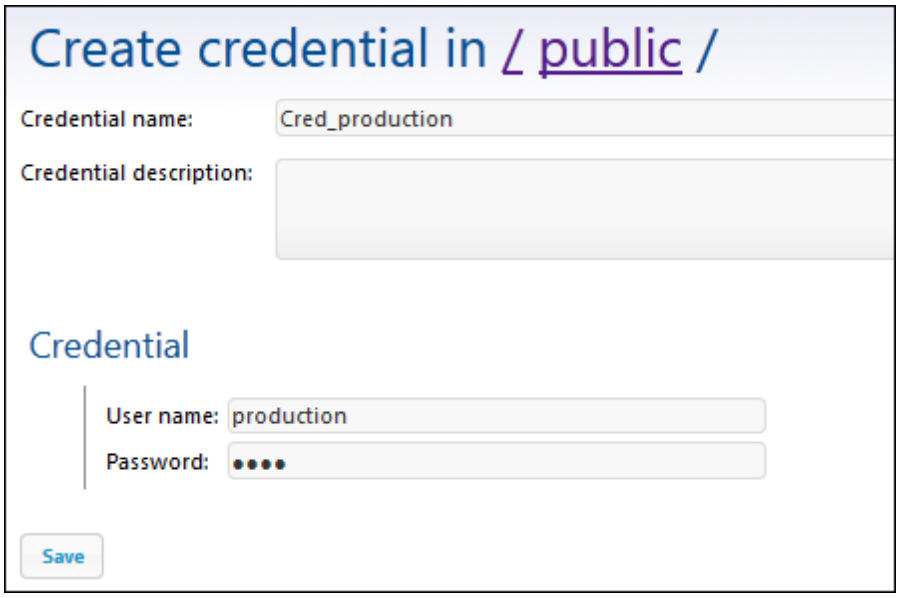

**To add a credential to FlowForce Server:**

1. Click the container you want to create the new credential in, e.g. public.
2. Click the "Create" button and select the "Create Credential" entry.

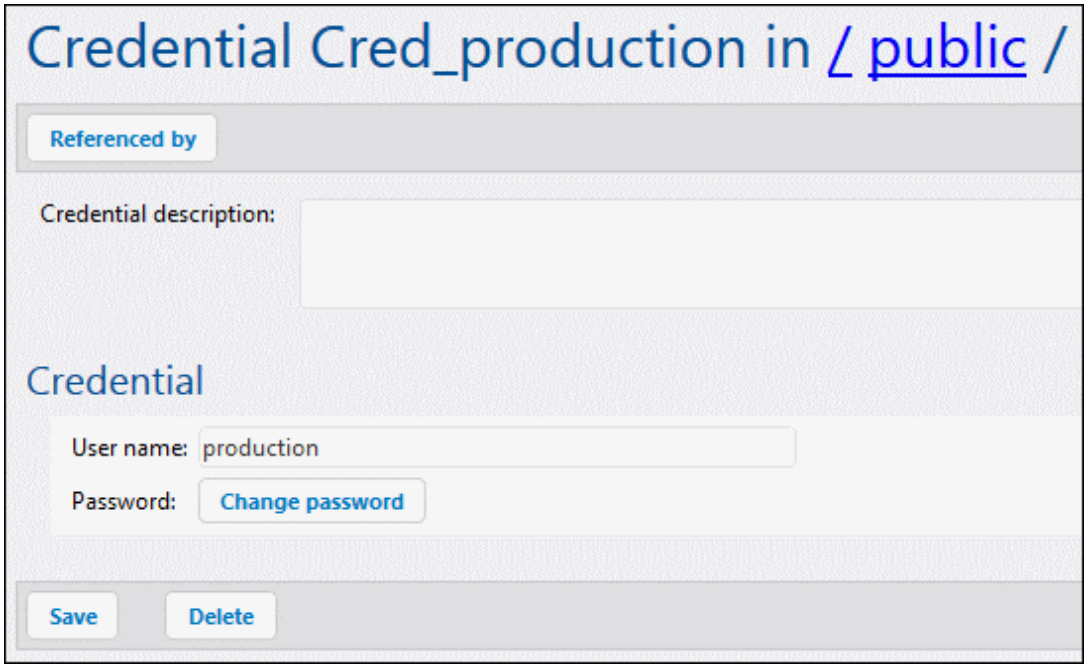



3. Enter the name of the credential as well as the **operating system** user name and password. To specify a user name in a Windows domain, please use the form

**username@domain**.



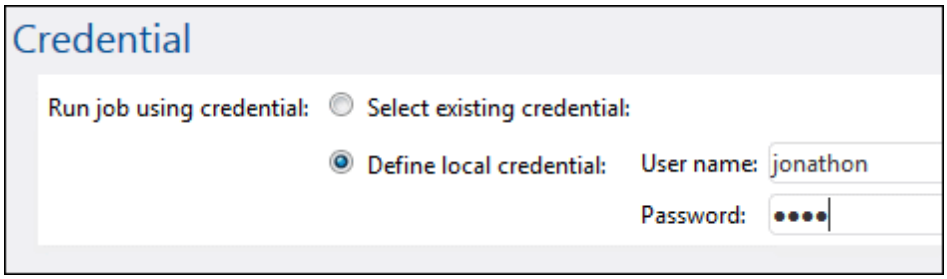

4. Click Save.
   The new credential "Cred_production" has been saved in the /public container.
5. Click the "Configuration" button to return to the Container page.




Please see Permissions for information on the container permissions that can be defined.

**Credentials and jobs**
Every job MUST have a credential assigned to it for the job steps to be executed. This defines the **operating system** user account used to run the job steps.

A predefined credential can be selected using the "existing credential" combo box, or the local credential can be manually entered in the "User name" and "Password" fields. This is done on the "Create job..." page.




Note:
If you **manually** enter the user name and password, as shown above, you will have to update them for those specific jobs, whenever your server credentials are changed.

**Credentials:**

- Credentials can be created in any container a user has access to.
- The credential password may be an empty string.
- As the clear text password needs to be sent to the operating system's login function, passwords are stored in a reversible encrypted form in the FlowForce Server database. The administrator should make sure to restrict access to the FlowForce Server database file.

**FTP credentials**

When using FTP system functions, e.g. ftp/retrieve, in the "Execute function" field you must also enter your FTP login credentials for the FTP server. You can select an existing credential or enter a local one.

**Required Permissions for a user to execute a job**

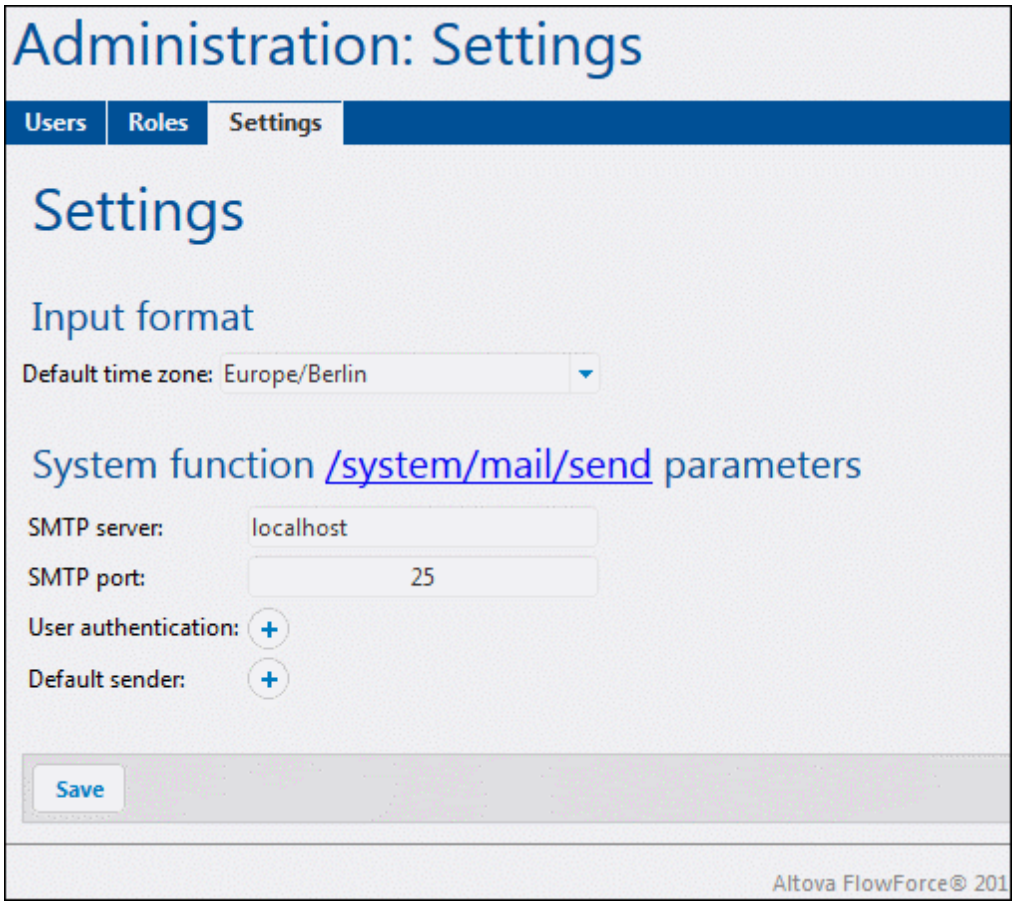
Since a job is defined to run with a certain credential, it is vital for the success of the job execution that the **operating system user** which is referenced by this credential has sufficient access permissions.

The operating system user needs the following **file system** permissions:

- Execution permission for the used server executables and all referred DLLs (implicitly set).
- Read permission for all paths used in the input files of the job.
- Write permission for all paths used in the output files of the job.
- Read and/or Write permission for the working directory, depending on the specific job.

## 2.9 Settings

This page contains the system-wide global settings of FlowForce Server.




**Input format**
lets you select your local time zone.

**System function /system/mail/send parameters**
lets you define your SMTP server settings and enter the user authentication for the SMTP server used by the built-in function /system/mail/send.

## 2.10 Command Line Usage

This section describes the command line interface of FlowForce Server.

**Default location on Windows**
The FlowForce Server executable (`FlowForceServer.exe`) is located by default at:

*<ProgramFilesFolder>*`\Altova\FlowForceServer\bin\FlowForceServer.exe`

**Default location on Linux**
On Linux systems, the FlowForce Server executable (`flowforceserver`) is located by default at

**`/opt/Altova/FlowForceServer2014/bin/flowforceserver`**

where the first forward slash indicates the root directory.

**Usage**
General command line syntax for `FlowForceServer` is:

**`FlowForceServer --h | --help | --version | <command> [options] [arguments]`**

The options and arguments in square brackets are optional.

where

| | |
|---|---|
| `--h \| --help` | Displays the help text. |
| `--version` | Displays the version of FlowForce Server. |

Valid commands are listed below and explained in the sub-sections of this section.

| | |
|---|---|
| `help` *`COMMAND`* | Displays help for a specific command. For example: `help run` |
| `createdb` | Creates a new FlowForce database. |
| `debug` | Starts the application in debug mode. |
| `exportresourcestrings` | Exports all application resource strings to an XML file |
| `foreground` | Starts the application in foreground mode. |
| `initdb` | Creates or updates the FlowForce database. |
| `install` | Installs the application as a Windows service. |

| | |
|---|---|
| `licenseserver` | Register FlowForce Server with the Altova LicenseServer on the local network. |
| `repair` | Starts the application in repair mode. |
| `setdeflang \| sdl` | Sets the default language. |
| `start` | Starts the application as a service. |
| `uninstall` | Uninstalls the Windows service. |
| `upgradedb` | Upgrades the FlowForce database with the latest version |

### 2.10.1 help

The **help** command takes a single argument: the name of the command for which help is required. It displays the correct syntax of the command and other information relevant to the correct execution of the command.

```
FlowForceServer help Command
```

**Note:** On Linux systems, use an all-lowercase **flowforceserver** to call the executable.

**Example**
Here's an example of the `help` command:

```
FlowForceServer help createdb
```

The command above contains one argument: the command **creatdb**, for which help is required. When this command is executed, it will display information about the **creatdb** command.

**The `--help` option**
Help information about a command is also available by using the `--help` option with that command. For example, using the `--help` option with the **run** command, as follows:

```
FlowForceServer run --help
```

achieves the same result as does using the `help` command with an argument of `generate`:

```
FlowForceServer help run
```

In both cases, help information about the **run** command is displayed.

### 2.10.2 createdb

The **createdb** command creates a new database. If the database already exists then the command will fail.

```
FlowForceServer createdb [options]
```

**Note:** On Linux systems, use an all-lowercase **flowforceserver** to call the executable.

The default database is created at installation time, so it is usually not necessary to use this command.

**Options**
The single option is shown below.

| | | |
|---|---|---|
| | `--datadir=VALUE` | `VALUE` is the path of the data directory. |

### 2.10.3 debug

The **debug** command starts FlowForce Server in debug mode, i.e. not as a service. To stop this mode press CTRL+C.

```
FlowForceServer debug [options]
```

**Note:** On Linux systems, use an all-lowercase **flowforceserver** to call the executable.

Not for general use.

**Options**
The single option is shown below.

| | | |
|---|---|---|
| | `--datadir=VALUE` | `VALUE` is the path of the data directory. |

## 2.10.4 exportresourcestrings

The **exportresourcestrings** command outputs an XML file containing the resource strings of the FlowForceServer application. It takes two arguments: (i) the language of the resource strings in the output XML file, and (ii) the path and name of the output XML file. Allowed export languages (with their language codes in parentheses) are: English (en), German, (de), Spanish (es), and Japanese (ja).

```
FlowForceServer exportresourcestrings Language XMLOutput
```

**Note:** On Linux systems, use an all-lowercase **flowforceserver** to call the executable.

### Arguments

The exportresourcestrings command takes the following arguments:

| | |
|---|---|
| Language | Specifies the language of resource strings in the exported XML file. Allowed languages are: en, de, es, ja |
| XMLOutput | Specifies the location and name of the exported XML file. |

### Example

Here's an example of the exportresourcestrings command:

```
FlowForceServer exportresourcestrings en c:\Strings.xml
```

This command creates a file called Strings.xml at c:\ that contains all the resource strings of the FlowForce Server application in English.

### Creating localized versions of FlowForceServer

Create a localized version of FlowForce Server as follows:

1. Generate an XML file containing the resource strings by using the exportresourcestrings command (*see command syntax above*).
2. Translate the resource strings into the target language. The resource strings are the contents of the <string> elements in the XML file. Do not translate variables in curly brackets, such as {option} or {product}.
3. Contact Altova Support to generate a localized DLL file from your translated XML file.
4. After you receive your localized DLL file from Altova Support, save the DLL in the C:\Program Files (x86)\Altova\FlowForceServer2014\bin folder. Your DLL file will have a name of the form FlowForceServer2014_lc.dll. The _lc part of the name contains the language code. For example, in FlowForceServer2013_de.dll, the de part is the language code for German (Deutsch).
5. Run the setdeflang command to set your localized DLL file as the FlowForce Server app to use. Use the language code that is part of the DLL name as the argument of the setdeflang command.

**Note:** Altova FlowForce Server is delivered with support for four languages: English, German, Spanish, and Japanese. So you do not need to create a localized version of these languages. To set any of these four languages as the default language, use FlowForce Server's `setdeflang` command.

### 2.10.5 foreground

The **`foreground`** command starts Altova FlowForce Server in the foreground. It is used internally by the startup scripts for Linux and should not specified by a user.

### 2.10.6 initdb

The **initdb** command creates a new database, or updates an existing one to the latest version.

```
FlowForceServer initdb [options]
```

**Note:** On Linux systems, use an all-lowercase **flowforceserver** to call the executable.

The default database is created at installation time, so it is usually not necessary to use this command.

**Options**
The single option is shown below.

| | | |
|---|---|---|
| | `--datadir=VALUE` | `VALUE` is the path of the database directory. |

### 2.10.7 install

The **install** command installs Altova FlowForce Server as a Windows service.

```
FlowForceServer install [options]
```

The service is installed at installation time, so it is usually not necessary to use this command.

**Options**
The single option is shown below.

| | | |
|---|---|---|
| | --datadir=VALUE | VALUE is the path of the database directory. |

### 2.10.8 licenseserver

The `licenseserver` command specifies the name of the machine on the network running the Altova LicenseServer. Alternatively, you can specify the machine's IP address.

The `licenseserver` command registers FlowForceServer with LicenseServer. Once this is done, you can, on LicenseServer, assign a license to FlowForceServer. How to do this is described in the LicenseServer documentation.

```
FlowForceServer licenseserver [options] Server-Or-IP-Address
```

**Note:** On Linux systems, use an all-lowercase **flowforceserver** to call the executable.

You must have Administrator privileges (root) to be able to register FlowForce Server with LicenseServer!

**Example**
Here's an example of the `licenseserver` command in its simplest form:

```
FlowForceServer licenseserver DOC.altova.com
```

The command above specifies that the machine named `DOC.altova.com` is the machine running Altova LicenseServer. If the LicenseServer is running on the user's machine, the following commands would also be valid:

```
FlowForceServer licenseserver localhost
FlowForceServer licenseserver 127.0.0.1
```

**Options**
The options are listed below, in their short forms (first column) and long forms (second column), together with their descriptions. On the command line, one or two dashes can be used for both short and long forms.

| | | |
|---|---|---|
| `--j` | `--json` | Prints the result of the registration attempt as a machine-parsable JSON object.<br>Form: `--json=`*`true`*`|`*`false`* |

### 2.10.9 migratedb

The **migratedb** command upgrades and transforms the database to the latest version.

E.g. If FlowForce Server 2013 was installed at the default location then this will be automatically detected by the installer when installing FlowForce Server 2014. An option in the installer allows you to choose if you want to migrate your data to the newer version.

If FlowForce Server 2013 was installed in any other directory, you will have to manually migrate the data, as discussed in the section Upgrading FlowForce 2013 to FlowForce 2014.

```
FlowForceServer migratedb [options]
```

**Note:** On Linux systems, use an all-lowercase **flowforceserver** to call the executable.

**Example**
Here's an example of the **migratedb** command for MS Windows:

```
"C:\Program Files(x86)\Altova\FlowForceServer2014\bin\FlowForceServer.exe"
migratedb
--datadir=C:\ProgramData\Altova\FlowForceServer2014\data --olddatadir=C:
\ProgramData\Altova\FlowForceServer2013\data
```

**Options**
The options are shown below.

| | | |
|---|---|---|
| | `--datadir=VALUE` | `VALUE` is the path of the database directory. |
| | `--olddatadir=VALUE` | `VALUE` is the path of the database directory |

### 2.10.10 repair

The **repair** command starts Altova FlowForce Server with all triggers and job execution processes disabled, to enable troubleshooting.

```
FlowForceServer repair [options]
```

**Note:** On Linux systems, use an all-lowercase **flowforceserver** to call the executable.

**Example**
Here's an example of the **repair** command:

```
FlowForceServer repair --datadir=C:\ProgramData\Altova
\FlowForceServer2014\data
```

**Options**
The single option is shown below.

| | | |
|---|---|---|
| | --datadir=VALUE | VALUE is the path of the database directory. |

### 2.10.11 setdeflang (sdl)

The `setdeflang` command (short form is `sdl`) sets the default language:

```
FlowForceServer setdeflang | sdl LanguageCode
```

**Note:** On Linux systems, use an all-lowercase **`flowforceserver`** to call the executable.

**Example**
Here's an example of the `setdeflang` command:

```
FlowForceServer setdeflang de
```

The command above sets the default language for messages to German.

**Supported languages**
The table below lists the languages currently supported together with their language codes.

| | |
|---|---|
| `en` | English |
| `de` | German |
| `es` | Spanish |
| `ja` | Japanese |

### 2.10.12 start

The **start** command starts Altova FlowForce Server as a service.

```
FlowForceServer start [options]
```

**Note:** On Linux systems, use an all-lowercase **flowforceserver** to call the executable.

This command is used internally by the startup scripts or by the Windows service installation. It should not be used directly.

**Options**
The single option is shown below.

| | | |
|---|---|---|
| | `--datadir=VALUE` | `VALUE` is the path of the database directory. |

### 2.10.13 uninstall

The **uninstall** command uninstalls the service Altova FlowForce Server.

```
FlowForceServer uninstall
```

**Note:** On Linux systems, use an all-lowercase **flowforceserver** to call the executable.

**Example**
Here's an example of the **uninstall** command:

```
FlowForceServer uninstall
```

## 2.10.14 upgradedb

The **upgradedb** command upgrades the database to the latest version.

```
FlowForceServer upgradedb [options]
```

**Note:** On Linux systems, use an all-lowercase **flowforceserver** to call the executable.

**Example**
Here's an example of the **upgradedb** command:

```
FlowForceServer upgradedb --datadir=C:\ProgramData\Altova
\FlowForceServer2014\data
```

The default database is upgraded automatically at installation time, so it is usually not necessary to run this command manually.

**Options**
The single option is shown below.

| | | |
|---|---|---|
| | `--datadir=VALUE` | `VALUE` is the path of the database directory. |

## 2.11 RaptorXML Server

Altova RaptorXML Server (hereafter also called RaptorXML for short) is Altova's third-generation, super-fast XML and XBRL processor. It has been built to be optimized for the latest standards and parallel computing environments. Designed to be highly cross-platform capable, the engine takes advantage of today's ubiquitous multi-core computers to deliver lightning fast processing of XML and XBRL data.

Note: XBRL processing is available only in RaptorXML+XBRL Server and not in RaptorXML Server.

RaptorXML is available in two editions:

- RaptorXML Server is a very fast XML processing engine with support for XML, XML Schema, XSLT, XPath, XQuery and is integrated into the FlowForce Server package.
- RaptorXML+XBRL Server supports all the features of RaptorXML Server with the additional capability of processing and validating the XBRL family of standards. This installer needs to be installed from the Altova website.

RaptorXML Server limitations:

- XML Signatures are not supported
- Global resources are not supported via the COM interface
- ODBC and ADO database connections are only supported by Windows. Other operating systems automatically connect via JDBC

**Downloading**

RaptorXML Server is part of the FlowForce Server installation package, please see Getting started for more information. All other editions need to be downloaded from the Altova website.

**Licensing**

Please see the Getting started page on how to register and license RaptorXML Server.

**Usage**

Please see Using RaptorXML Server to validate a document in the tutorial section on how to use RaptorXML with FlowForce Server.

Please see RaptorXML Commands for an explanation of all the RaptorXML functions available to a FlowForce execution step.

### 2.11.1 RaptorXML Commands

The following RaptorXML functions are available in FlowForce Server to be used as functions in a job execution step.

The XBRL functions are only available (from the RaptorXMLXBRL container) if you have downloaded and installed/registered RaptorXML (+XBRL) Server from the Altova website.

The parameter names of the FlowForce functions approximate the command line parameter names of the RaptorXML command line interface. Explanations of each of the parameters is available by clicking the supplied links.

RaptorXML functions:

- valany
- valdtd
- valxml-withdtd
- valxml-withxsd
- valxquery
- valxsd
- valxslt
- wfany
- wfdtd
- wfxml
- xquery
- xslt

# Chapter 3

# FlowForce Tutorial - Automated Processing

# 3 FlowForce Tutorial - Automated Processing

The aim of the tutorial is to:

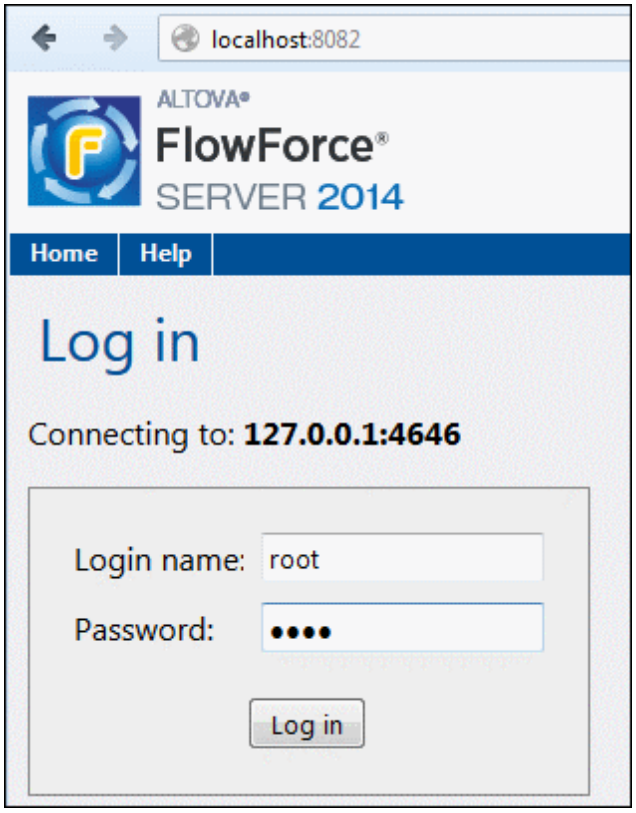
- Deploy a MapForce mapping to FlowForce Server, and create and execute a job at a specific time.
- Create a subjob that copies the previously generated output files into an archive directory.
- Check a directory for new files to be passed on to a job, that uses the new file as an input file.
- Supply job parameters at runtime, to a deployed mapping, that queries a database.
- Use a deployed mapping as a web service, and view the mapping results in a browser.
- Deploy a StyleVision transformation file to FlowForce Server and have it run at a specific time each day.
- Using RaptorXML Server to validate a document.
- Passing key/value parameters to RaptorXML.

Both FlowForce Server and FlowForce Administration Interface need to be started to deploy mappings or to manage the server.

This tutorial assumes that **FlowForce Server** and **MapForceServer** have been installed and registered with **LicenseServer**, and have also been assigned the correct licenses by your Administrator. The browser interface is identical from this point on for Windows and Linux.

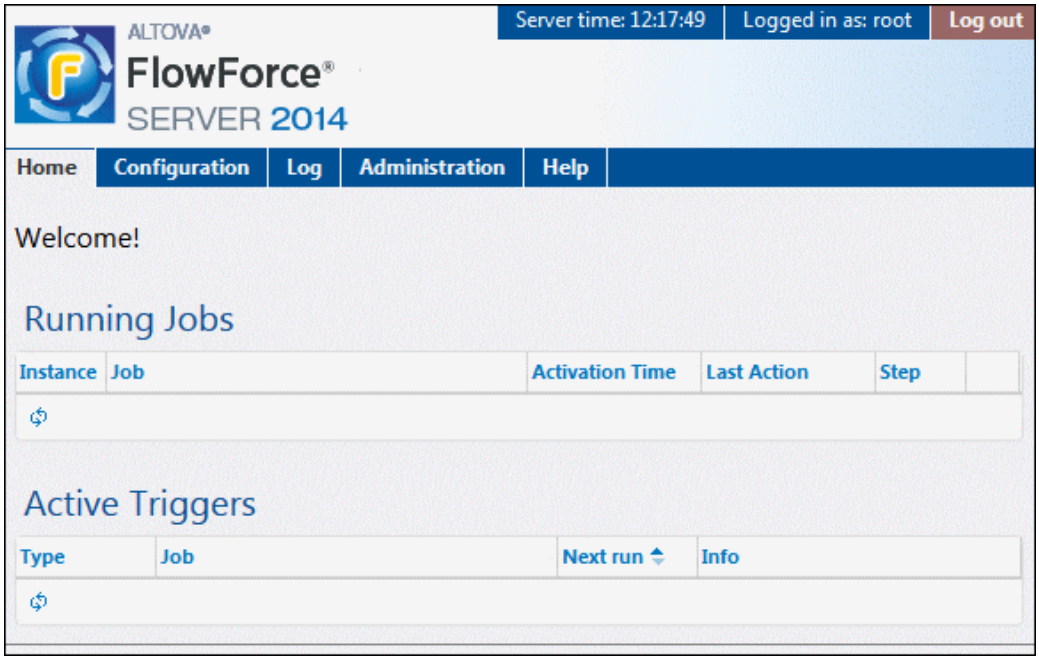
**To log in to the FlowForce Web Administration Interface:**

1. Start you browser and enter http://localhost:8082. If you changed the port on the FlowForce Server Configuration page, use the one you entered there.
   You are now connected to FlowForce Web Server and the Login page for FlowForce Server is opened.




Enter login name "**root**", as well as the password "**root**" if this is the first time that you have started FlowForce Server.

2. Click the "Log in" button to log in.
   You have now logged onto FlowForce Server.
   Connection information, as well as any running jobs and active triggers are visible on the Home screen.



**Accessing network drives - drive letters**
If the FlowForce Server service is to access a network resource, i.e. mapped network drives, please make sure that you use the Universal Naming Convention to do so. This is necessary because drive letters are not global to the system, and each logon session is assigned its own drive letters.

The UNC syntax is in the form:

*//server/sharedfolder/filepath*

Where:

- *server* references the server name in the network (defined by the DNS)
- *sharedfolder* references a label defined by the administrator, admin$ is generally the root directory of the operating system installation.
- *filepath* refers to the subdirectories below the share.

  Note:
  Microsoft Windows treat the delimiters slash "/" and backslash "\" as equivalent.

# 3.1 Deploying a MapForce mapping

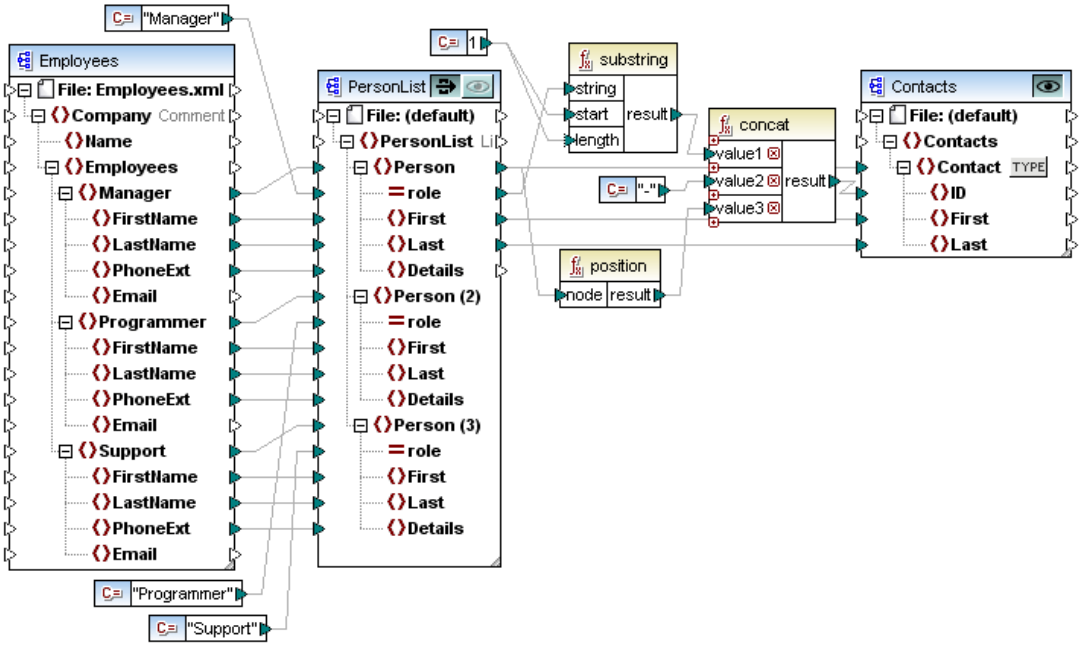
Aim: to deploy a MapForce mapping.

Deploying a mapping means that MapForce organizes all the mapping resources, used by the specific mapping, into an object and passes it on to the server/machine running FlowForce.

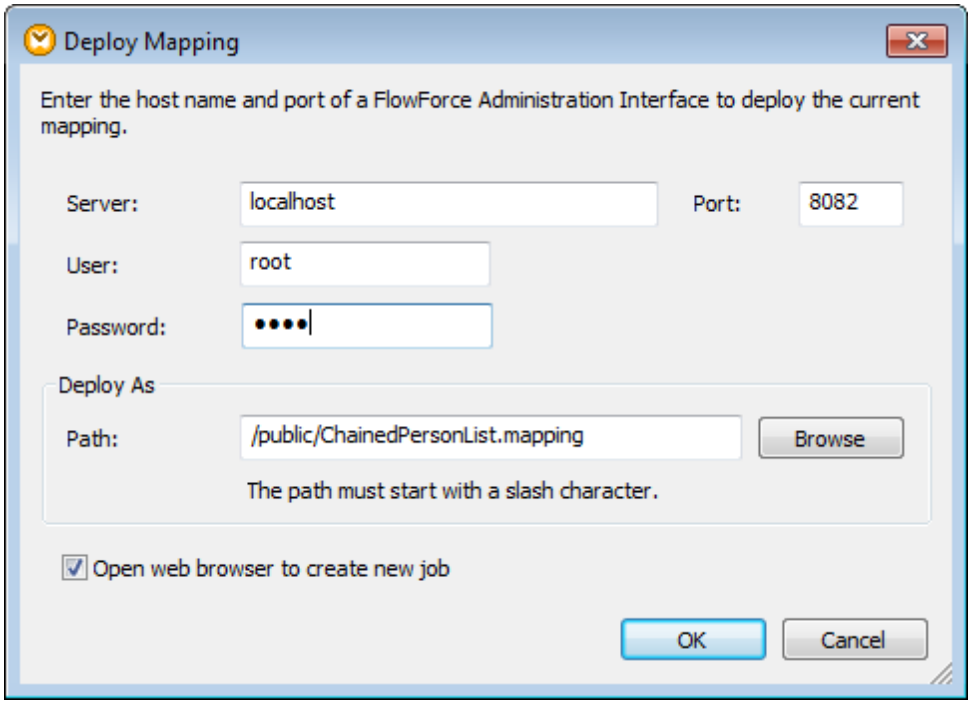
Please note: when deploying a mapping to FlowForce, make sure that your target language is Built-in, i.e. click the Built-In icon  .

### To deploy a mapping in MapForce

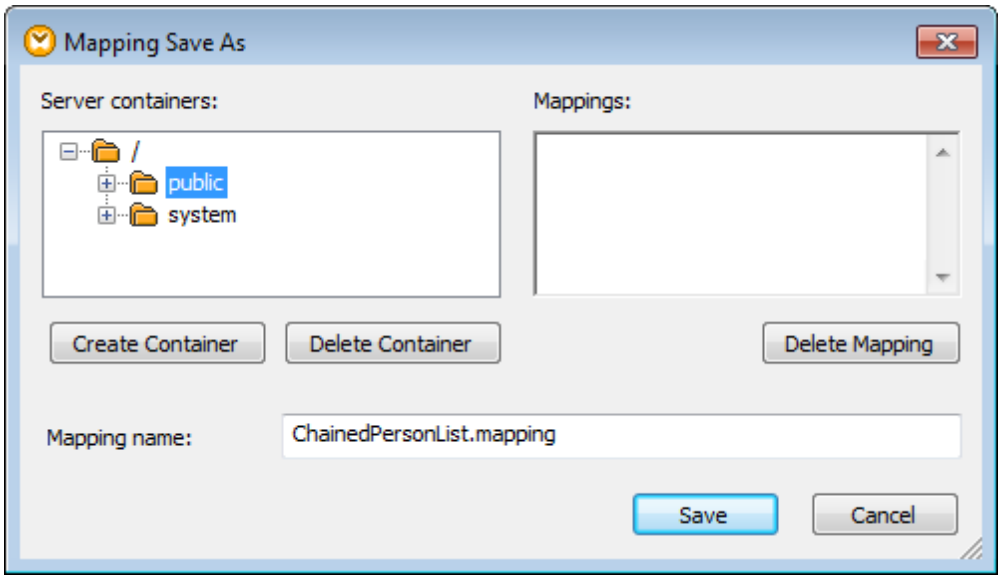
1. Open a mapping in MapForce e.g. **ChainedPersonList.mfd**.




2. Select the menu option **File | Deploy to FlowForce Server**.
3. Enter the Server name and Port of the web administration interface in the respective fields, e.g. localhost and 8082 if FlowForce Server is running on the same machine and the default port is used.
4. Enter the User Name and Password needed to access the server, e.g. "root" and "root".

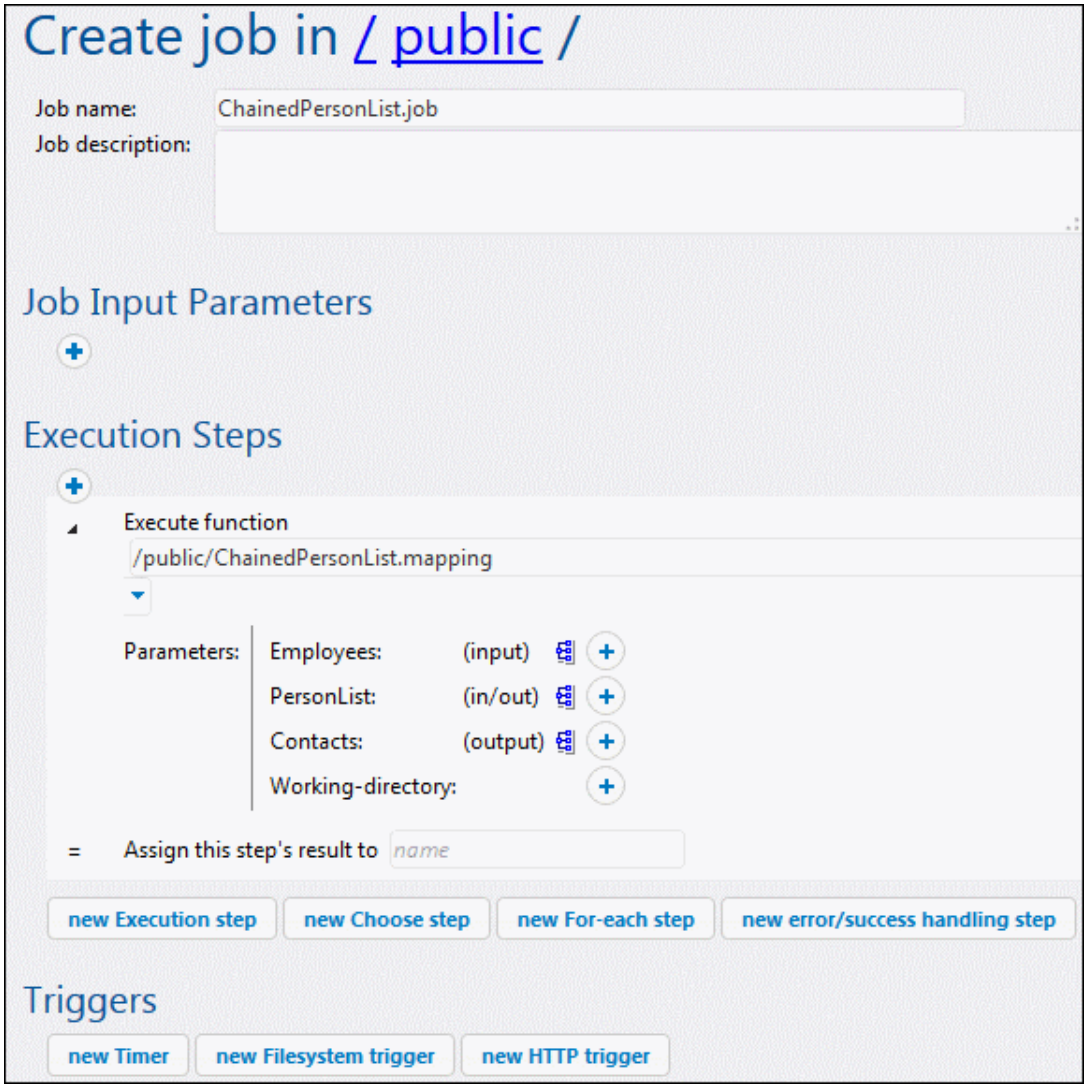



5. Optionally, click on the "Browse" button to define where the mappings are going to be placed inside the FlowForce Server's object system ("public" is selected by default), then click Save.
   Make sure the "Open web browser to create new job" check box is active.




7. Click OK to deploy.

   The messages window shows if the mapping deployed successfully. The FlowForce Server Administration Interface is automatically opened in your web browser, and a partially filled in job page is displayed.




The next thing to do is to define the rest of the job, i.e. the Job Triggers, the Job Credentials, and the Execution Steps.

## 3.2 Defining a job - triggers & execution steps

Aim: To define a simple job that:

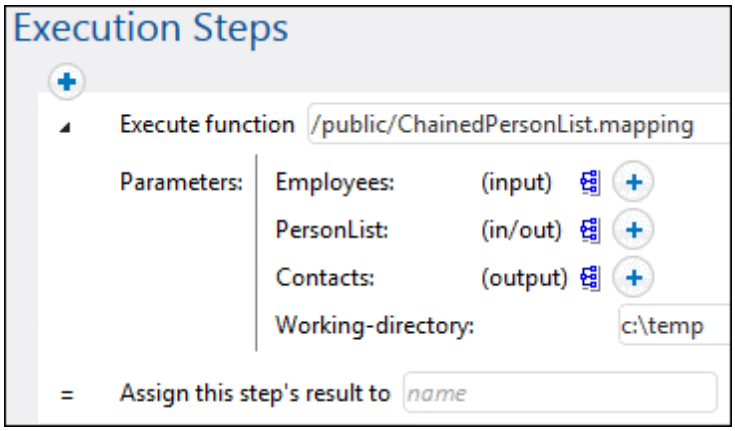
- Uses the deployed mapping function(s) from MapForce
- Uses a local, or predefined credential: see Administration Guide
- Triggers the job at a specific time

As this mapping was deployed from MapForce and the "Open web browser..." check box was activated, you do not have to navigate to the Jobs page, it is automatically created for you.

**To define the job execution steps:**

Some of the fields of the Execution steps group have been filled out automatically. (You would normally have to click the "+" button to add a new Execution step.)

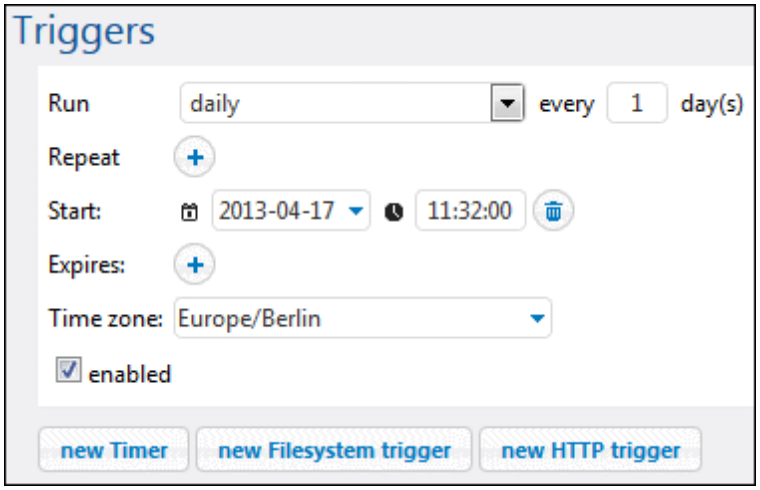
The "Execute function" is: /public/ChainedPersonList.mapping




1. Click the "+" button of the Working-directory entry to enter a different directory, e.g. c:\temp. Note that this must be a path on the server machine (that runs FlowForce), not on your local machine.
   As we do not want to **override** any of the parameter settings defined by the deployed mapping, we are not going to change any other Parameter settings.

**To define the trigger:**

1. Click the "new Timer" button, in the Triggers group.
2. Click into the (Start) date field and select the start date from the date picker.
3. Enter the time the job is to be triggered. Note that the time is entered in 24 hour format. For testing purposes, use a time close to your current time.

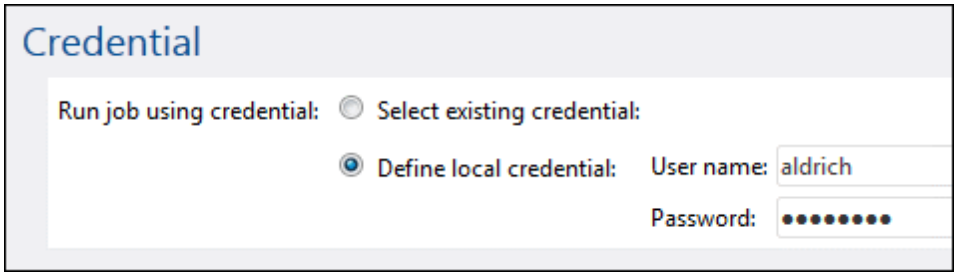



As soon as the trigger time is reached, the job is executed and the output files, generated by the mapping, appear in the c:\temp directory. The output files are PersonList.xml and Contacts.xml.

**To define the credentials:**

There are two ways that you can define job credentials:

- In the Credential group, click the "Select existing credential" combo box and select a previously defined credential e.g. "Cred_production".
- Manually enter you personal server credentials in the User name and Password fields of the local credential group.




Note:
Entering credentials manually, forces you to update the credentials of this job if your **server** login changes.

**To save your job:**

1. Click the Save button.
   A save confirmation message appears at this point. If any mandatory fields were left out, you will be shown where this is the case.

**Running the job:**

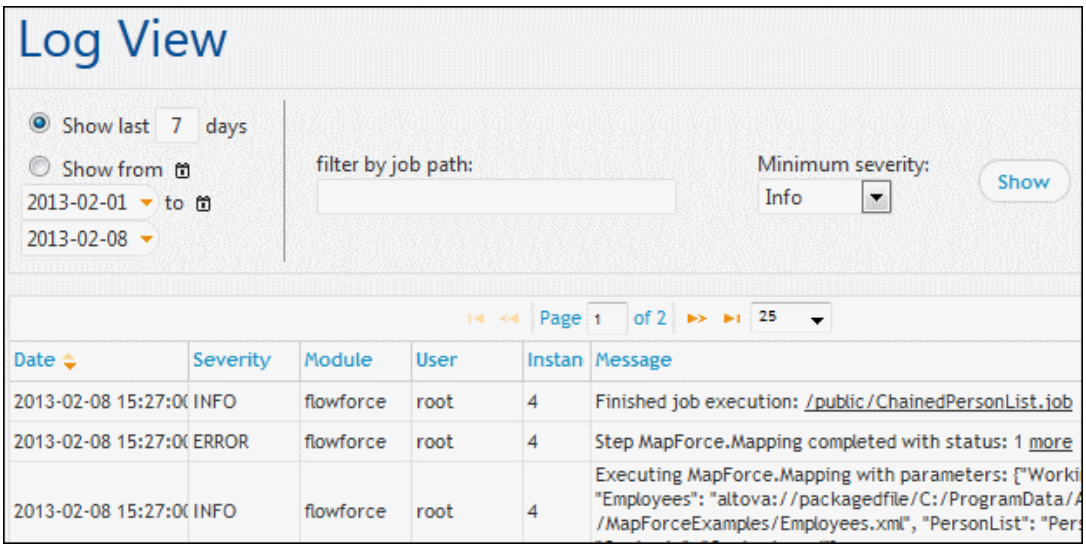
As soon as the trigger time has been reached, (i.e. 11:32) the trigger wil fire and the job will be executed. Two XML files are placed in the c:\temp folder: Contacts.xml and PersonList.xml.

**Viewing the job log**

- Click the View log button near the top of the left of the Job page, to open the Log View

filtered for the current job.

The execution parameters and the execution status are displayed in the Log View table.

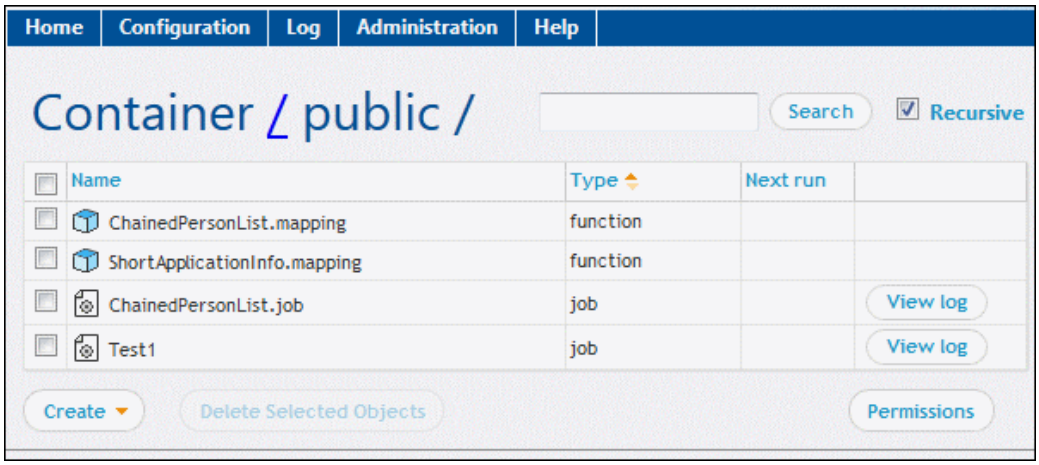



**Viewing the defined job**

1. Click the ChainedPersonListJob **link** in the Message column.
   This opens the previously executed job definition page.

Notes:

Click the "Configuration" button to see the various containers. Click a folder e.g. public, to see its contents. To see the root container contents, click "/".




Each container object, i.e. function, job, credential, etc., has a check box to the left of its name to select it. The topmost check box, to the left of the column header "Name", selects/deselects **all** objects in the list.

The "Create" button lets you create Containers, Jobs, and Credentials.

The "Delete Selected Objects" button becomes active when objects have been selected in the list; clicking it deletes the selected objects.

See: Defining a subjob

## 3.3 Defining a subjob

Aim: To create and integrate a separate job that:

- Copies the mapping result files of the previous job into an archive directory.

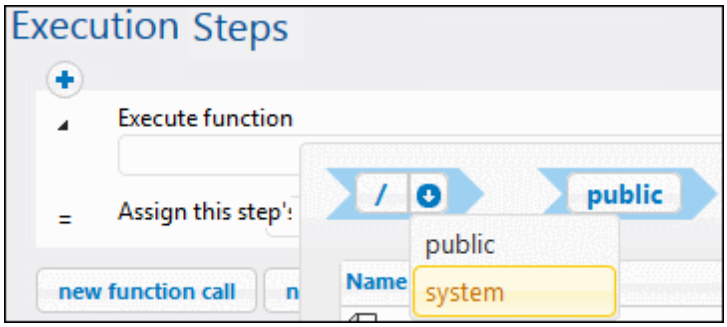
  This job will act as a subjob to the calling job "ChainedPersonListJob".

**To create a new job:**

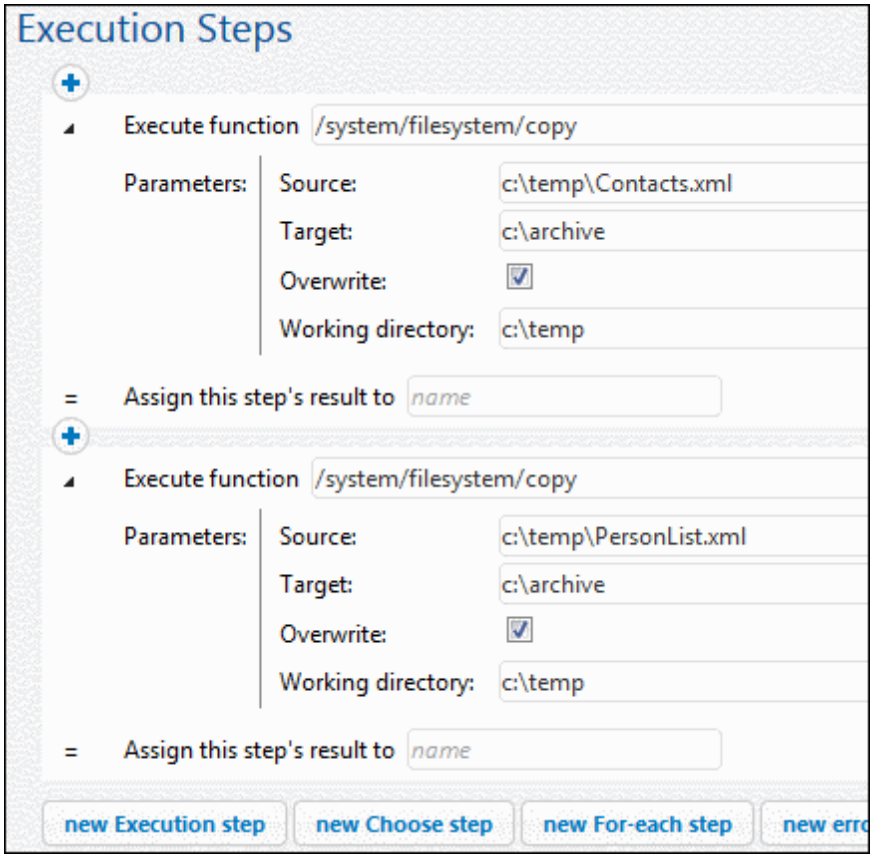
1. Click the "Configuration" button, then click the container "public".
2. Click the "Create" button and select "Create Job" from the popup menu.
3. Enter the name of the job, e.g. "copy2archive".
   There is no need to define a trigger for this job, as it will be called by another job.

**Defining the subjob execution steps:**

1. In the Execution Steps group click the New Execution step button, then click into the "Execute function" field.
   A popup window opens allowing you to select the function (or job) from the public folder.



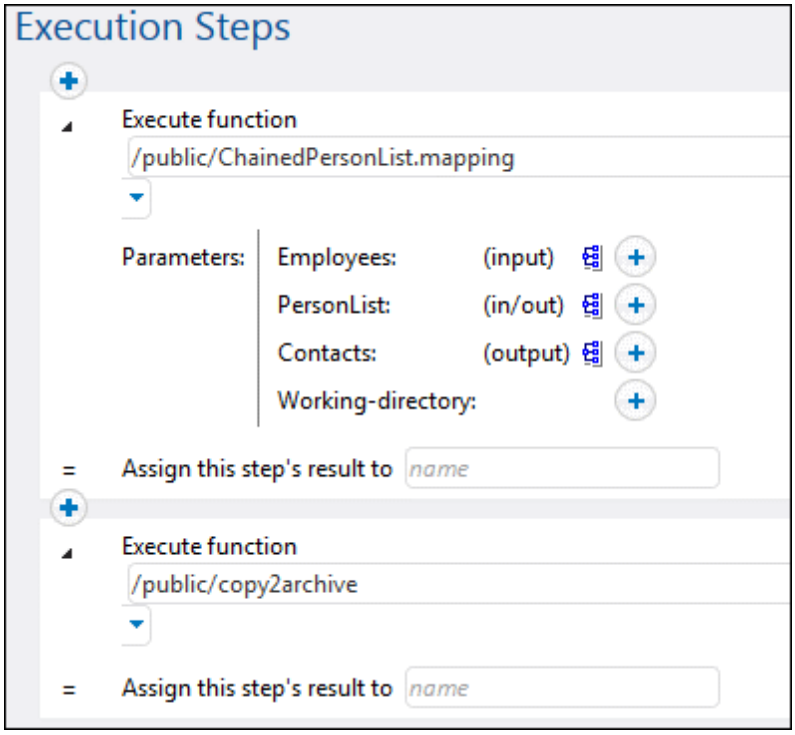

2. Click the down arrow of the left-hand tag and select "system".
   Another popup window is opened.
3. Select **/filesystem/copy**.
4. Enter the name of the file that you want to copy in the Source field, e.g. c:\temp \Contacts.xml.
5. Enter the name of the destination directory, e.g. c:\archive. (Click the "+" button next to the Overwrite field, and activate the check box, if you want to be able to overwrite the same file at the destination.)
6. Enter the name of the working directory, e.g. c:\temp.
7. Click the "new Execution step" button under the previously defined Execution function to add a second copy function.
   Source c:\temp\PersonList.xml, destination c:\archive, and working directory, c:\temp.
8. Click "Save" to save the job.



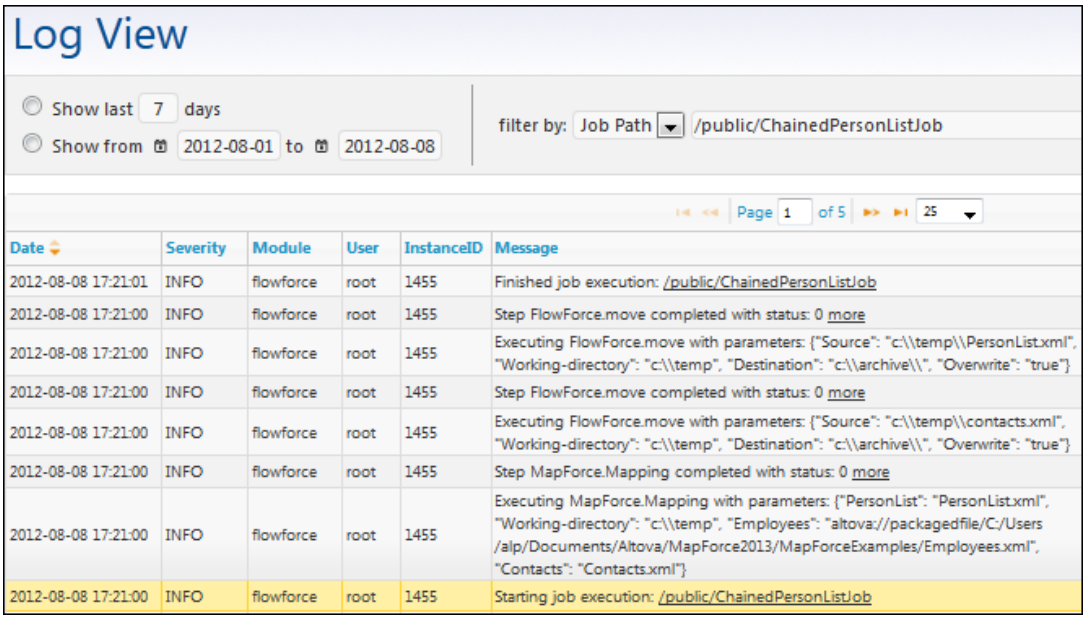

9. Select an existing credential or enter your local credentials.

**Calling a job from another job:**

1. Click the "Configuration" button, then the public container, and select ChainedPersonList.job.
2. Scroll down to the Execution Steps group and click the "New Execution step" button to add a new execution step.
3. Click the Execute function combo box and select **copy2archive** from the popup.




4. Update the timer trigger and click the "Save" button.
5. After the job has been triggered, click the "View Log" button at the top of the job page.




| Date | Severity | Module | User | InstanceID | Message |
|---|---|---|---|---|---|
| 2012-08-08 17:21:01 | INFO | flowforce | root | 1455 | Finished job execution: /public/ChainedPersonListJob |
| 2012-08-08 17:21:00 | INFO | flowforce | root | 1455 | Step FlowForce.move completed with status: 0 more |
| 2012-08-08 17:21:00 | INFO | flowforce | root | 1455 | Executing FlowForce.move with parameters: {"Source": "c:\\temp\\PersonList.xml", "Working-directory": "c:\\temp", "Destination": "c:\\archive\\", "Overwrite": "true"} |
| 2012-08-08 17:21:00 | INFO | flowforce | root | 1455 | Step FlowForce.move completed with status: 0 more |
| 2012-08-08 17:21:00 | INFO | flowforce | root | 1455 | Executing FlowForce.move with parameters: {"Source": "c:\\temp\\contacts.xml", "Working-directory": "c:\\temp", "Destination": "c:\\archive\\", "Overwrite": "true"} |
| 2012-08-08 17:21:00 | INFO | flowforce | root | 1455 | Step MapForce.Mapping completed with status: 0 more |
| 2012-08-08 17:21:00 | INFO | flowforce | root | 1455 | Executing MapForce.Mapping with parameters: {"PersonList": "PersonList.xml", "Working-directory": "c:\\temp", "Employees": "altova://packagedfile/C:/Users/alp/Documents/Altova/MapForce2013/MapForceExamples/Employees.xml", "Contacts": "Contacts.xml"} |
| 2012-08-08 17:21:00 | INFO | flowforce | root | 1455 | Starting job execution: /public/ChainedPersonListJob |

You can now see the status of the job and its subjob.

The two XML files generated by the first job have been copied to the archive directory.

Note:

If you want to rename a file when it is copied, enter the new file name in the "Destination" field.

See: Directory polling - acting on a trigger file

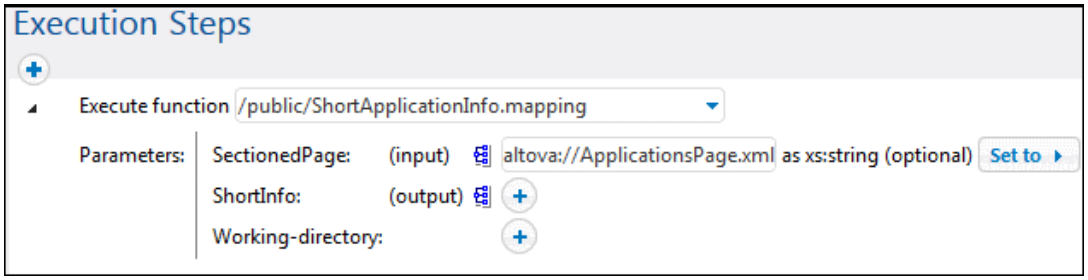
## 3.4 Directory polling - acting on a trigger file

Aim: to check a directory for new XML files, execute the deployed mapping with those files, and copy the result files into an archive directory.

Deploying the mapping and creating the job:

1. Open the **ShortApplicationInfo.mfd** mapping in MapForce.
2. Select the menu option **File | Deploy to FlowForce Server**.
3. Enter the password in the Password field; make sure that the "Open web browser..." check box is active, then click OK.
   This generates a new job in the public directory of FlowForce.
4. A default job name is automatically entered, i.e. ShortApplicationInfo.job.

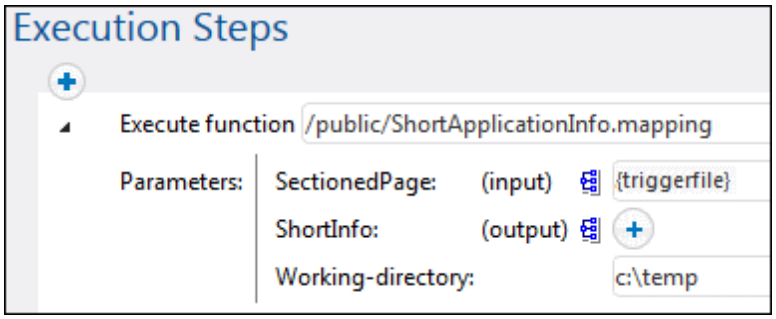

5. Select "/public/ShortApplicationInfo.mapping" from the Function combo box to use the previously defined mapping (if not already selected).
6. Click the "+" icon to the right of the **SectionedPage** label.




This creates an edit field.

6. Click the 

button to the right of the expanded SectionedPage field, and select "triggerfile".
7. This causes the input field contents to change to {triggerfile}. Please do not edit the name "triggerfile", or the job cannot be saved.
8. Click the Working directory "+" button and enter the working directory e.g. c:\temp.




The file in the directory being polled, will now be used as the input file in Parameters group of the Execution step. Note that the name of the (output) file is also shown as a

parameter in this group, i.e. "ShortInfo.xml".

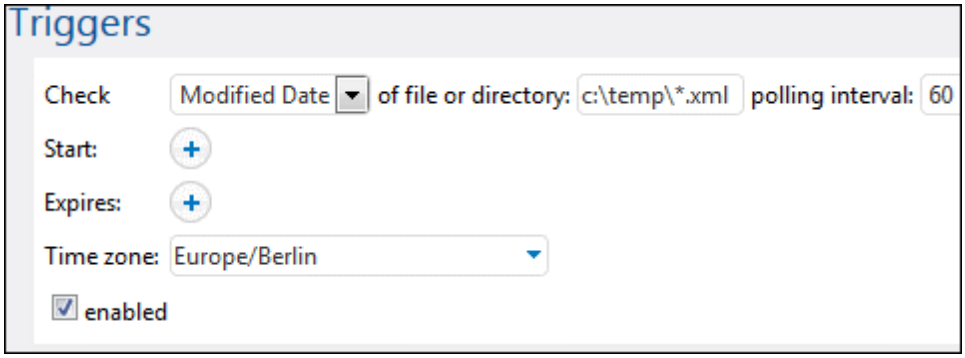
Note:

The **working directory** is used to resolve relative paths that occur during the execution of any type of step. When a relative path is encountered, it is resolved with respect to the path of the current working directory.

If no working directory is specified, a temporary directory will be used.

**Creating the polling trigger:**

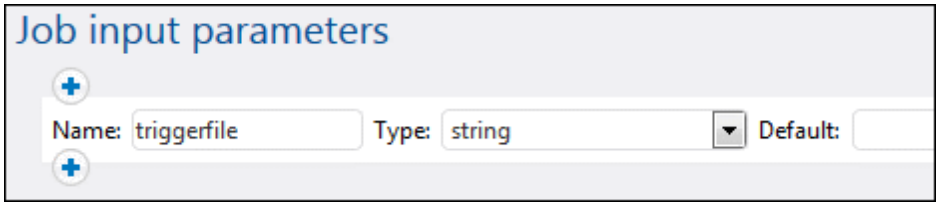
1. In the Triggers section, click the "new File System" trigger button.
2. Select Modified Date in the Check field.
3. Enter the directory name and file types that you want to check for, e.g. c:\temp*.xml.
4. Enter the polling interval, e.g. 60 seconds.




5. Select the credential you want to use for this job, or enter your local credentials.

Note:

When you select "File system trigger", the "triggerfile" entry is automatically added to the "Job input parameters" group.

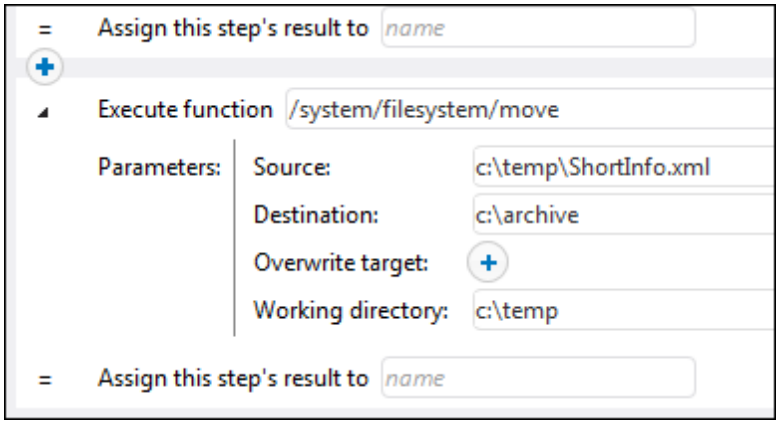



The "triggerfile" parameter will contain the absolute path of the triggering file. If you want to extract portions of the path, please use the File system functions to do so.

E.g. {extension(triggerfile)} retrieves the extension of the triggering file.

**Adding a second job execution step:**

1. Click the "new Execution step" button below the execution step that was just created.
2. Use the Execute function combo box to select "/system/filesystem/move".
3. In the Source field, enter the path/file name of file that you want to move, e.g. c:\temp \ShortInfo.xml.
4. Enter the location of the Destination directory, e.g. c:\archive.
5. Enter the working directory c:\temp.




6. Click the "Save" button to save the job.

   As soon as the trigger start time has been reached, the trigger will be active and c:\temp folder will be polled every 60 seconds.

Note:

When entering file names in the Source and Destination fields be aware that the entries are **case sensitive**! (e.g. shortinfo.xml will not work as the name of the source file, as the file name generated by the mapping deployment is **ShortInfo**.xml).

**To start the dirPolling job:**

- Navigate to your ...\Altova\source folder and copy the file that starts the mapping process to the c:\temp folder (e.g. **ApplicationsPage.xml)**

Result:

- As soon as a new XML file is found, that XML file becomes the input file for the deployed mapping.
- The job is started and the result of the processed input file (ShortInfo.xml) is moved to the archive directory.

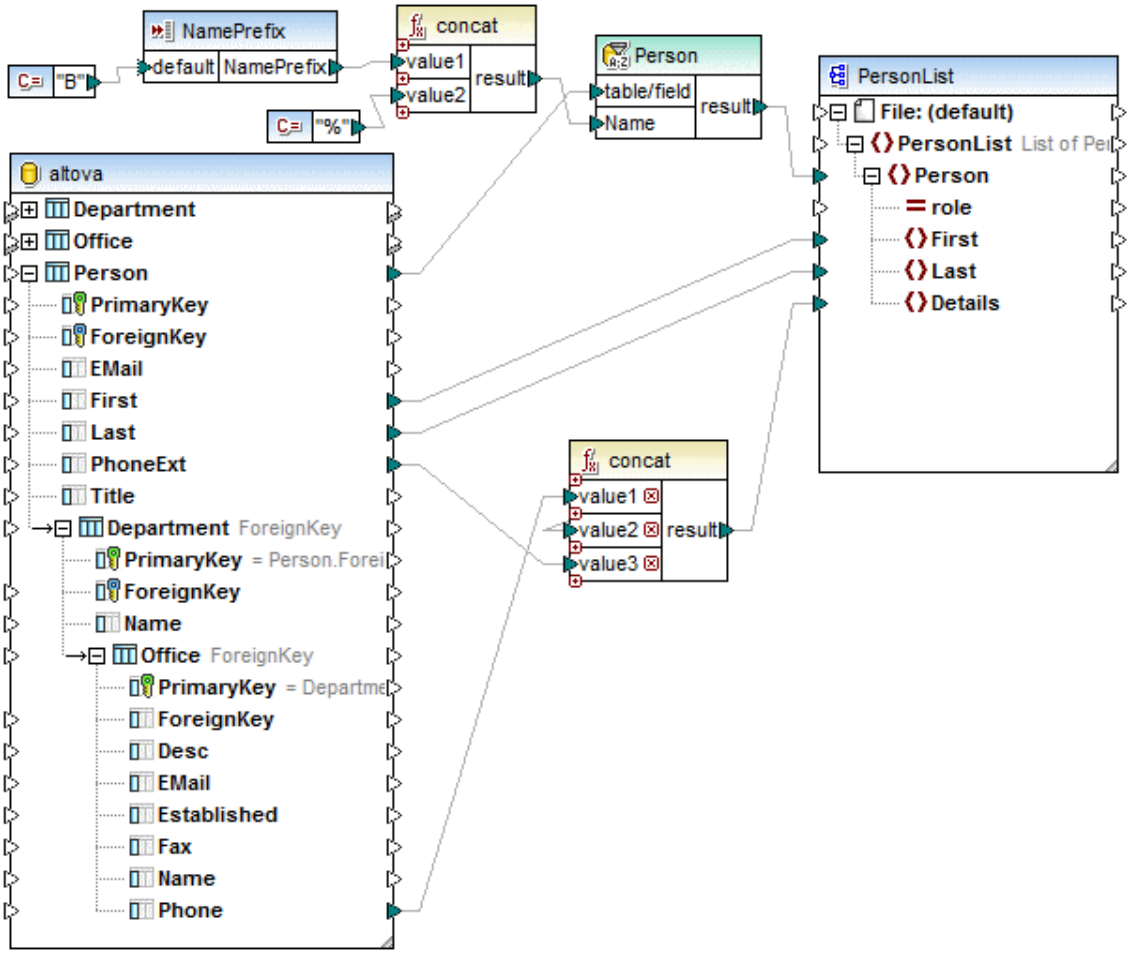
See: Using parameters to query a database

## 3.5 Using parameters to query a database

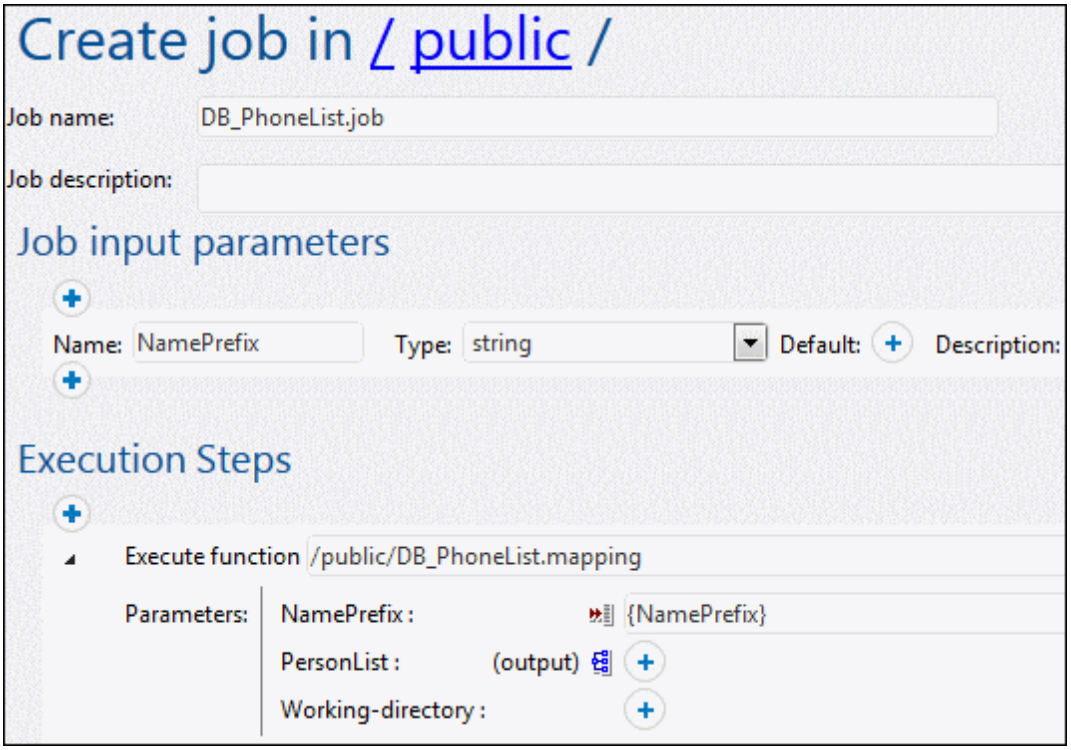
Aim: to query a database using job input parameters, via a web browser.

- This example uses the DB_PhoneList.mfd mapping available in the ... \MapForceExamples folder.
- The NamePrefix input parameter of the mapping, will be used to supply the query data in the browser client.

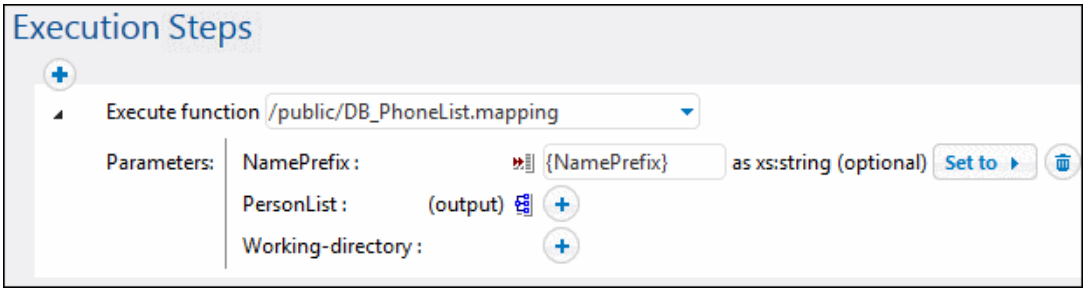



**Deploying the mapping and creating the job:**

1. Open the DB_PhoneList.mfd mapping in MapForce.
2. Select the menu option **File | Deploy to FlowForce Server**.
3. Enter the password (root) in the Password field; make sure that the "Open web browser..." check box is active, then click OK.
   This generates a new job in the public directory of FlowForce.
4. Click the "+" button of Job input parameters and enter NamePrefix.




5. Click the "+" button to the right of the NamePrefix entry in the Execution steps group.
6. Click the "Set to" button and select NamePrefix (the parameter name is automatically available).




7. Click the check box in the Service group and enter **myURL** in the text box.
8. Select the credential you want to use for this job, e.g. cred_production.
9. Click the "Save" button to save the job.

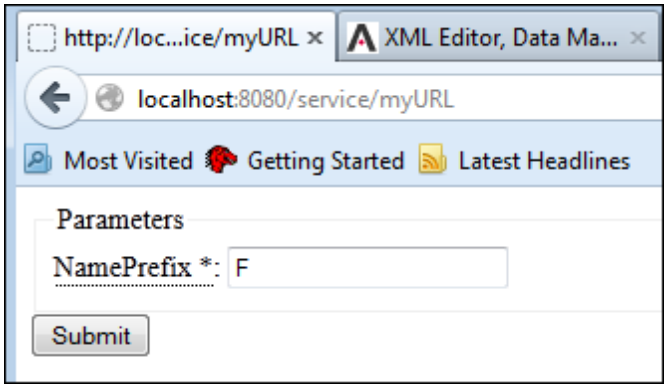
Note: No triggers were defined because the web browser is used to access the service.

### Using the browser to run the job and query the database:

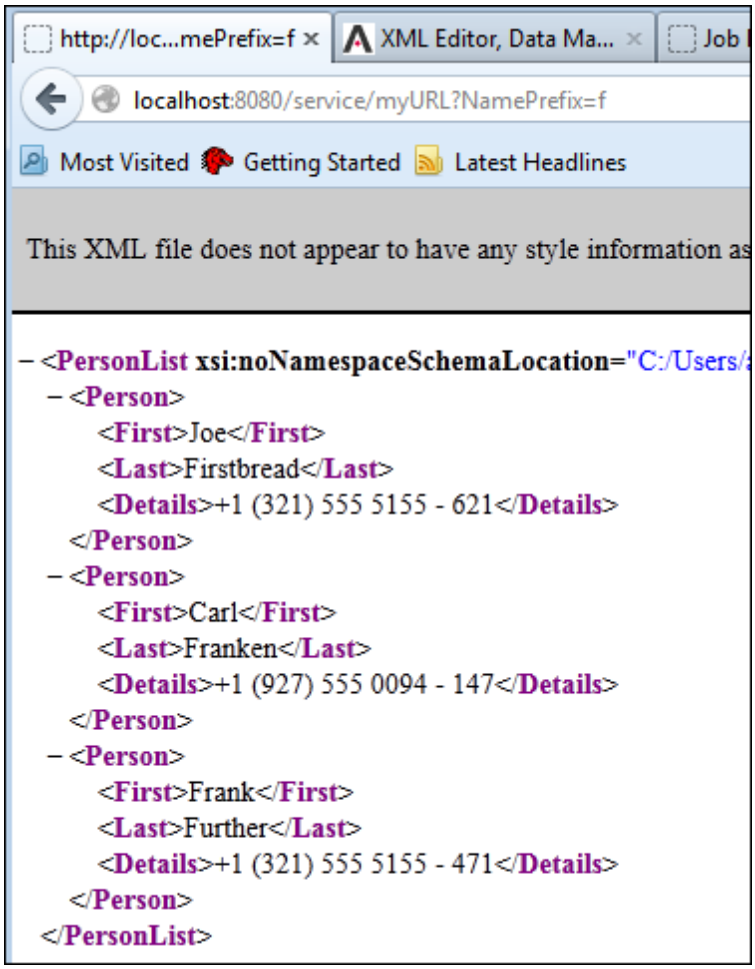
1. Open your browser and enter http://localhost:4646/service/myURL in the URL text box. If you changed the port number for FlowForce Server, please use that one.

2. Enter the letter of the last name of the person(s) you are looking for, e.g. "F".




3. Click the "Submit" button to send the query to the server.




The resulting XML file is now displayed in the browser.

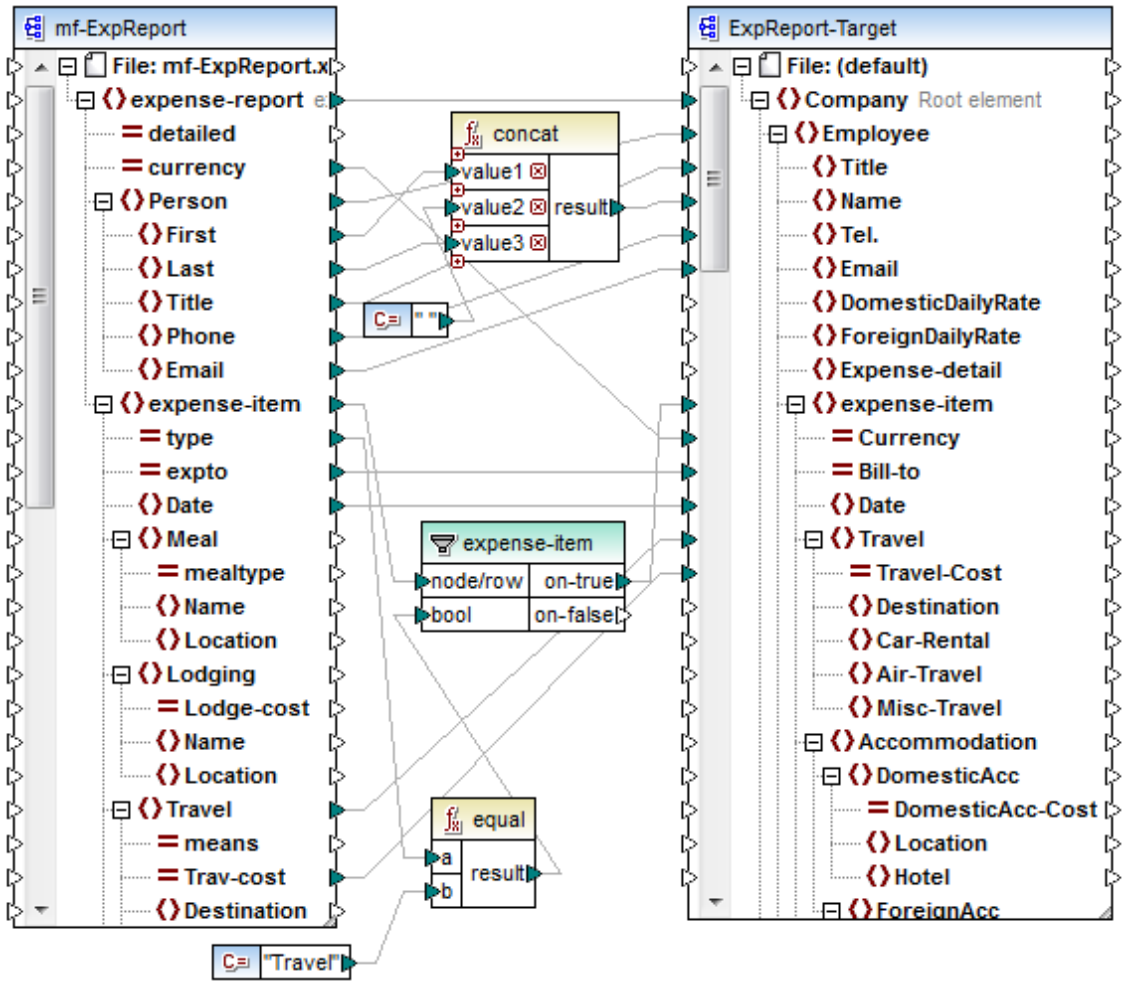
Please note:
You can press the "Back" button and reenter a query for a different Last name.

See: Using a deployed mapping as a web service

## 3.6 Using a deployed mapping as a web service

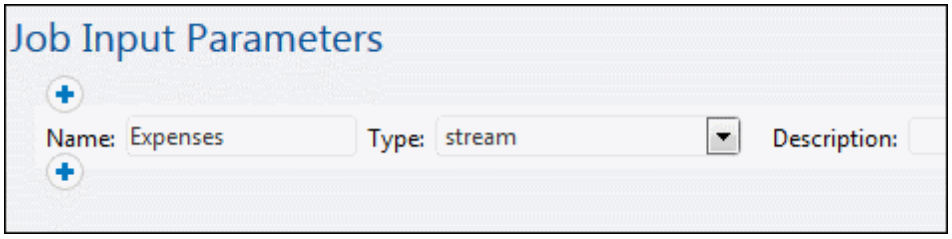
Aim: to supply various XML files as source files, and view the mapping result via a browser client.

- This example uses the **Tut-ExpReport.mfd** file available in the ...\MapForceExamples \Tutorial folder.
- The XML source file, mf-ExpReport.xml, will be replaced at runtime in the browser client.

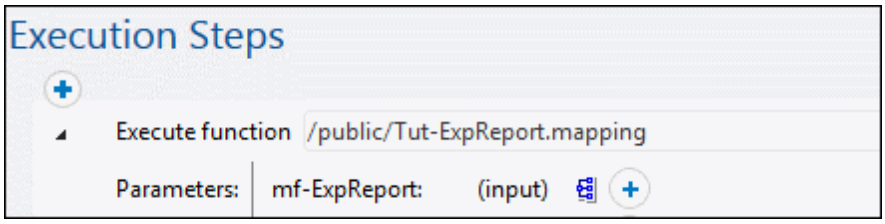



**Deploying the mapping and creating the job:**

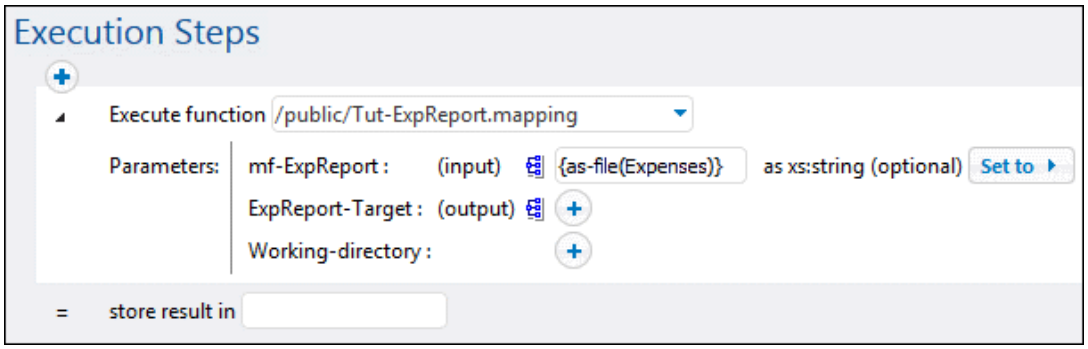
1. Open the **Tut-ExpReport.mfd** mapping in MapForce.
2. Select the menu option **File | Deploy to FlowForce Server**.
3. Enter the password (root) in the Password field; make sure that the "Open web browser..." check box is active, then click OK.
   This generates a new job in the /public directory of FlowForce.
4. Click the "+" button of the "Job Input Parameters" group and enter **Expenses**.
5. Click the "Type" combo box and select **stream**. This defines the parameter to represent a file uploaded to the server with the HTTP POST request.



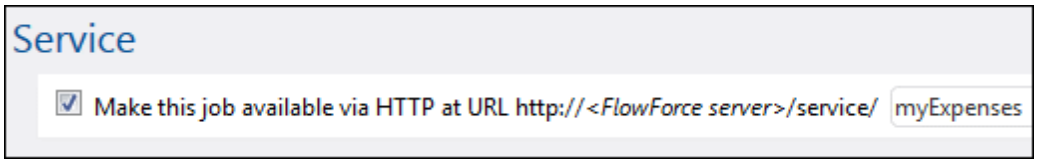

6. Click the "+" button to the right of the **mf-ExpReport** entry in the "Execution Steps" group.




7. Enter the expression **{as-file(Expenses)}** in the Execute function field. Please see: Streaming functions for more information.




8. Click the check box in the "Service" group and enter **myExpenses** in the text box.

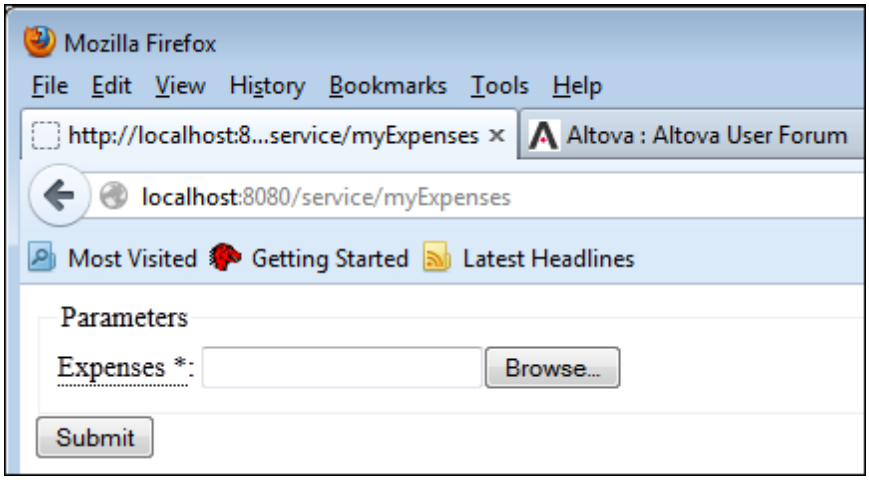



9. Select the credential you want to use for this job.
10. Click the "Save" button to save the job.

Note: No triggers were defined because the browser is used to access the service.

**Using the browser to run the job and choose different XML input files:**

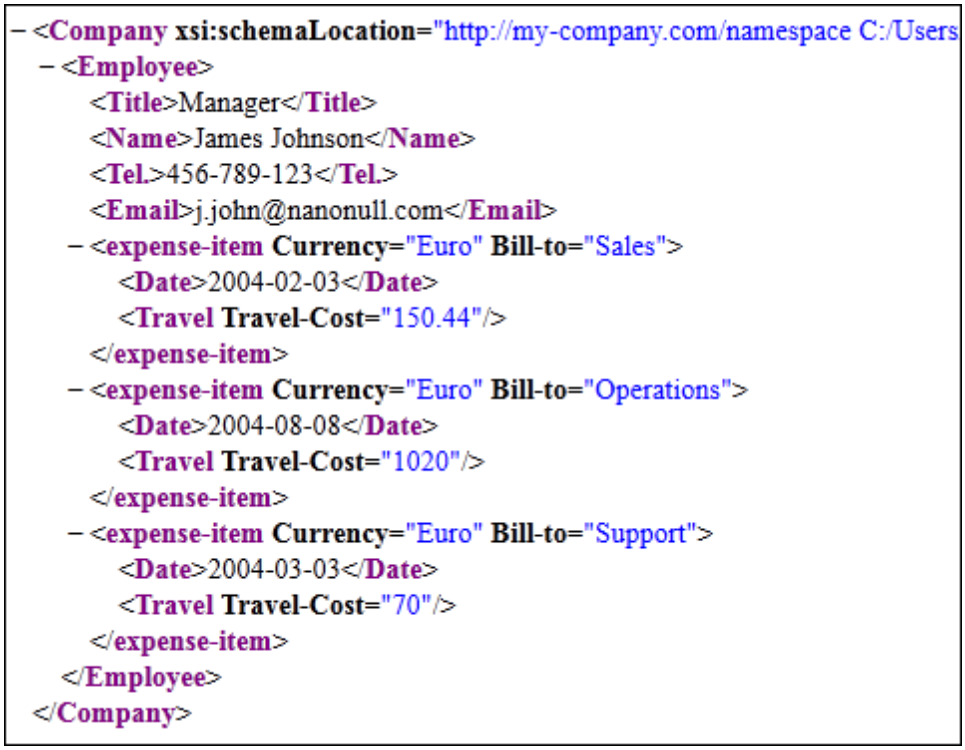
1. Open your browser and enter http://localhost:4646/service/myExpenses in the URL text box.
2. Click the "Browse" button.




3. Select mf-ExpReport.xml in the ...\MapForceExamples**Tutorial** folder from the dialog box, and click "Submit".

```
- <Company xsi:schemaLocation="http://my-company.com/namespace C:/Users
  - <Employee>
      <Title>Project Manager</Title>
      <Name>Fred Landis</Name>
      <Tel.>123-456-78</Tel.>
      <Email>f.landis@nanonull.com</Email>
    - <expense-item Currency="USD" Bill-to="Development">
        <Date>2003-01-02</Date>
        <Travel Travel-Cost="337.88"/>
      </expense-item>
    - <expense-item Currency="USD" Bill-to="Accounting">
        <Date>2003-07-07</Date>
        <Travel Travel-Cost="1014.22"/>
      </expense-item>
    - <expense-item Currency="USD" Bill-to="Marketing">
        <Date>2003-02-02</Date>
        <Travel Travel-Cost="2000"/>
      </expense-item>
    </Employee>
  </Company>
```

4. Click the browser "Back" button, then the myExpenses link, and click the "Browse" button.
5. Select mf-ExpReport2.xml from the dialog box, and click "Submit".




Two completely different Expense reports were processed by the deployed mapping and output to the browser.

Note:
The path of the XML output instance file is saved with the deployed mapping. There is therefore no need to supply the working directory.

## 3.7 Deploying a StyleVision transformation

The **File | Deploy to FlowForce** command of Altova StyleVision enables you to deploy a `.transformation` file from StyleVision to your Altova FlowForce Server. The `.transformation` file contains all the files and information required to carry out transformations as designed in the SPS (stylesheet) you created with Altova StyleVision.

After the `.transformation` file has been deployed to the FlowForce Server, you can create jobs in Altova FlowForce Server that use the `.transformation` file to generate transformations according to triggers specified in the job definition.

In this section, we describe how to deploy a StyleVision transformation to FlowForce Server and important points related to deployment. You can try out the deployment process described below by using the `AutoCalc.sps` file in the `StyleVisionExamples` folder as your starting point. The file `AutoCalc.sps` can also be opened from the `Basics` folder of StyleVision's `Examples` project.

A `.transformation` file is generated from a Portable XML Format (PXF) file. So, the **File | Deploy to FlowForce** command of StyleVision can be used when a PXF file is active. (If an SPS file is active, the **Deploy to FlowForce** command will be active, but clicking it will prompt you to save the SPS file as a PXF file. To create a PXF file from an SPS file, use the **File | Save As** command and select PXF as the format to save as.)

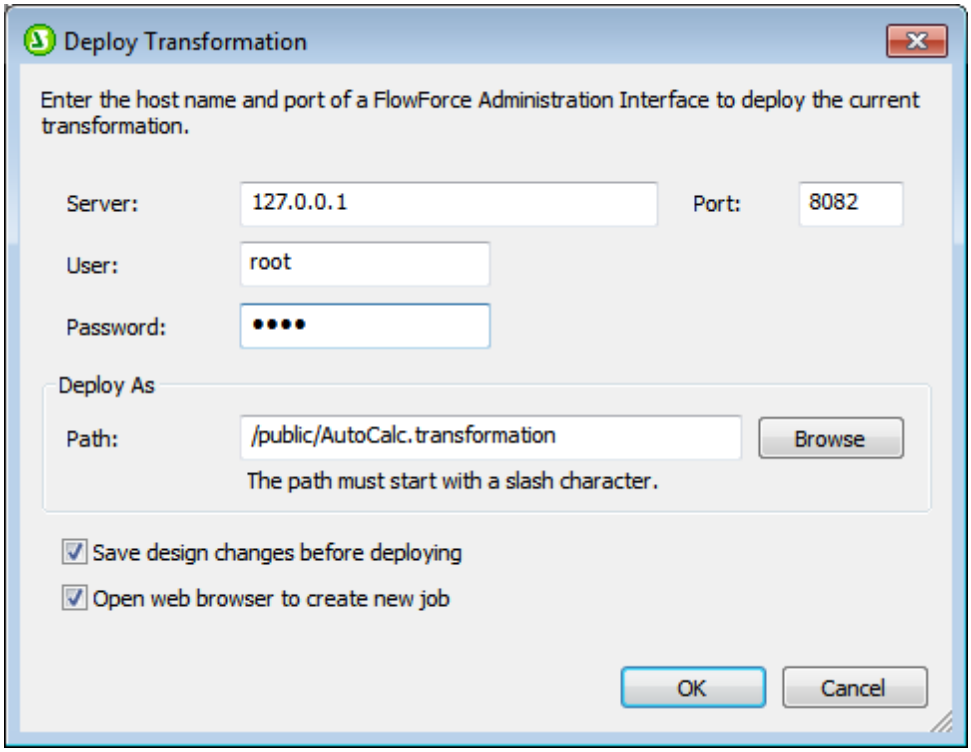
**Note:** When a PXF file is saved, an option is provided for including external files (such as image files) in it. If an external file is not included in the PXF file but is required for the transformation, then the external file must be saved on the FlowForce Server. Since the external files will be accessed from the working directory (specified in the FlowForce Server job definition), they should be placed relative to the working directory, in such a way that links originating in the working directory will correctly access them.

**Note:** Designs containing a database schema source are currently not supported, and cannot be deployed to FlowForce Server.

**Note:** When a FlowForce Server job requiring a StyleVision transformation is executed, the job is passed to StyleVision Server, and StyleVision Server will extract the contents of the PXF file to the working directory that was specified in the job's parameters. To ensure that there is no filename collision when this extraction occurs, there should be no file in the working directory that has the same name as a file contained in the PXF file.

Before running the **Deploy to FlowForce** command in StyleVision, make sure that Altova FlowForce Server and Altova StyleVision Server are correctly licensed and running. (StyleVision Server is packaged with FlowForce Server.)

The **File | Deploy to FlowForce** command in StyleVision pops up the Deploy Transformation dialog (*screenshot below*).




In this dialog, you specify the following:

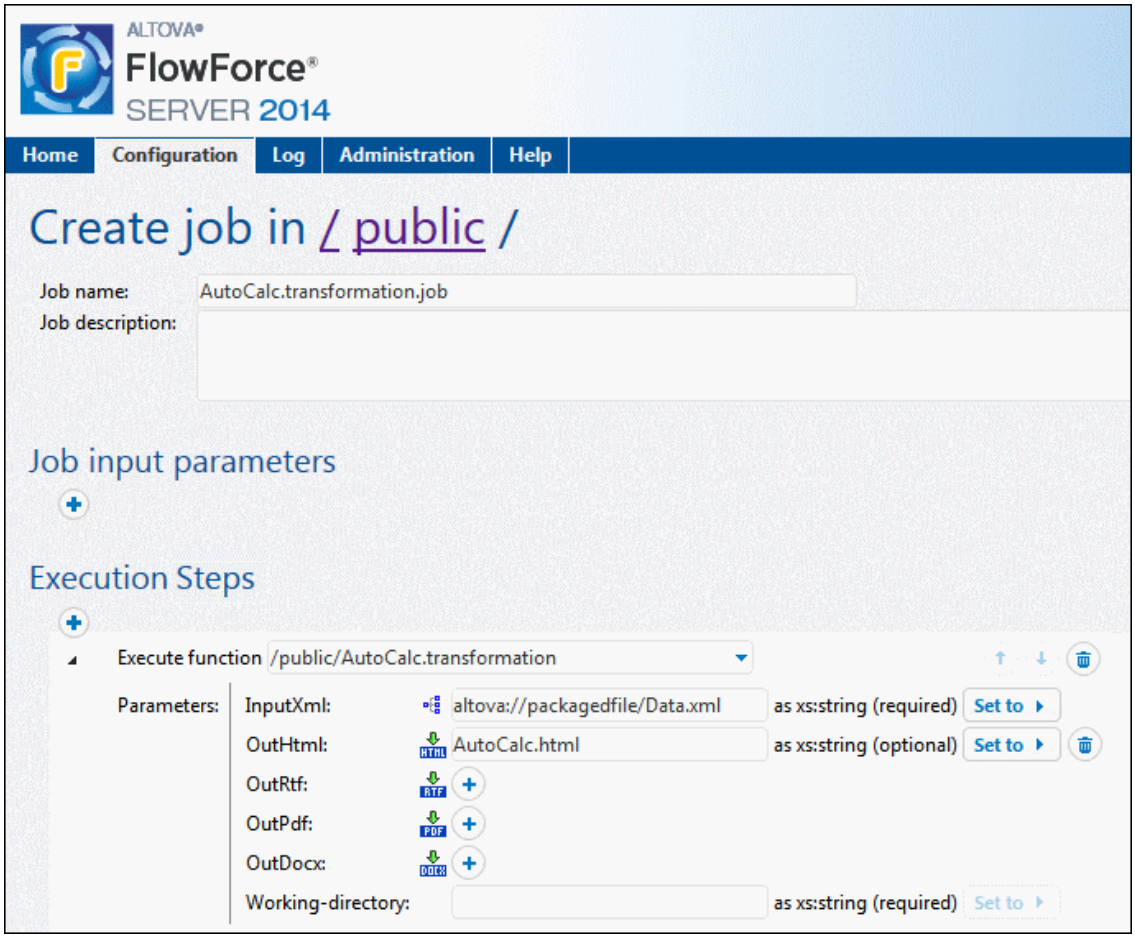
- The address and port number of the FlowForce Web Server (not the FlowForce Server), together with access details (user and password) for the FlowForce Server.
- The filename of the transformation file and the location on the FlowForce Server where it is to be saved. The filepath must start with a slash, which represents the root directory of the FlowForce Server.
- If changes have been made to the design since the file was last saved, the *Save design changes before deploying* check box will be enabled. Check the box if you wish to save these changes; otherwise uncheck the box.

On clicking **OK**, the `.transformation` file is deployed to the FlowForce Server at the location specified. If you have checked the *Open web browser to create new job* check box (*see screenshot above*), a web browser is opened in which the draft job created during the deployment step can be edited (*see screenshot below*). The next section describes how to configure a transformation job.

**Configuring the transformation job**

The transformation job specifies the name of the job, the input files and parameters for the transformation, the output files of the transformation, triggers and security credentials.

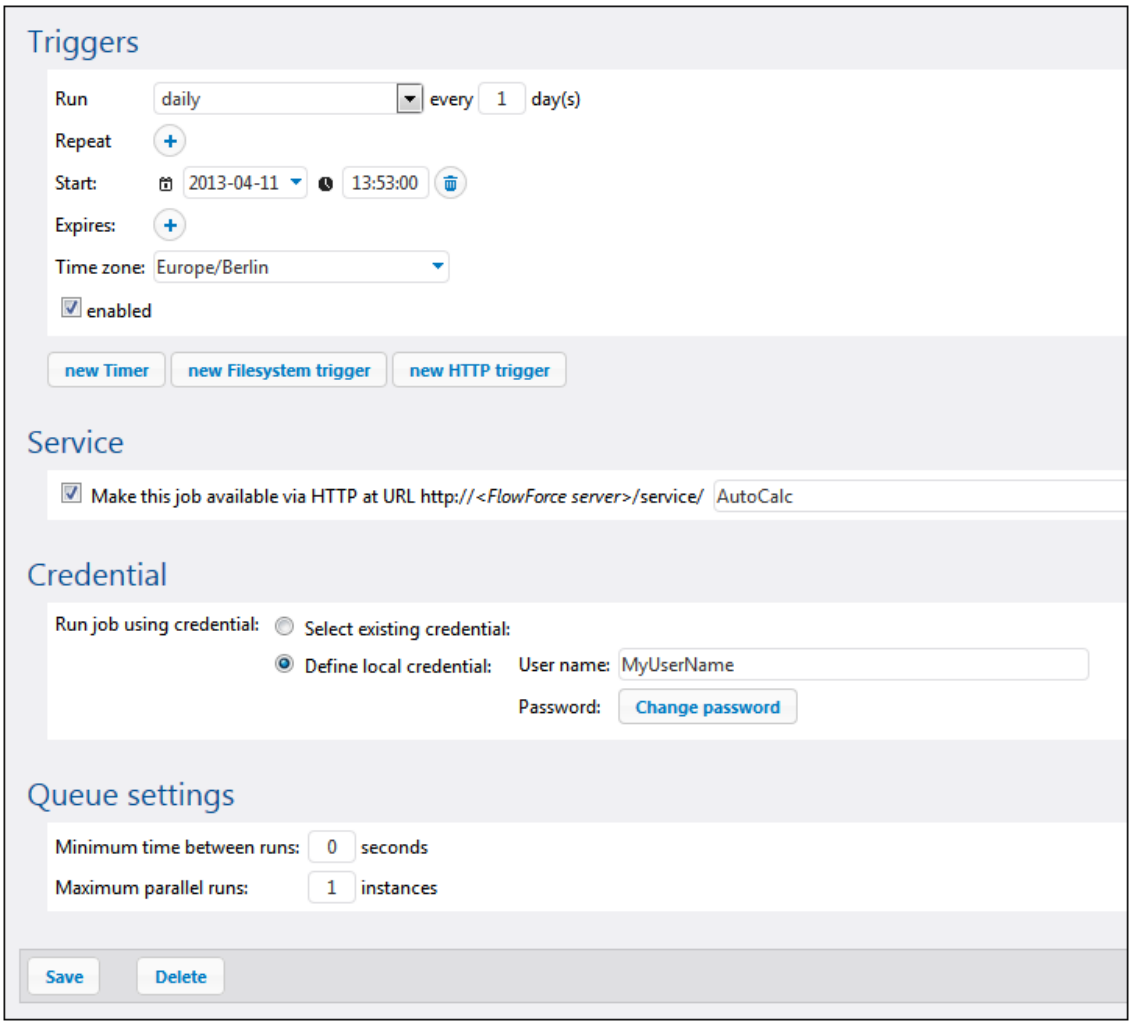
The screenshot below shows the top half of the job configuration page.




Notice the following points:

- The ***job name*** is `AutoCalc.transformation.job`. You could give the job any name you like.
- ***Execution***: A function is being executed, namely the transformation `AutoCalc.transformation` that was deployed to the FlowForce Server from StyleVision. Compare the file name and location given when the transformation was deployed to FlowForce Server (*see screenshot above*).
- The ***Working directory*** is the location on the FlowForce Server where StyleVision Server will unpack the input files and save the output file.

In the bottom half of the job configuration page, you set up the triggers for the job and/or set up the job as a service. The credentials are your user name and password on the current client machine.




A trigger is an event that starts execution of the job. In the screenshot above, we have used a timer event as the trigger: The job will be executed once a day at the specified time. We have also specified that the job will be available as a service at the URL:

```
http://<FlowForce Server>/service/AutoCalc
```

To view the result of the job execution (in this case, the transformation), enter the URL of the service in a web browser. If, for example, the FlowForce Server is on the current machine and its port is `4646`, then the URL for the service would be:

```
http://localhost:4646/service/AutoCalc
```

or

```
http://127.0.0.1:4646/service/AutoCalc
```

After you have finished configuring the job, click Save. The job will now be executed according to the triggers and when the service is called. You can view the log of FlowForce Server activity by clicking the **View Log** button at top left of the job configuration page.

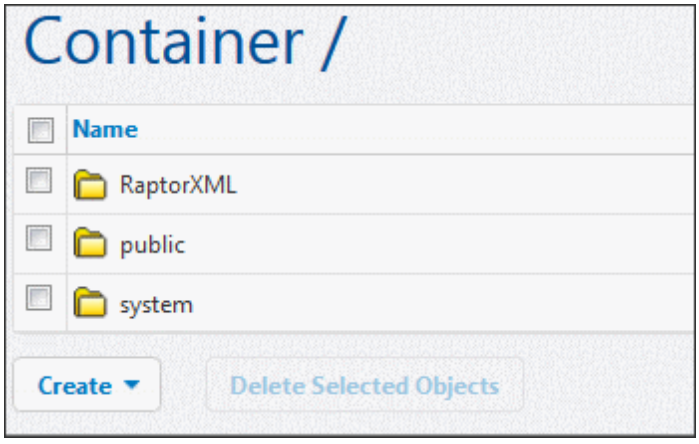
## 3.8 Using RaptorXML Server to validate a document

Aim: to validate an XML Schema file supplied with RaptorXML Server.

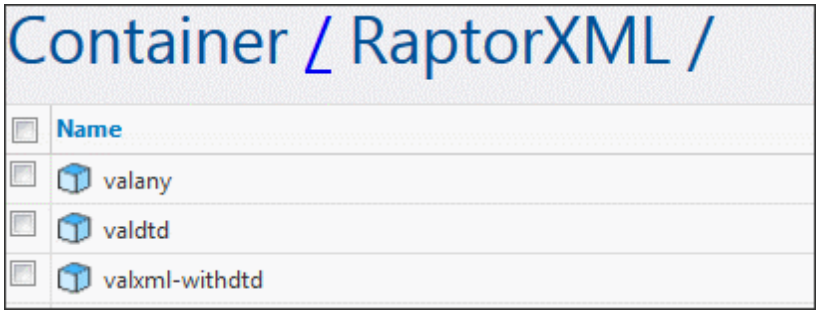
- This example uses the **address.xsd** file available in the .../RaptorXMLServer2014 folder (if you used the default installation path).

**To create a new job:**

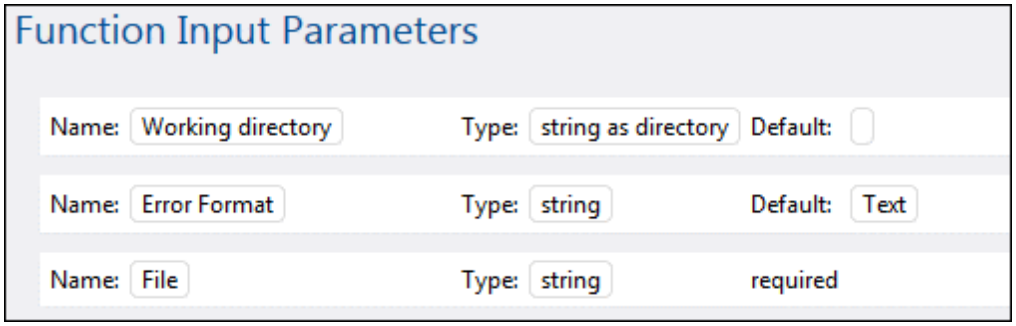
1. Click the "Configuration" button, then click the container "RaptorXML".



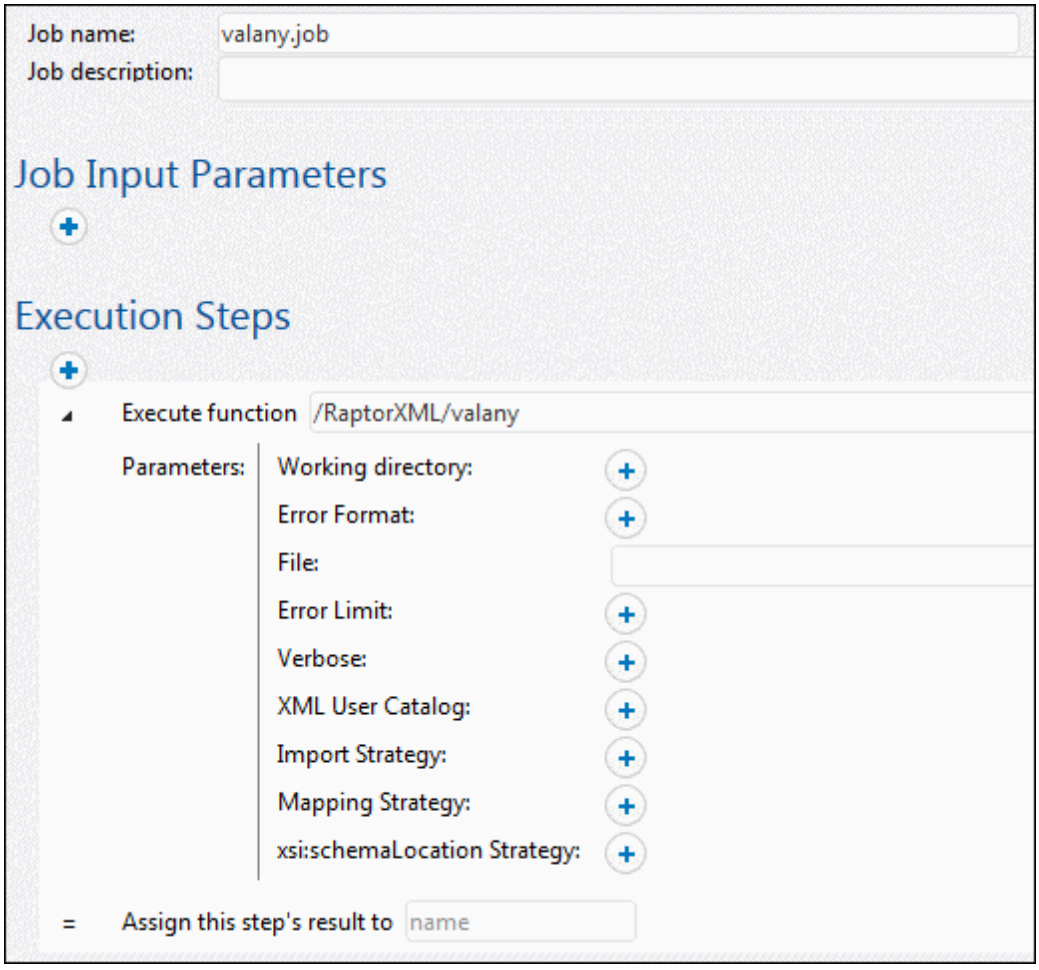

This opens the container and displays all the default functions available for RaptorXML.




2. Click the **valany** entry. This displays a window showing all the Function Input Parameters along with their types and default values.

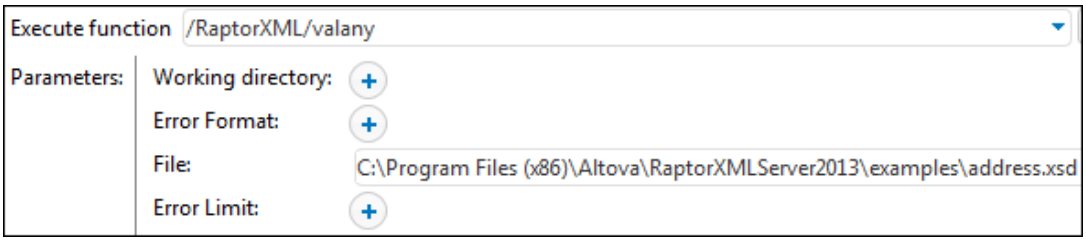



3. Click the "Create Job" button at the bottom of the page.
This creates a job with the default name "valany.job". Edit the job name if necessary.




The valany parameters are now visible on the page. Note that the **mandatory** parameter that you need to supply, is shown as an expanded field.

4. Click in the **File** field and enter the path and file name of the file that you want to validate, e.g. C:\Program Files (x86)\Altova\RaptorXMLServer2014\examples\address.xsd.




5. Define a trigger that you want to execute the job, e.g. timer trigger daily at 12:00.
6. Enter the user credentials (or select one a predefined one).
7. Click save to save the job.
   After the allotted time has passed click the "View log" button to see the job execution details.


If the validation process was successful you will see result="OK". If the file did not validate you will see "FAIL".

Note:

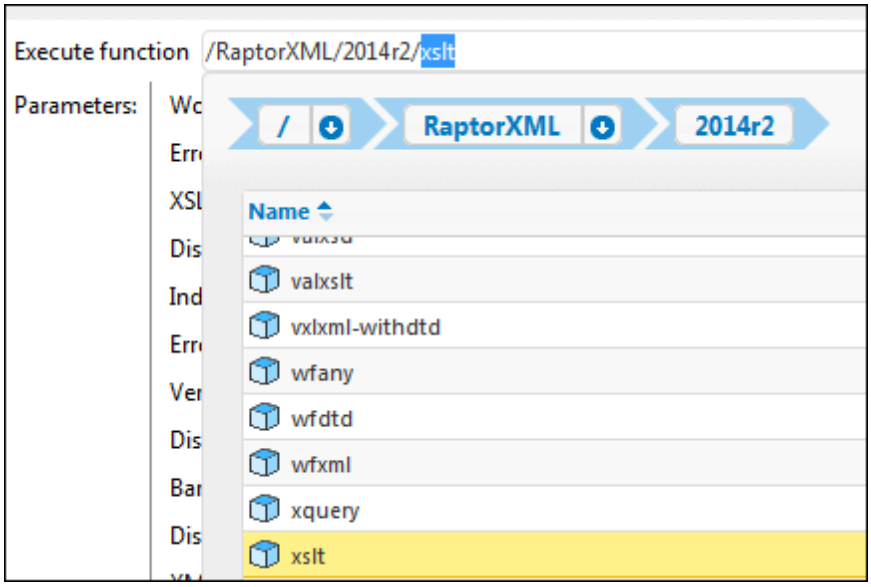
To see an explanation of all the RaptorXML functions and their associated parameters, please see: RaptorXML Commands.

## 3.9 RaptorXML - passing key/value parameter pairs

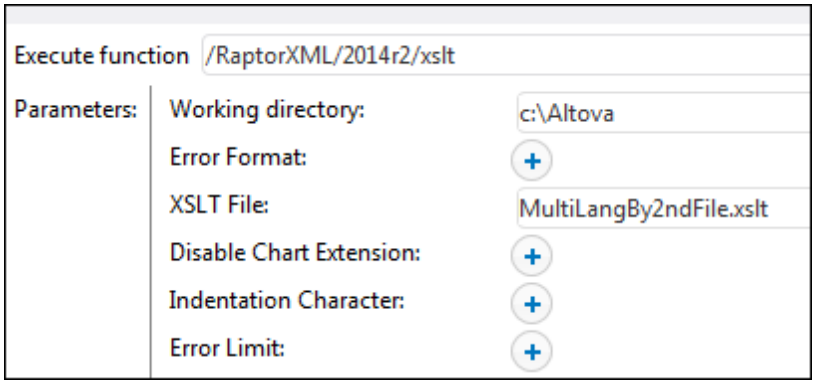
FlowForce can pass key and value pair parameters to XSLT stylesheets that are then executed by RaptorXML.

In this generalized example, an XSLT file transforms an input XML file into a different language. A second XML file contains the original and translated values/terms. Two sets of related parameters are thus needed for this transformation.

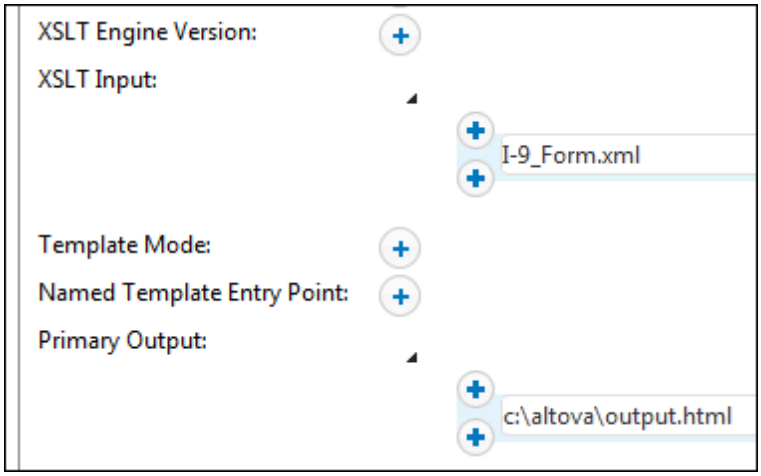
1. Use the navigator to select the execute function, i.e. /RaptorXML/2014r2/xslt.



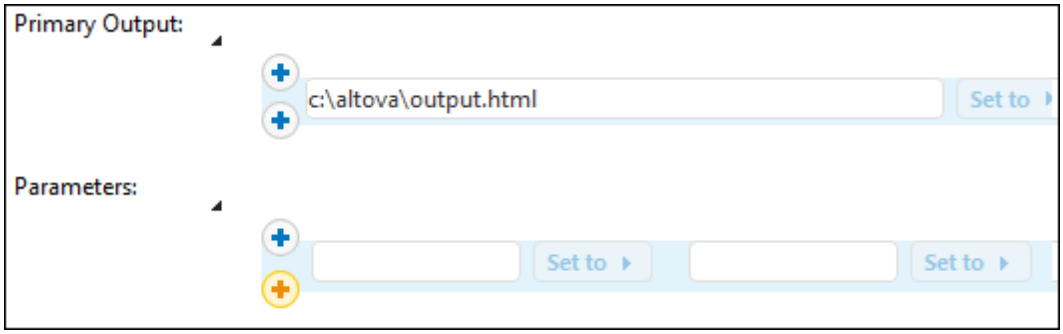

   All the XSLT parameters are listed in the Parameters section.
2. Enter the name of the XSLT file, e.g. MultiLangBy2ndFile.xslt.



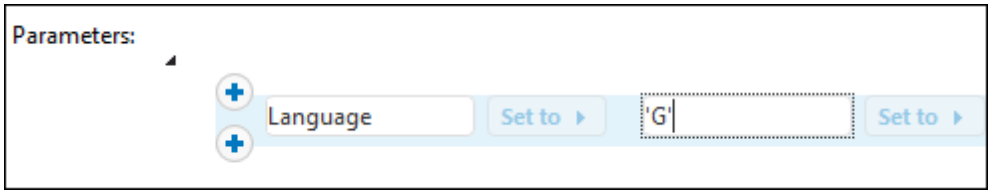

3. Enter the name of the XSLT input file, e.g. I-9_Form.xml and then the name of the generated output file, e.g. output.html.



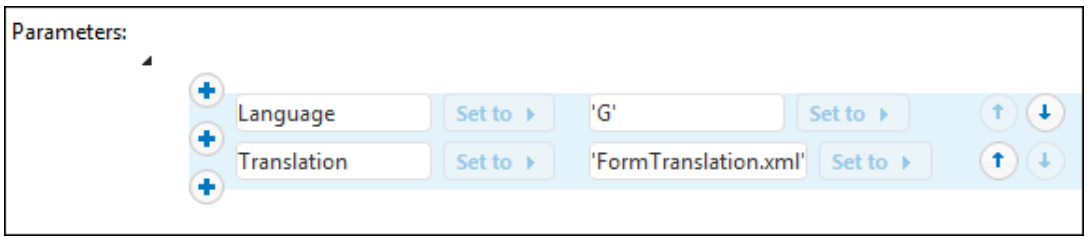

4. Click the "+" button to the right of the Parameters label to create the first parameter pair.




5. Enter the "key" and then the "value" of that parameter in the field to the right. E.g. Language and 'G'.




6. Click the "+" button below these two fields and enter the second key and value pair, e.g. Translation and 'FormTranslation.xml'. The Translation element contains both language values of the FormTranslation.xml file.



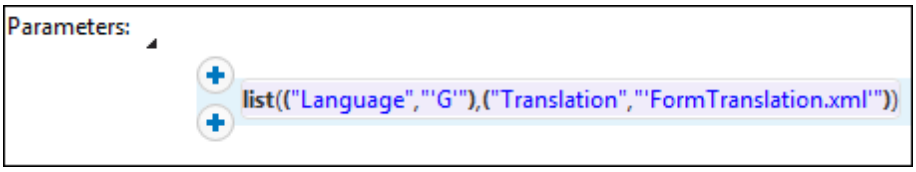

All you need to do now is create a trigger that is to start the XSLT transformation.

Please note:

The contents of the "value" fields are XPath expressions and both must therefore be enclosed in quotes to define them as of type "string" (single, or double quotes are ok).

Alternatively:
If you click the "Set to" button at the right of the parameters block you can enter the XSLT expression in a single field, i.e.

```
list(("Language","'G'"),("Translation","'FormTranslation.xml'"))
```



# Chapter 4

# User Guide

# 4 User Guide

**Object System**
Jobs, functions, triggers, etc. are stored in the object system inside the FlowForce Server database in a hierarchical structure.

The properties and capabilities of the FlowForce Server object system are similar to those of commonly used file systems. File systems use folders, while FlowForce Server uses containers.

Containers can have access permissions assigned to them, or inherit permissions from their parent container(s).

- The root of the object system is the "**/**" container (the **root container**) which can contain other containers, or other user-defined objects.
- The predefined container "**/system**" contains the system functions(s) and should not be used for user-defined objects.
- The predefined container "**/public**" is the default location to create user-defined objects like jobs, functions, credentials and other containers. You can of course create any number of containers.

**Deploying mappings / transformations**
Deploying a mapping means MapForce organizes all the mapping resources, used by the specific mapping, into a FlowForce Server function and passes it on to the server/machine running FlowForce, where it will be processed.

A deployed mapping function can then be used in a job execution step.

**Jobs**
Jobs consist of triggers, execution steps and various other settings. The triggers define when the job will be executed, and the execution steps define what the job actually does when it executes. Multiple triggers and execution steps can be defined per job.

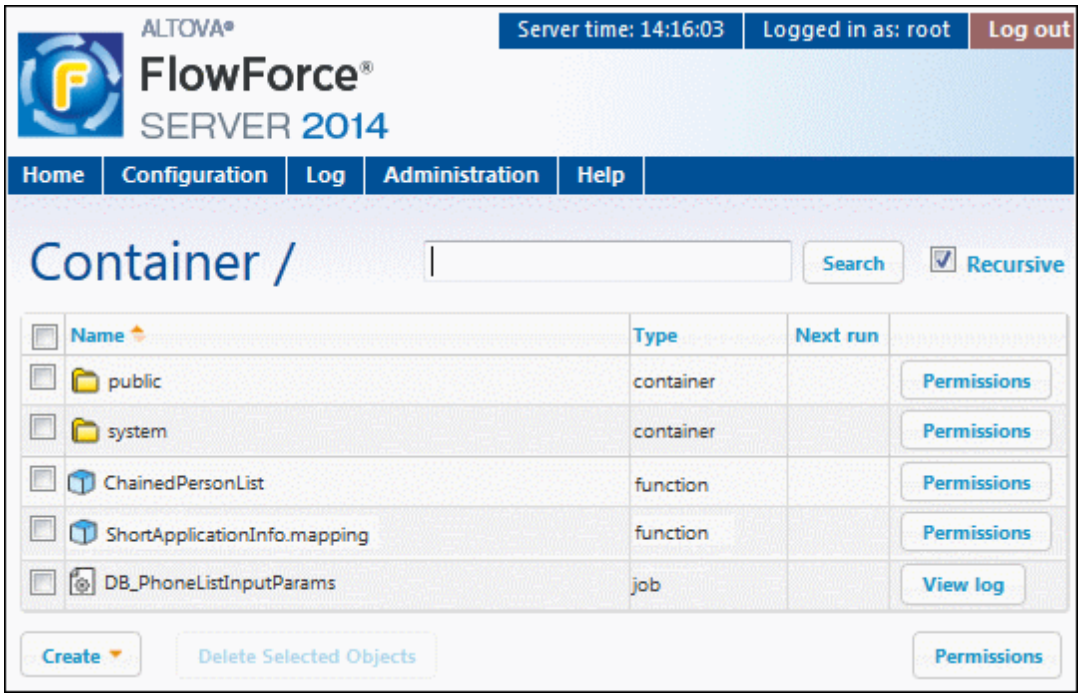
Jobs can call other jobs allowing you to create subjobs.

Jobs can contain placeholder values that can be passed to the job at runtime. These placeholders are called "Job input values" and can supply values through a default, or through manual input via an HTTP client, e.g. internet browser.

Please see Job configuration for more information.

## 4.1 FlowForce Administration Interface

The FlowForce Server Administration Interface is used to define jobs and triggers and to display the log table.




There are several menu items available in the browser window:

- **Home** shows you the connection details and any active jobs.
- **Configuration** shows containers and the objects they contain: jobs, credentials, functions, etc.
- **Log** shows you the server logs. The Log View contents can be configured.
- **Administration** shows you the Users, Roles, and Settings
- **Help** shows this help file

**Configuration**

FlowForce Server has a hierarchy of "items" visible in the Configuration page.

- The top-level is the "Container". Containers can contain "objects".
- Objects can be other Containers, Jobs, Instances, or Functions. Clicking the "Name" check box (top left corner of the table) selects/deselects all the objects in the list.
- Clicking a container displays the objects that it contains.
- Clicking a job displays the job definition page, showing the triggers, execution steps, and other settings that make up the job.

# 4.2 FlowForce concepts

## Configuration

Configuration data in FlowForce Server's database are comprised of various objects that define the operation of FlowForce Server. This includes jobs, credentials, functions, triggers, and other objects.

Configuration objects are organized in a freely defined hierarchy of containers. Some configuration settings are edited together (e.g. jobs include triggers), and other settings can also be stored as standalone objects under their own name (e.g. credentials and functions).

**Container**
A container is similar to a folder in a commonly used file system. It is used to create a hierarchical structure for storing configuration objects and other containers. Containers can be assigned access permissions.

Two predefined containers exist in FlowForce Server: /system which contains system functions, e.g. copy, move, etc., and /public which is the default container when deploying a mapping to FlowForce Server from MapForce. Other containers can be created as needed, e.g. for departments or user groups.

**Function**
A FlowForce Server function performs a specific operation when used in a job execution step. It may have input parameters that need to be passed to it by the caller. Available functions include the system functions delivered with FlowForce Server, deployed MapForce mappings or StyleVision transformations, and the execution steps of other jobs.

**Job**
A Job consists of Triggers, Execution steps, input parameters, and other settings. Triggers define when a job will be executed, and the execution steps define what the job actually does when it executes. Multiple triggers and execution steps can be defined per job.

**Trigger**
Triggers define under which circumstances a job will be executed. Three types of triggers can currently be defined: Timer triggers, File system triggers, and HTTP triggers. Multiple triggers can be defined per job.

**Service**
FlowForce Server permits exposing jobs as web services via the HTTP protocol. This allows interactive or automated access to these jobs.

**Credential**
Credentials are stored login data used to execute FlowForce Server jobs. Credentials can be defined as standalone "objects" and be assigned to various jobs, or they can be manually entered for a specific job.

**Queue**
The queue settings in a FlowForce Server job allow limiting the number of parallel job executions to control use of server resources.

## Access Control

All important operations in FlowForce Server are linked to permissions or privileges which need to be assigned to the user to successfully execute them.

**User**
FlowForce Server users are persons that have been added to FlowForce Server by the FlowForce Server administrator with a login name and a password. Depending on the assigned rights and privileges, users can define FlowForce Server jobs, deploy mappings, or view logs.

Two special users are predefined by FlowForce Server: "root" is the initial administrator user, and "anonymous" is a special user account used for FlowForce Server services that should be available to users without explicit log in to FlowForce Server.

**Role**
Roles are used to manage privileges and object permissions for user groups as opposed to individual users.

Having defined users, you can assign them to a role thus creating user groups. The users become "members" assigned to the specific role.

**Permission**
Permissions control access to containers and configurations. Unlike privileges they can be redefined on every level of the container hierarchy, and are by default inherited from parent containers.

Permissions, like privileges, are inherited from all roles the user is a member of, as well as from permissions directly assigned to the user.

**Privilege**
Privileges control user rights globally. This means privilege settings cannot be overridden in the container hierarchy of FlowForce Server.

When a user logs into FlowForce Server, the set of effective privileges is determined by the user privileges and all role privileges the user is member of.

## 4.3 Job configuration

The job page lets you define how the job will be processed and when it will be executed. The triggers define when the job will be executed, and the execution steps define what the job actually does when it executes. Multiple triggers and execution steps can be defined per job.

You can create a job from scratch, or you can deploy a mapping from MapForce (or a transformation from StyleVision) that generates a partially filled in job in FlowForce Server.

Jobs can be created in any container/folder where you have sufficient access permissions.

**Structure of a job**
The job name and job description fields make it easy to administer your jobs.

Job input parameters are placeholders for values (or files) that can be supplied at runtime.

Execution Steps define what the job does when it runs.

Execution Result lets you define the execution result type.

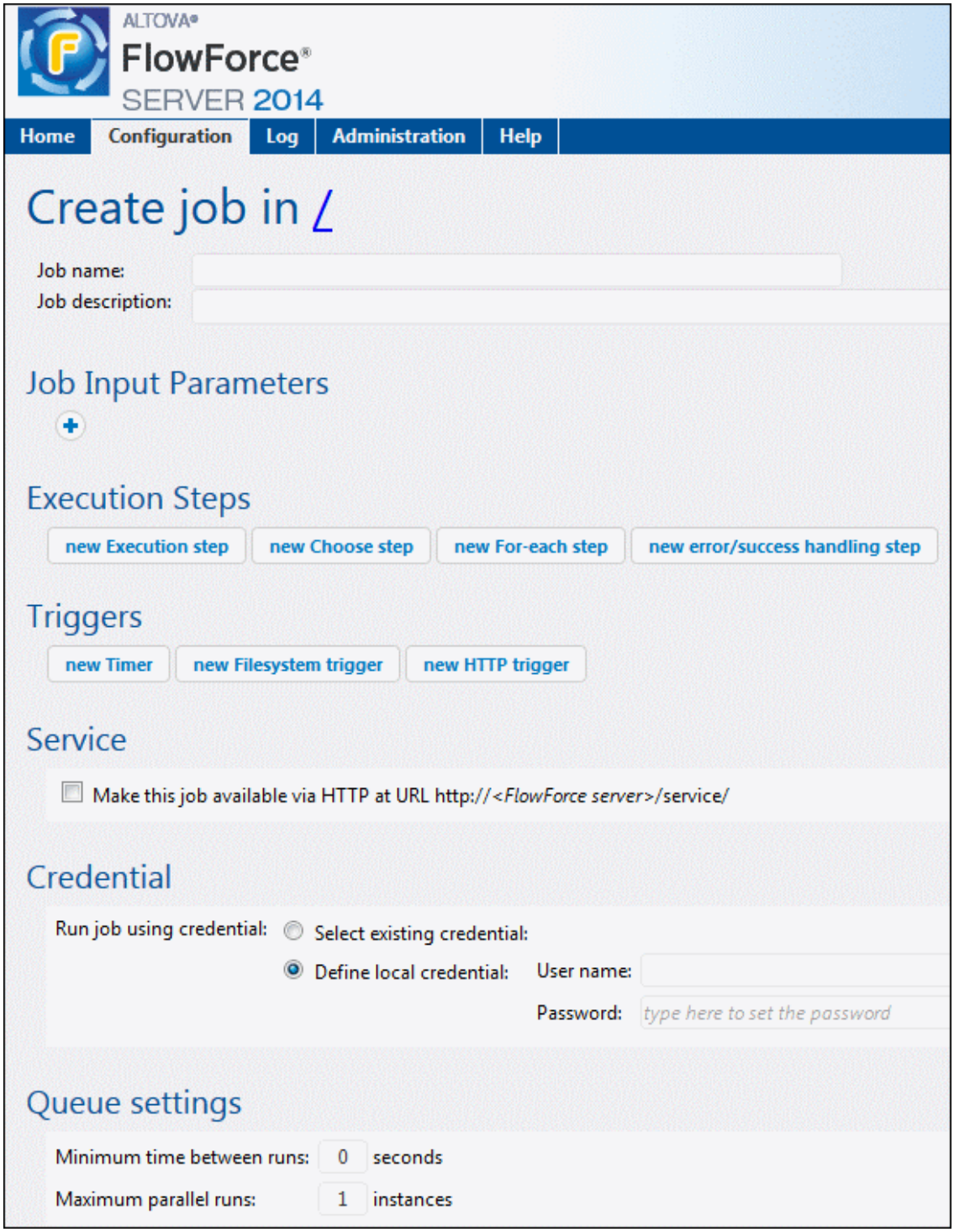
Caching Result lets you define that the result of the current job will be cached, and used by a different calling job.

Triggers let you define how, or when, a job will be executed. The following triggers are currently available: Timer triggers, File system triggers, and HTTP triggers.

The Service option makes it possible to access jobs as webservices via the HTTP protocol.

Credentials are stored login data that define the operating system user account used to execute FlowForce Server jobs.

Queue settings let you define how many parallel jobs can run in parallel and the minimum time between runs.


ALTOVA®
FlowForce®
SERVER 2014
Home
Configuration
Log
Administration
Help
Create job in /
Job name:
Job description:
Job Input Parameters
Execution Steps
new Execution step
new Choose step
new For-each step
new error/success handling step
Triggers
new Timer
new Filesystem trigger
new HTTP trigger
Service
Make this job available via HTTP at URL http://<FlowForce server>/service/
Credential
Run job using credential:
Select existing credential:
Define local credential:
User name:
Password:
type here to set the password
Queue settings
Minimum time between runs:
0
seconds
Maximum parallel runs:
1
instances

### 4.3.1 Job input parameters

Job input parameters are placeholders for values (or files) that can be supplied at runtime.


Creating an input parameter, e.g. NamePrefix, automatically makes it available for selection in the "Set to" popup window, of any of the execution step parameters.


For an example please see: Using a deployed mapping as a web service, or Using parameters to query a database.

When adding a file system or HTTP trigger to a job, FlowForce Server automatically creates a parameter named "triggerfile" that contains the name of the file that activated the trigger. Please do not edit the name "triggerfile", or the job cannot be saved.

**Type: string**
Use the string type for most parameters that you use.

**Type: stream**
Allows you to select files when using the job as a service.

**Default**
Allows you to specify a default value for the parameter that is used when no value is passed to the job at runtime.

Job parameter values are determined at runtime as follows:

- File system and HTTP triggers set the parameter "triggerfile".
- If a job is called as service via HTTP, all parameters are passed from the HTTP request. Please see the Service section for more information.
- If a job is called from an execution step in another job, parameters are passed from the step definition in the calling job.
- Parameters that are not supplied any value get the default value defined in the "Default" field.

### 4.3.2 Execution steps

The execution steps define what actions the job executes when it is started by a trigger or an HTTP request.

A job can have one or more execution steps. The list of execution steps is processed from top to bottom. FlowForce Server can also execute job steps conditionally and can use expressions to define flow control sequences.

New Execution step
Lets you execute specific system calls, MapForce mappings, or StyleVision transformations, that were deployed to the respective server.

New Choose step
Lets you define specific conditions that will apply to individual job steps.

New For-Each step
Lets you execute one or more job steps repeatedly.

New error/success handling step
Lets you define actions (cleanup actions, notifications/emails) depending on the final state of a the enclosed steps, i.e. on error, on success, or always.

#### Execution step

The standard "Execute function" lets you execute a specific FlowForce function. Available functions include the system functions delivered with FlowForce Server, deployed MapForce mappings or StyleVision transformations, and the execution steps of other jobs.

Clicking in the "Execute function" field opens a popup from which you can select a built-in function from the /system container, or deployed mappings/transformations from any other container. You can also select another job here, in which case the job steps of the selected job will be executed as subjob.

**Execute function:**
The combo box ***initially*** displays a popup window allowing you to select system functions, or MapForce mappings (StyleVision transformations) from the configuration containers.

#### MapForce mapping

Parameters for MapForce actions are defined by the specific mappings.

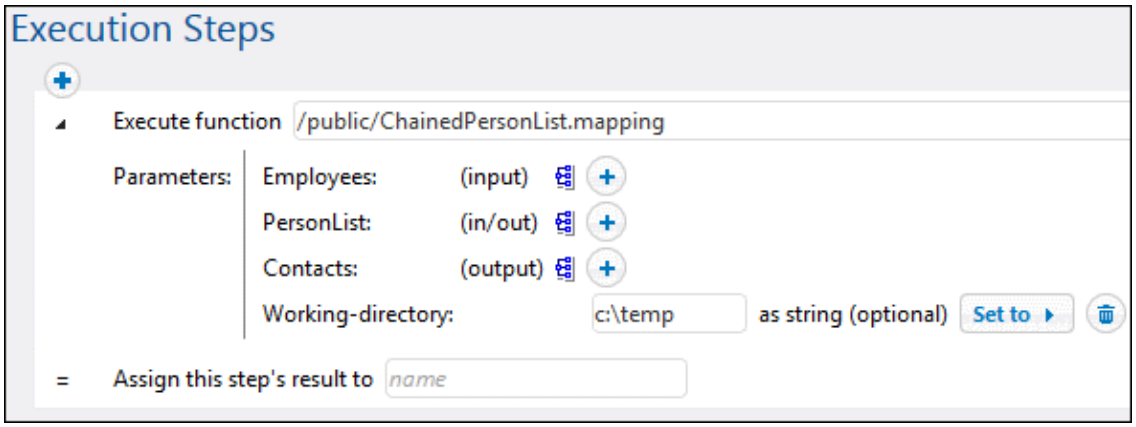
Parameters are defined by:

- input components
- in/out components
- output components

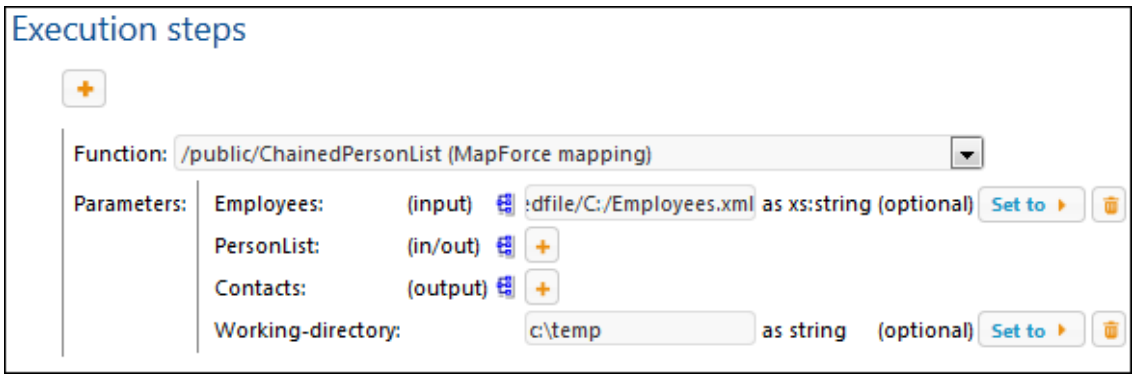
Parameters allow you to **override** the input and output file names that were defined when the mapping was deployed from MapForce. When the job executes, the new files will be used instead of the ones defined in the mapping. Note that all file paths in job execution steps must be a path on the server machine (that runs FlowForce), not on your local machine.

E.g.
Using the deployed ChainedPersonList as an example:

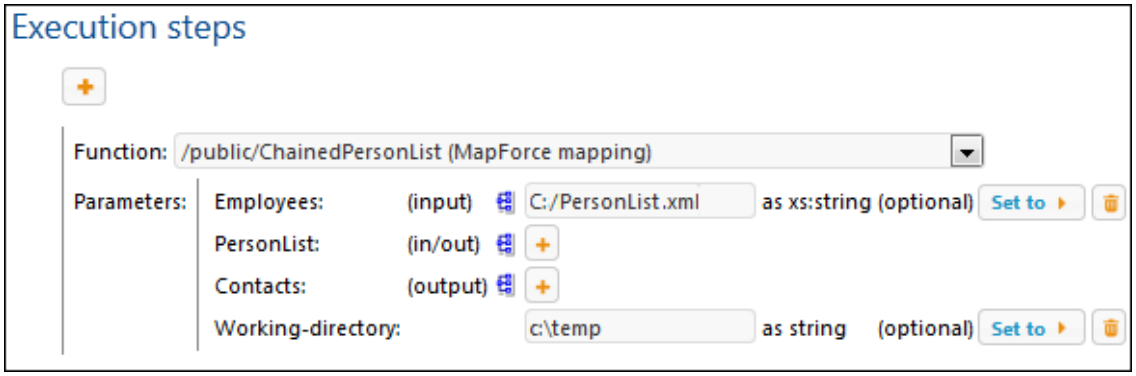
| | |
|---|---|
| **Employees (input)** | is the source component with Employees.xml as the instance document. |
| **PersonList (in/out)** | is the intermediate document and therefore shown as in/out, because it is used as both a source and target document in the chained mapping. |
| **Contacts (output)** | is the target document |




**To change the source/destination files:**
Click the "+" button next to the list of parameters to expand the optional fields.



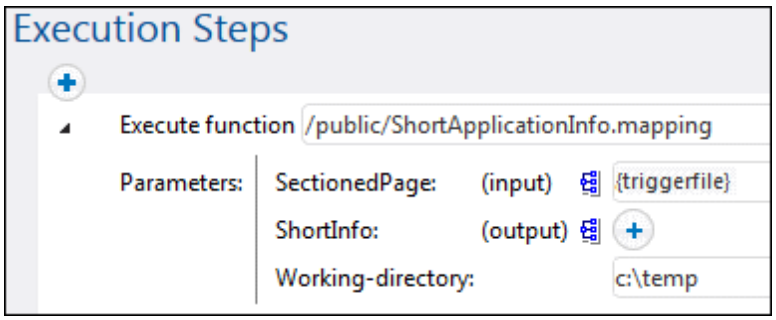

Click in the Employees (input) field and delete the "altova://packagedfile/C:/Documents and Settings.../Employees.xml" file and replace it with the file you want to use instead (e.g. PersonList.xml).




Note:
Any path starting with "**altova://packagedfile/**" refers to the file content that was **deployed** together with the mapping, and not to the current version of that file in any path on the server.

**Acting on files that cause the trigger to fire**
If you create a "File system trigger" (by clicking the "new File system trigger" button) this automatically adds the "triggerfile" entry into the Job input parameters field. Please do not edit the name "triggerfile", or the job cannot be saved.


Select the deployed mapping file you want to use in the Execute function field (e.g. ShortApplicationInfo.mapping).
Clicking the "+" icon to the right of SectionedPage creates an edit field.
Click the Set to button to the right of the expanded SectionedPage field, and select "triggerfile" entry.

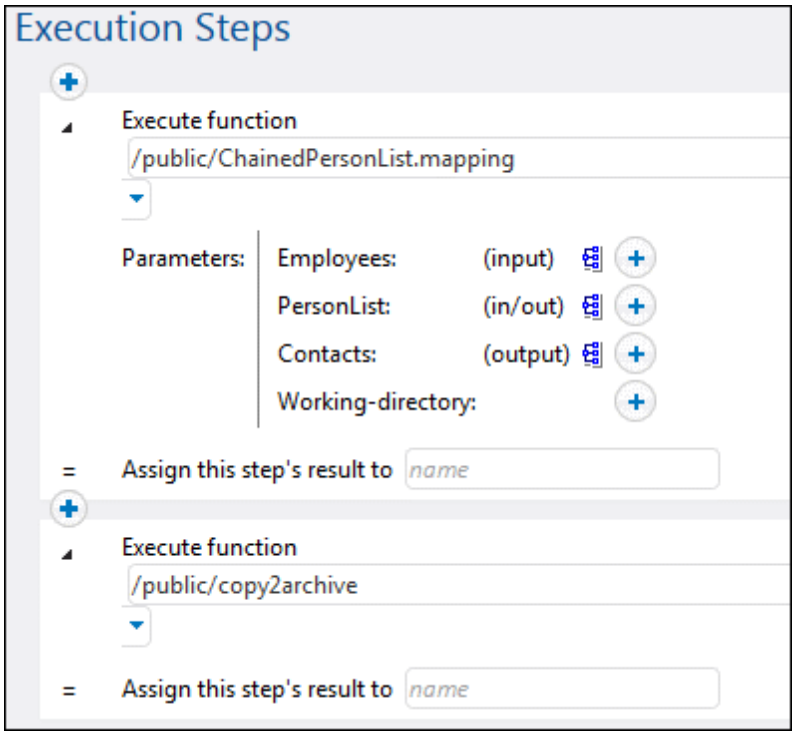



This causes the input field contents to change to {triggerfile}.
The file, in the directory being polled, will then be used as the input file for the execution step.

Note:
Using a file that caused the trigger to fire, does not work with time-based triggers.

Please see: **Directory change - act on trigger file**

**Function - Subjob**
Once a job has been defined it can be used in an execution step of another job as a subjob. In the screen shot below, the subjob is added as an extra execution step, by clicking the Function combo box and selecting /public/copy2archive. If the selected subjob has job input parameters, they appear below the function and can be filled with values.




**Assign this step's result to**
Allows you to use the result of the current execution step for a following step. Please see Step Result Functions and the Cache example for more information.

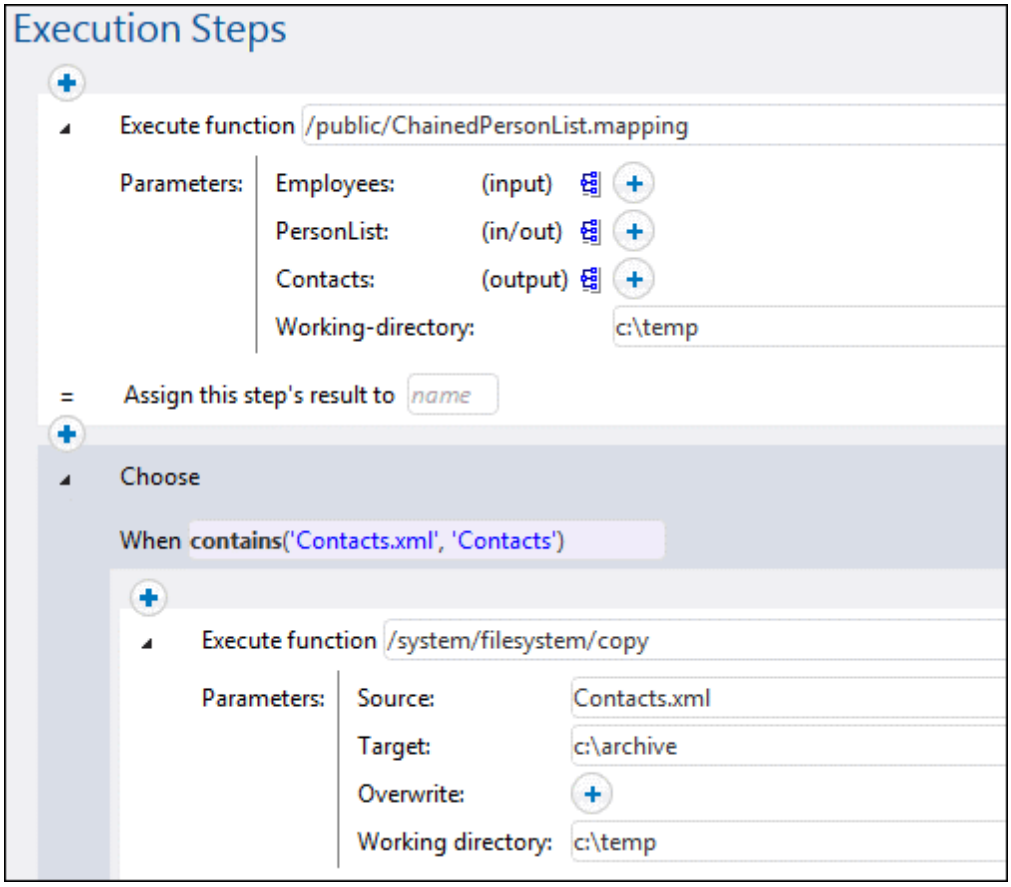
**Choose step**

The "new Choose step" button allows you to define conditions under which specific job steps should be executed.

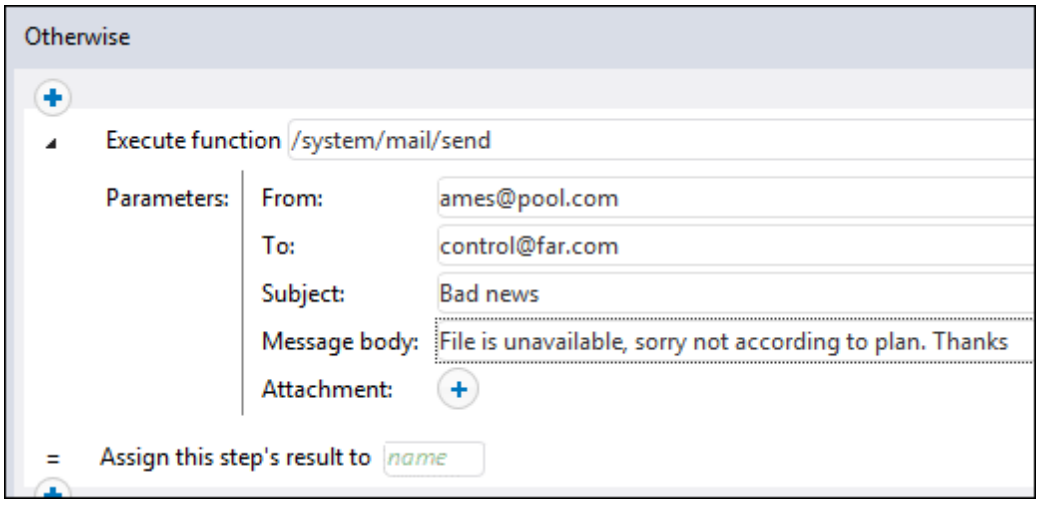
The condition expression is entered in the "When" field and the step(s) to be executed can be selected by clicking the "+" button (below the When field). This opens a popup allowing you to select the specific step to insert: Execution step, Choose step, For-each, or error/success handling step.

Any number of conditions can be defined, and as soon as one of the conditions is true, that conditional step is executed and the remaining conditions of that conditional group are ignored. The execution sequence is then continued with the step following the successful conditional group.




The "Otherwise" group lets you define what will be executed if all the previous choices fail.




Note: Placing the mouse cursor on the arrow-up, or arrow-down icons to the right of the block allow you to move each individual step within the step group. The step to be moved is also highlighted when the mouse is over the icon.

### Error/success handling step

The "error/success handling step" button allows you to define specific actions that should take place upon step completion.

Step completion can mean: success, failure, or always. This allows you to perform cleanup actions after step completion and generate notifications if errors should occur.

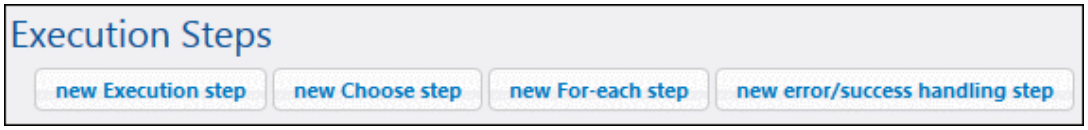
Whenever a error/success handling process is complete, irrespective of whether it was successful or not, the result of the execution is checked. If the execution result matches the value selected in the combo box (on error, on success, or always) then the notification or cleanup block, i.e. below the "do" keyword is executed.

In the example below the ChainedPersonList.mapping (deployed from MapForce to the public folder) is executed and the result is compared to the "on success" selection in the combo box. If the job completed successfully, the system function .../mail/send is executed and a mail is sent to the person entered in the "To" field.

In the second example the same mapping is executed and if an error occurs, an e-mail containing the error details is sent to the defined recipient.

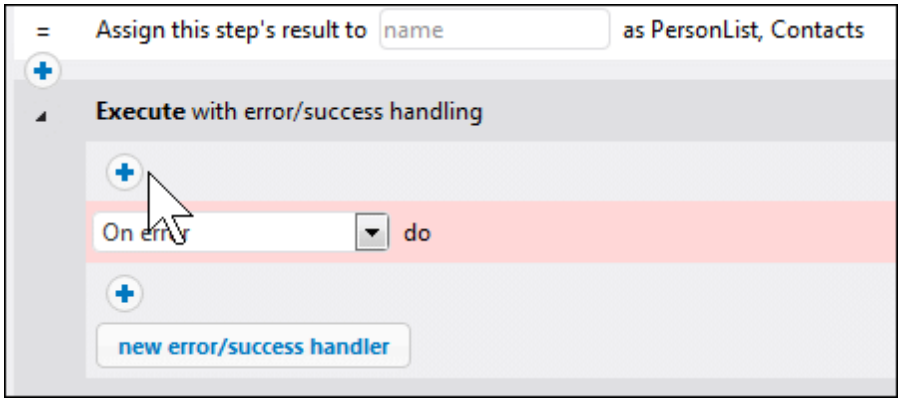
#### To define a success handling step:

1. Click the "new error/success handling step" button of the Execution Steps group.

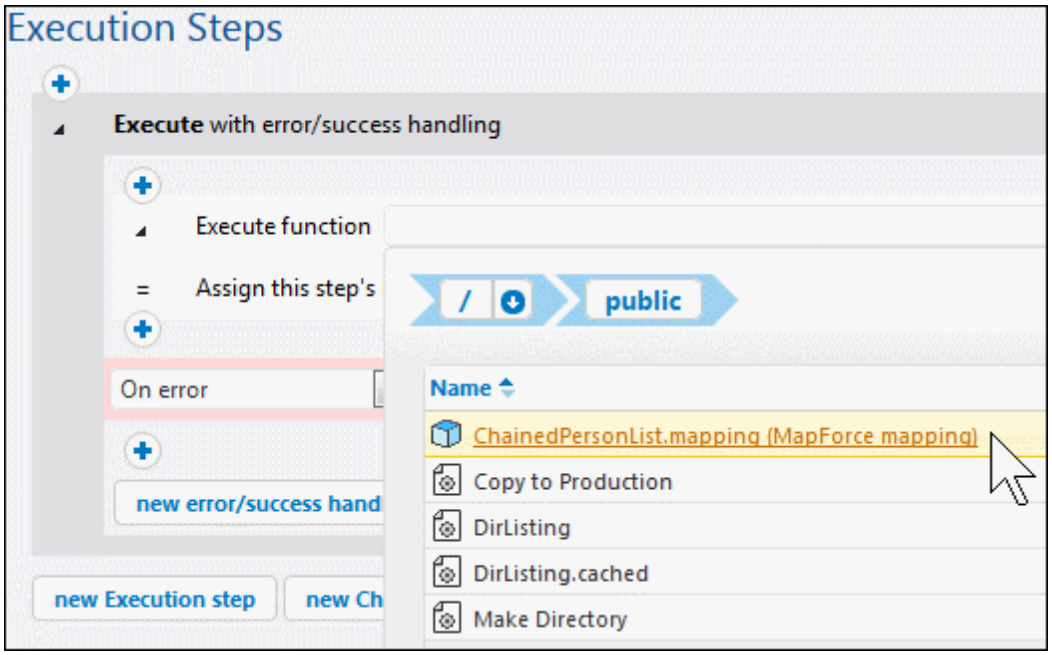



   This creates an Execution Steps group as well as a notification group.
2. Click the top "+" button to create the Execute group and select "new Execution step".

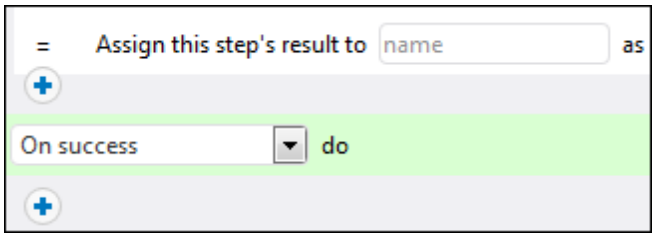
   Note that the title of the execution block is "**Execute with error/success handling**".



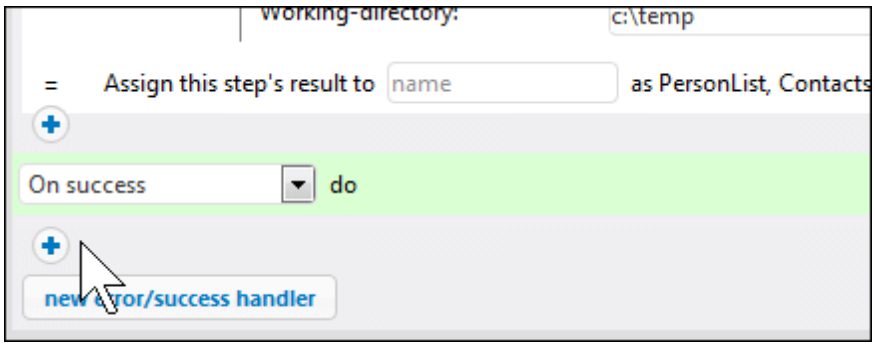

3. Click in the Execute function field and select **\public | ChainedPersonList.mapping** from the pop-up.




4. Click the combo box and select "On success".




5. Click the lower "+" button and select "new Execution step".



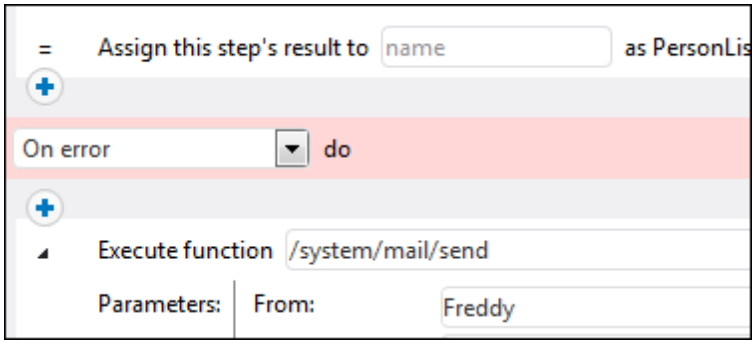

This is what will be executed if the result of the execution function is the same as the selection in the combo box, e.g. "On success" in the example above.

6. Click in the Execute function field and select select / | system | mail | send.
7. Fill in the necessary fields for the e-mail to be sent.
8. Define a trigger to execute the job and then click Save to save the job.

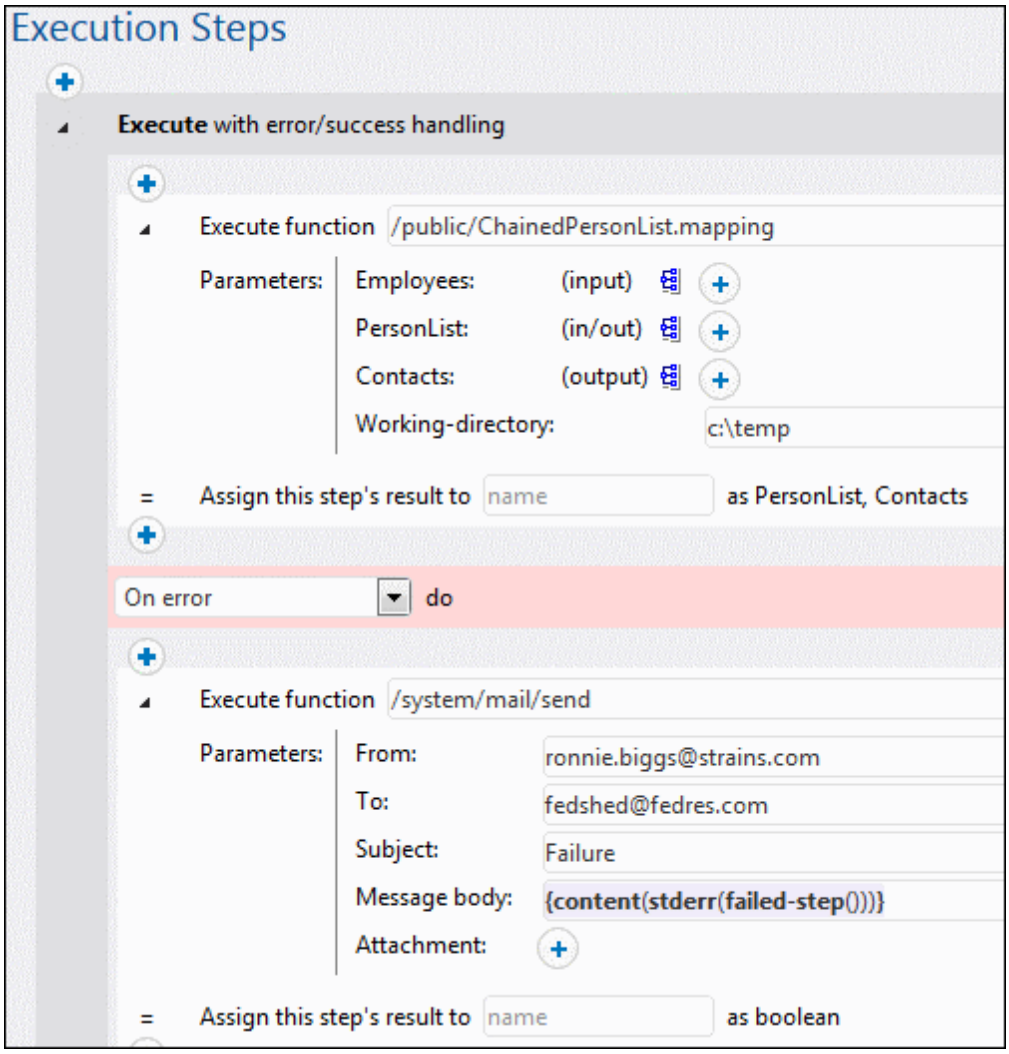
**To define an error handling step:**

Follow the steps 1 to 3 from above and then:

4. Click the combo box and select "On error", then /system/mail/send.




This is what will be executed if the result of the execution function is the same as the selection in the combo box, e.g. "On error" in the example above.




5. Enter the e-mail addresses in the From/To fields.
6. Enter **{content(stderr(failed-step()))}** into the Message body field.
   This function outputs the generated error messages into the e-mail body text.

If the job encounters an error, then the error details are inserted into the message body of the e-mail and sent to the recipient entered into the "To" field.

### For-each step

The "For-each step" button allows you to repeat an execution step any number of times.

The variable/counter is entered in the "For each" field, while the sequence to iterate is entered as an expression in the "in sequence" field.

The execution step to execute repeatedly is selected by clicking the "+" button (below the For-each step field). This opens a popup allowing you to select the specific condition: Execution step, Choose step, For-each step, or error/success handling step.

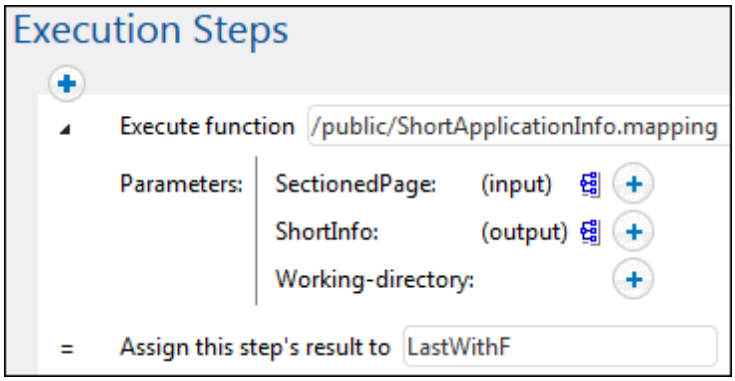
E.g
A new "For-each step" step was added after the execution of the ChainedPersonList.mapping job step. It iterates through all the XML files in the c:\temp folder and copies them to a different directory.

| | | |
|---|---|---|
| For-each *file* | in sequence | *list-files('c:\temp*.xml')* |
| Execute function is | /system/shell/commandline | |
| Command is | copy {file} c:\archive\ | |

### Step results

Step results are variables defined by the name entered in the "Assign this step's result to" field.

The "Assign this step's result to" field, available in most job steps, is used to assign the output/result of that step to a variable entered in this field. This result/variable can then be used with specific step result functions by any of the following steps in the Parameter fields or in other expressions. Please see Cache example to see how this is done.




Please see: Step result functions for list of the expressions that can be used together with step results.

### 4.3.3 Step expressions

FlowForce uses a simple expression language similar to that of Microsoft Excel, to compute values, create streams, create/disassemble lists, etc. The expression functions are grouped as shown below:

- Step Result Functions
- Stream Functions
- File System Functions
- File path Functions
- List Functions
- String Functions
- Boolean Functions
- Runtime information Functions
- Operators

#### Step Result Functions

Step result functions are applicable to results from steps like the command line step. To obtain a result, use the name entered in a previous step's "Assign this step's result to" field. You cannot apply step result functions to the result of steps which do not provide it; doing so gives an error when saving the job.

**stdout**

stdout(result) of type stream

Returns the standard output of result, fails if the result does not provide standard output.

Example: If you use the /system/shell/commandline step with the command cmd.exe /c echo "hello world"

Then the stdout of this step result is a stream containing "hello world", see also cache example

**stderr**

stderr(result) of type stream

Returns the standard error of result, fails if the result does not provide a standard error. See Error/ success handling step for an example.

**exitcode**

exitcode(result) of type number

Returns the exit code of result, as returned by the executed program.

**results**

results(result, name) of type stream
results(result) of type stream

Returns an array/list of streams of the specified result, optionally filtered by name. Use the function "nth" to access a particular one.

E.g. If a MapForce component CompletePO produces a result and you intend to access a specific stream, you could use the following expression to access the first one:

{as-file(nth(results(MapForceMapping, "CompletePO"), 0))}

E.g. 2 an SPS stylesheet created in StyleVision outputs the result to HTML, with the step result being assigned to a variable "StyleVision" in the "Assign this step's result" field. To pick the first result you could enter:

Execute function: /system/compute
`Expression: nth(results(StyleVision, "ReturnTypeHtml"), 0)`

### Stream Functions

Streams can be passed to FlowForce Server via the service interface, and also during job execution within the various step results.

**as-file**
as-file(stream) of type string

Creates a file if the stream source is a file. Creates a temporary file if the stream source is not a file.

as-file(stream-open(myFile.txt)) returns myFile.txt

This is useful to pass the output of one step as a parameter to another: If MapForce component CompletePO produces a result and you intend to further process it via some other tool, you can use

{as-file(results(MapForceMapping, "CompletePO"))} as the command line.

Note:
It is also possible to pass a stream from a Job Input Parameter to any **function** that expects a file name. In the tutorial example a Job Input Parameter named ***Expenses*** (of type stream) has been defined. This input parameter is then used with the function "as-file" to define the input parameter of the MapForce mapping:

{as-file(Expenses)}

**content**
content(stream, encoding = 'UTF-8') of type string

Reads the content of the specified stream as text in the specified encoding.

**empty-stream()**
The function creates an empty stream.

**stream-from-string**
stream-from-string (string, encoding = "UTF-8", contenttype="text/plain") of type stream

This function creates a stream from a string using the supplied encoding. The content type is associated to the stream.

This type of stream is not automatically saved as a file.

**stream-open**
stream-open(name, contenttype="application/octet-stream") of type stream

This function creates a stream from an exisiting file. E.g. content(stream-open("C:\files \textfile.txt") and reads the text file as a UTF-8 coded text file into the string.

**File system Functions**

File system functions permit access to the file system. Note: The access restrictions of the specified user credential always apply.

**list-files**
list-files(path) of type "list of string"

Lists the files in the path (which may terminate with a wildcard) and returns the resulting string list.

If the path does not end with a path separator and is not a wildcard, a search is made for exactly the specified item in the parent directory.

**list-directories**
list-directories(path) of type "list of string"

Lists the subdirectories in the path (which may terminate with a wildcard) and returns the resulting string list.

**read-lines**
read-lines(file name, encoding="UTF-8") of type "list of string"

Reads the lines from the given file and returns them as a list of strings.

**File path Functions**

File path functions allow you to extract specific portions of paths and file names.

**parent-directory**
parent-directory(path) of type string

Extracts the directory portion of a path, e.g. parent-directory("c:\temp\my.txt") is "c:\temp\".

**filename**
filename(path) of type string

Extracts the file name portion of a path, e.g. filename("c:\temp\my.txt") is "my".

**filename-with-extension**

filename-with-extension(path) of type string

Extracts the file name and extension portions of a path, e.g. filename-with-extension("c:\temp \my.txt") is "my.txt".

**extension**
extension(path) of type string

Extracts the extension portion of a path, e.g. extension("c:\temp\my.txt") is ".txt".

If you are polling a directory, i.e. checking to see if changes occur there, the "triggerfile" parameter will contain the absolute path of the triggering file. If you want to extract portions of the path, use the File path functions to do so.

E.g. {extension(triggerfile)} retrieves the extension of the triggering file.

### List Functions

List functions are used to create and disassemble lists. Lists always contain items of a single type, e.g. only strings, only number, or only nested lists with the same item type, there are no mixed type lists.

**char(number)**
char(number) of type string

Returns a string that contains the unicode character of "number". E.g. char(10) is line feed.

**code(string)**
code(string) of type number

Returns the unicode value of the first character of "string".

**list**
list(item1, item2, ...) of type list

Builds a list from single items. All items must be of the same type, the resulting list is a list of items of that type.

**join**
join(list of lists, separator = empty list) of type list

Concatenates the lists given by the first argument using the second argument as separator between each pair of lists.

**nth**
nth(list, index) of type item

Returns the specified item from the list. The index is zero-based. Fails if the index is out of bounds.

**from-to**
from-to(from, to) of type list of number

Produces the list of integers between "from" and "to" inclusive. If "from" > "to", this list is empty.

**length**
length(list) of type number

Returns the number of items in the list.

**slice**
slice(list, start, end=length(list)) of type list

Selects a partial list from a list. E.g. slice(list(1,2,3,4),1,3) returns list(2,3).

Note:
"Start" is the zero-based index of the first list item to include in the slice (i.e. 2), "end" is the zero-based index of the first item to ignore in the slice (i.e. 4).

**String Functions**

The string functions deal with basic string operations.

**concat**
concat(string1, string2, ...) of type string

Concatenates/joins all of the separate strings into one string.

Same as string-join(list(string1, string2, ...)).

**string-join**
string-join(list of strings, separator = an empty string) of type string

Joins the "list of strings", inserts the separator in between each.

**number**
number(string) of type number

Computes the number representation of the string, i.e. converts the string into a number.

**string**
string(number) of type string

Computes the string representation of the given number, i.e. converts the number into a string.

**split**
split(string, separator) of type list of string

Splits the string at each occurrence of separator.

**find-all**
find-all(string, pattern) of type list of string

Extracts all occurrences of pattern in the string, where pattern is a regular expression.

**trim**
trim(string) of type string

Removes leading and trailing whitespace from the string (space, tab, linefeed, carriage return, form-feed and vertical tab).

**trim-start**
trim-start(string) of type string

Removes leading whitespace, (see trim).

**trim-end**
trim-end(string) of type string

Removes trailing whitespace, (see trim).

**contains**
contains(string, substring) of type boolean

Returns true if the first string contains at least one occurrence of substring, otherwise false.

**starts-with**
starts-with(string, start) of type boolean

Returns true if the first string starts off with the string "start".

**ends-with**
ends-with(string, end) of type boolean

Returns true if the first string ends with the string "end".

**string-length**
string-length(string) of type number

Returns the number of characters in the string.

**substring**
substring(string, start, end = string-length(string)) of type string

Returns the speficied substring. Start and end are zero-based character positions.

### Boolean Functions

**not**
not(boolean) of type boolean

Returns the negation of the boolean.

**all**
all(boolean1, boolean2, ...) of type boolean

Returns true if all boolean values are true; stops evaluation after the first false value and returns false.

**any**
any(boolean1, boolean2, ...) of type boolean

Returns true if any boolean value is true; stops evaluation after the first true value. Returns false if all values are false.

**if**
if(boolean, valueTrue, valueFalse) of type ...

Returns valueTrue if the boolean is true, and valueFalse if false. Only the selected subexpression is evaluated. Both subexpressions must be of the same type, which is also the return type.

Example: To pass a boolean as XML Schema conformant value, use

if(b, "true", "false")
or
if(b, "1", "0")

**true**
true() of type boolean

Returns true.

**false**
false() of type boolean

Returns false.

### Runtime information Functions

**instance-id()**
instance-id() of type string

Returns a unique string for every job execution. This can be used to create a unique directory for each job execution, where the string is used to define the directory name.

**slot-number()**
slot-number() of type number

Returns the execution slot number of the queue currently running the job. This number should not be used as a file name. The number can be used to access different servers to execute parallel jobs (simple load balancing).

The slot number depends on the queue in which the slot execution was started. If the current job is called by another job, then it inherits the slot number of the calling job.

**Operators**

Basic mathematical operators can be used to work on strings and numbers.

a == b
checks if a and b are equal (numerically equal for numbers, code-point equal for strings)

a != b
is equivalent to not (a == b). a <> b is another variation.

a < b
checks if a is less than b (numerically less for numbers, see below for strings)

a >= b
is equivalent to not (a < b)

a > b is equivalent to b < a

a <= b is equivalent to b >= a.

String comparisons are performed as follows:

- The common prefix of the two strings are ignored (evaluated on codepoints)
- If both remaining strings are non-empty, their first codepoints are compared numerically
- Empty strings are less than non-empty strings

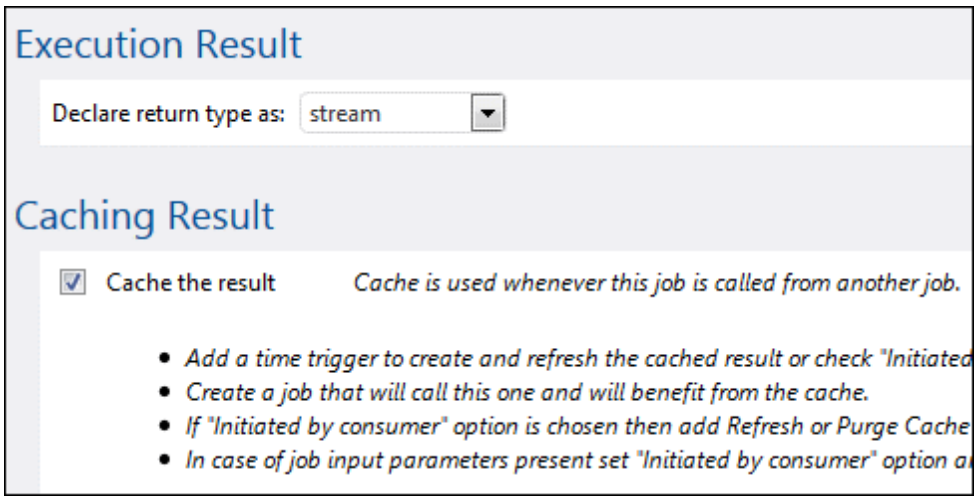
Operators on numbers:
a + b, a - b, a * b, a / b

All compute the normal arithmetic results.

### 4.3.4 Execution Result

The Execution Result field allows you to explicitly define the return type of the job result (more specifically the return type of the last step of the job). The default is "ignore/discard" which does not enforce a return type.

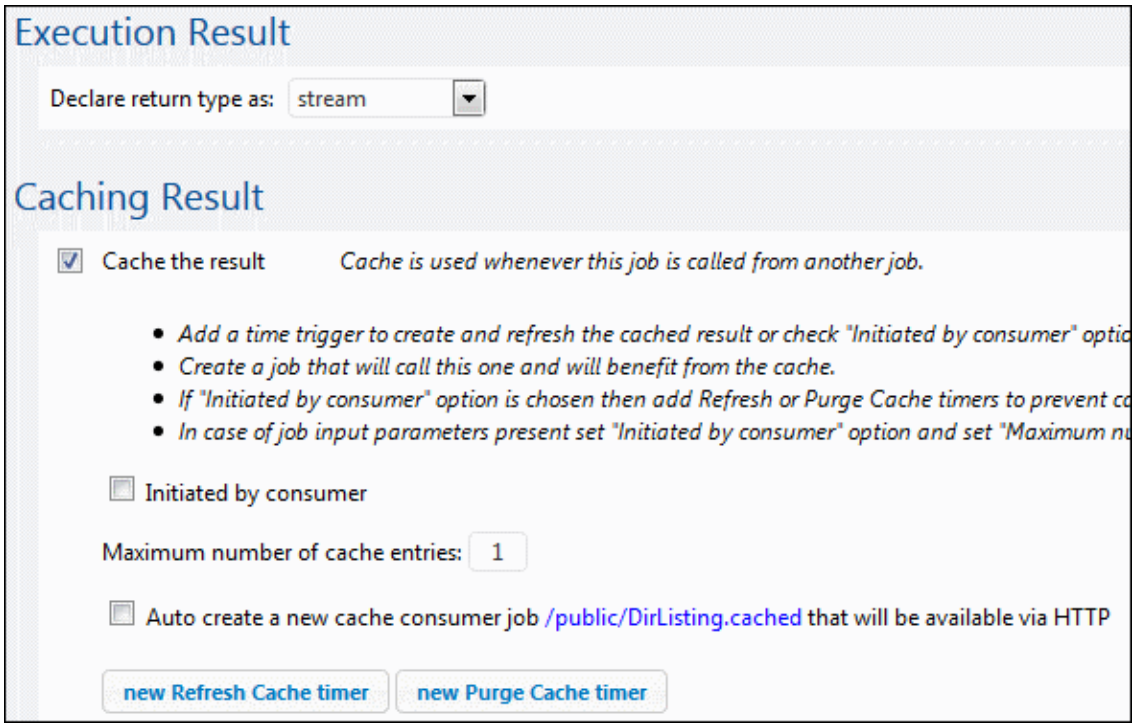
If one of the return types is selected from the combo box, e.g. string, stream, etc., then the result of the job can also be cached by clicking the "Cache the result" check box of the Caching Result group.



### 4.3.5 Caching Result

The cache option allows FlowForce to reduce the response time of web-service jobs and to also reduce the server load. This is achieved by caching the results of one job and using the cached result in another job step.




FlowForce fills the cache whenever a job is executed by a defined trigger or web service call. If the "Initiated by consumer" check box is active, FlowForce also fills the cache on-demand, i.e. when the job is called from another job.

Cache results are defined by the job parameters used to create them. When a particular parameter combination is manually refreshed (by clicking the "Refresh Cache Timer" button, or by a web service call) the cache entries are recomputed. FlowForce uses the cached result to improve response times.

The cache (result) is queried by a second job that contains the first job as a job step within it. Instead of rerunning the first job, as would normally be the case, the cache result is used. Please see the **Cache example** for more information.

Notes:

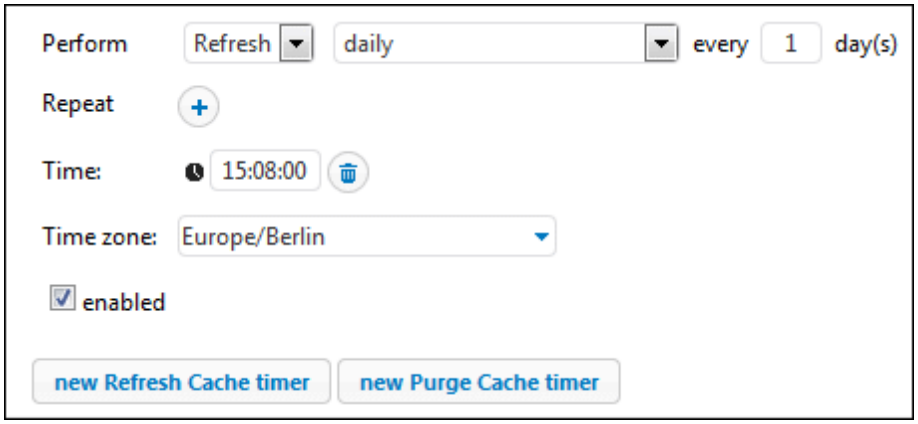
- Both of the jobs must use identical job credentials. If the credentials differ, then the job executes as if no cache were defined.
- Making changes to the configuration of the cached job invalidate/flush the cache data.
- The cache can be manually refreshed by clicking the "Save and Refresh the cache" button at the bottom of the page, or whenever the job is triggered.

**Initiated by consumer**
Activating this check box allows the cache to be filled by any other execution of the job, not just by a trigger.

**Maximum number of cache entries**
This cache limit restricts the number of cached job results per job. FlowForce limits the number of cached results to the specified number; this limit can be temporarily exceeded e.g. during heavy server loads.

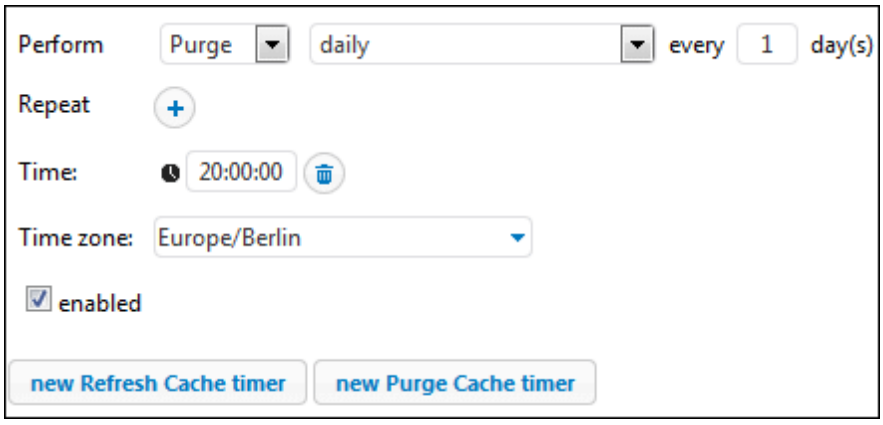
**Auto create a new cache consumer job**
Activating the check box adds a new URL field below the check box.

**new Refresh Cache timer**
Clicking this button lets you to define when the cache contents will be refreshed, e.g. daily, days of week, etc.




FlowForce recomputes the cache when the cache timer fires.

**new Purge Cache timer**
Clicking this button lets you to define when the cache contents will be purged, e.g. daily, days of week, etc.



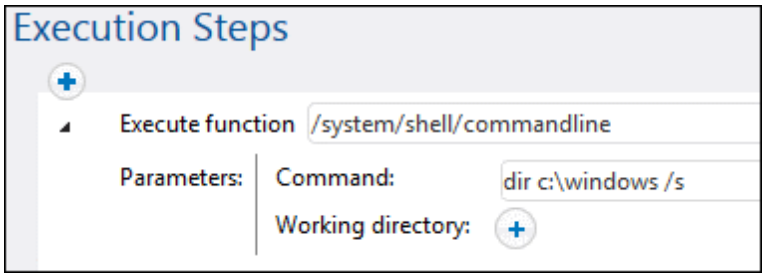

Please see the **Cache example** for how this is set up.

### Cache example

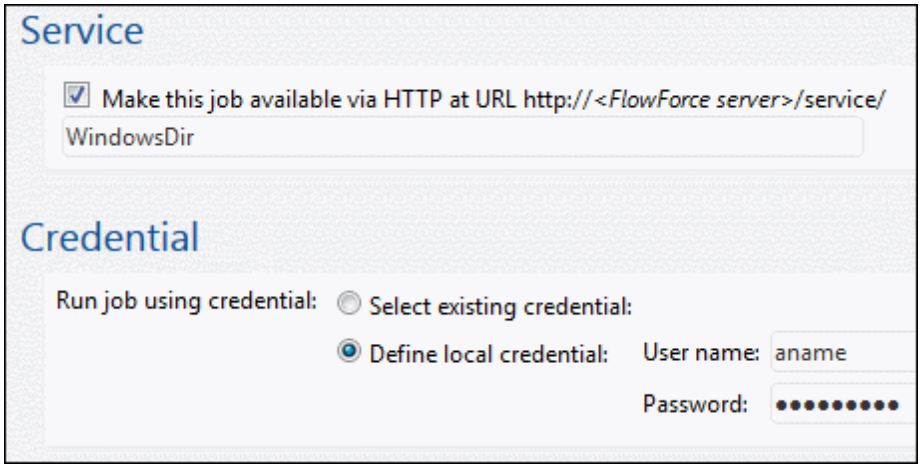
The aim of this simple example is to recursively list the contents of c:\windows, and then use the cache result in a different job.

**Defining the initial job:**

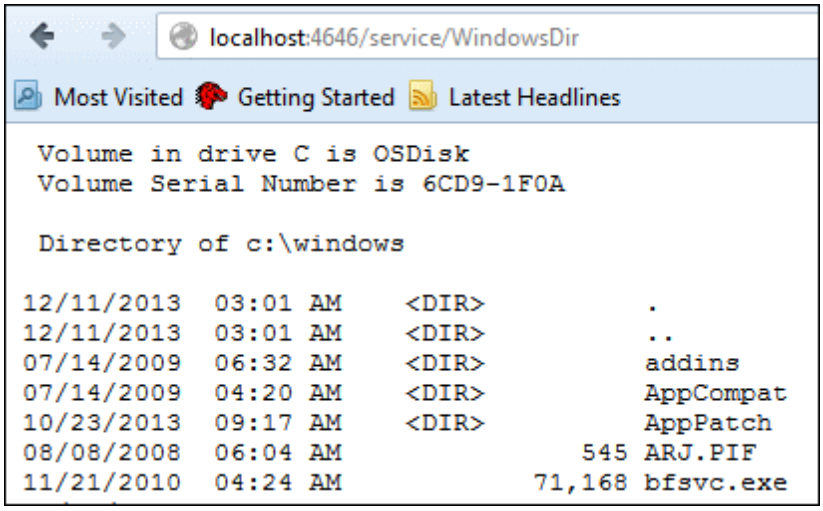
1. Define a new job with a single execution step, e.g. click in the Execute function field and select system/shell/command line.
2. Enter the command line in the Command field, e.g. dir c:\windows /s.




3. Enter a webservice name/binding in the Service group, e.g. WindowsDir.
4. Enter the credentials needed to run the job in the Credentials field, then click Save to save it.

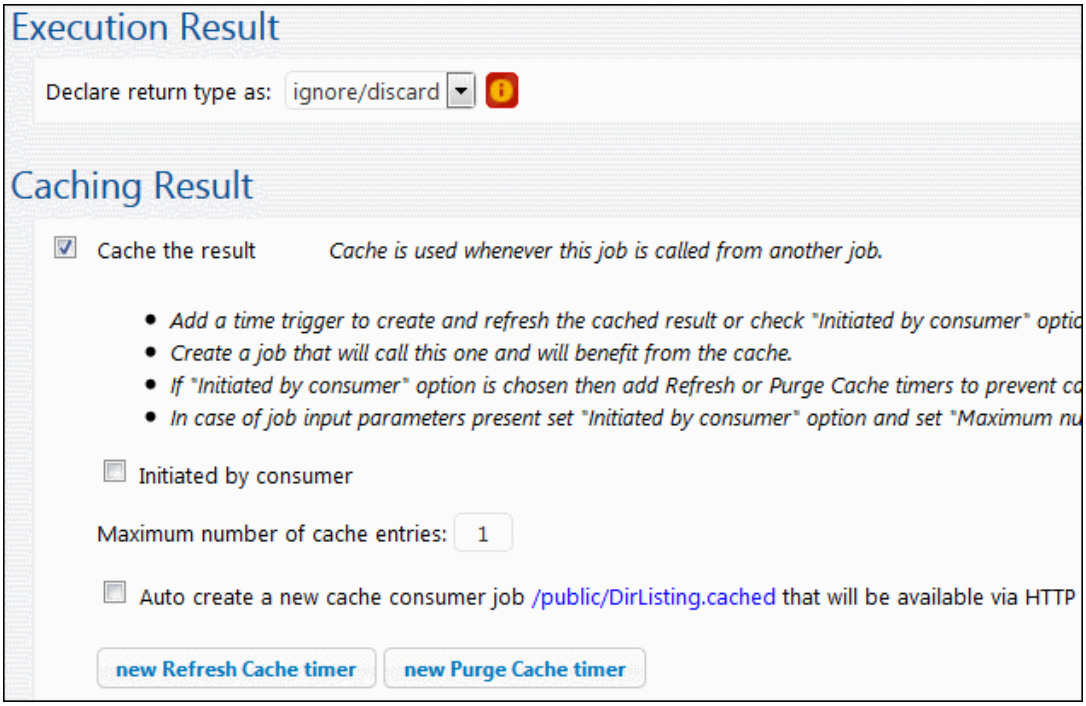



5. Enter the URL ***http://localhost:4646/service/WindowsDir*** in your browser to access and start the job, this might take a few seconds. You might have to enter your login details at this point.
   A directory listing will now be visible in the browser window.



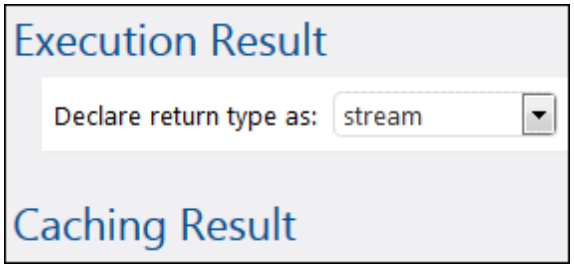

**Defining the cache settings:**

1. Click the "Cache the result" check box in the Caching Result group to enable the cache.

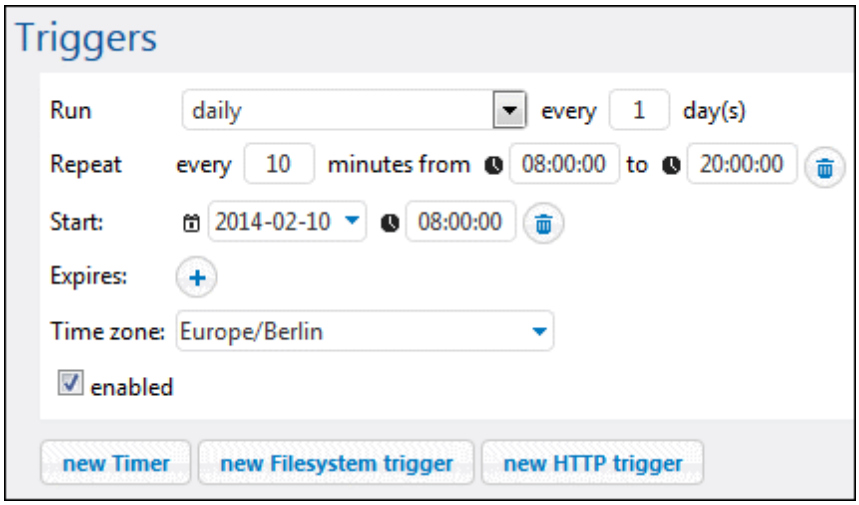



   You are prompted to create a time trigger and a job that will call this one.
   The red information icon, of the Execution Result group, also prompts you to define the return type.
2. Click the "Declare return type as:" combo box and select "stream".

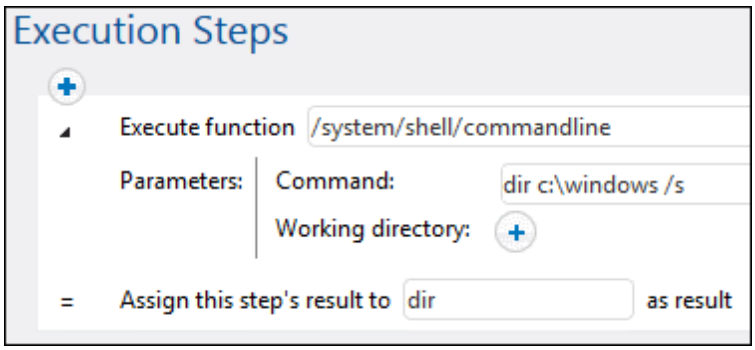
 




3. Click the "new Timer" button and define a trigger that will fire every 10 minutes, for example.

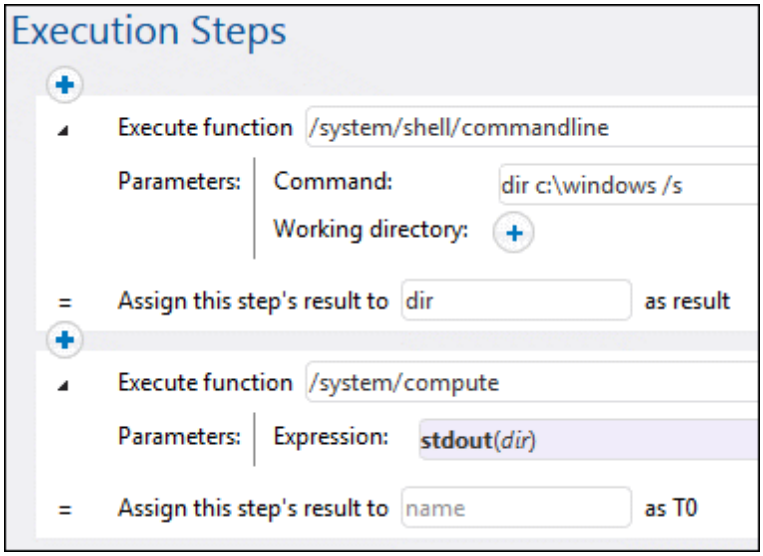



4. Click into the "**Assign this step's result to...**" field of the Execution Steps group, and enter "**dir**" as the step result.




To be able to use the "dir" result, we need to add an extra step to the job.

5. Click the "new Execution step" button and enter **/system/compute** with the parameter **stdout(dir)**.

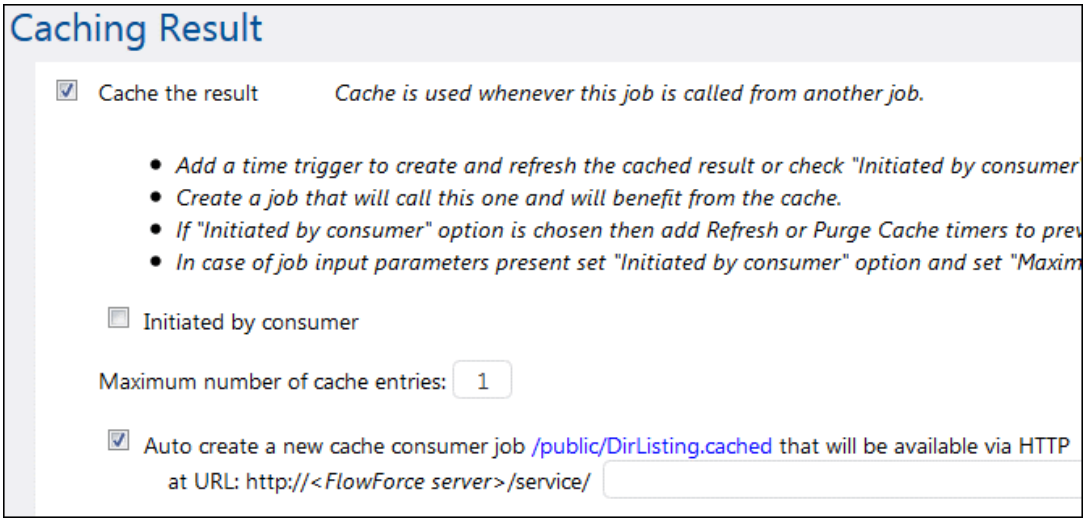



6. Click Save to complete the definition of the cached job.

We now need to define the calling job that will make use of the cached result.

**Defining the calling job:**

1. Click the "Auto create a new cache consumer job..." check box.
   This adds a new "**at URL:**" field below the check box.



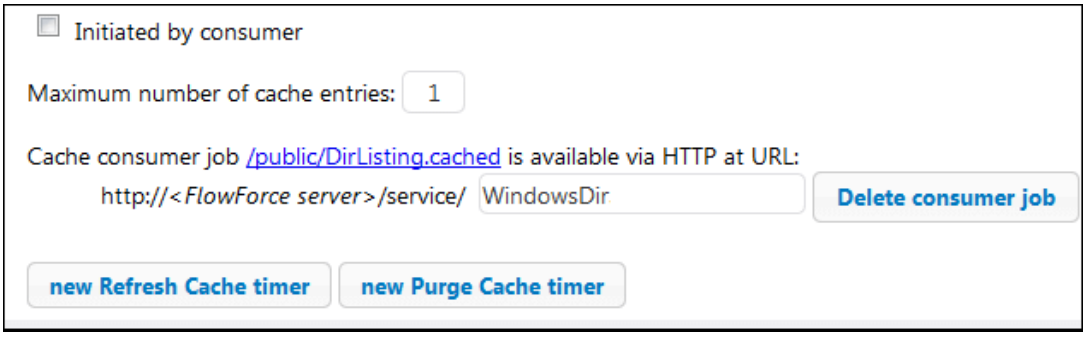

2. Scroll to the **Service** group and copy the URL from there (**WindowsDir**) into the newly created URL field.


3. Click the "Save" button at the bottom of the page.

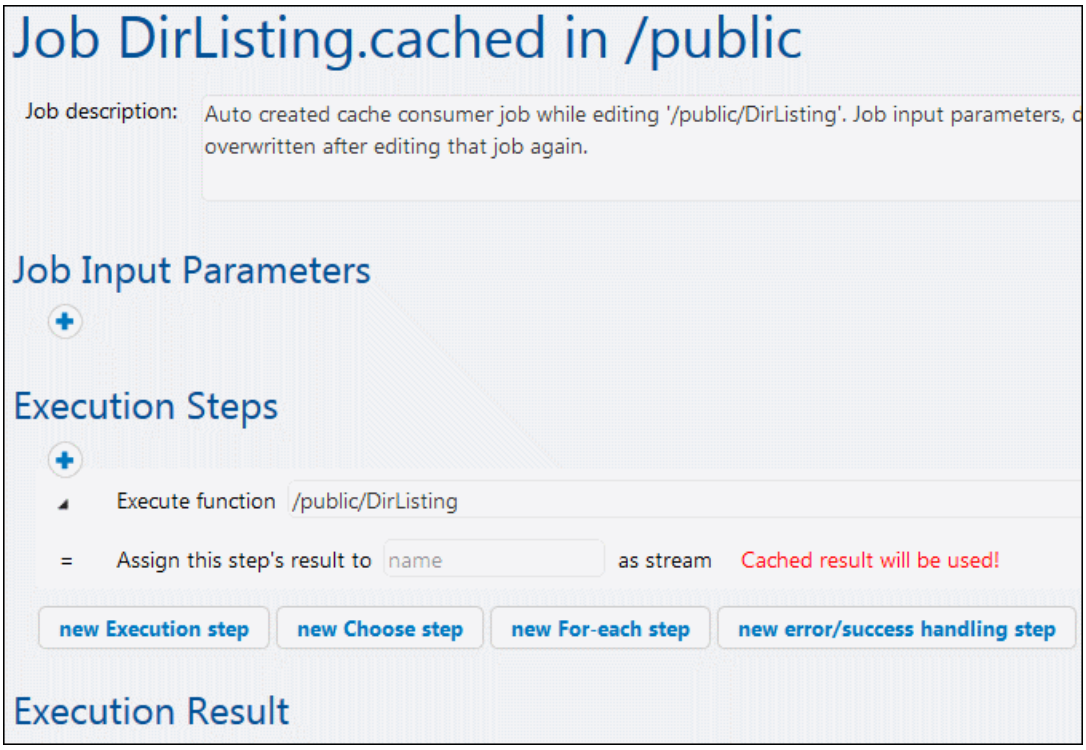
 

The job is saved and the page is refreshed.

**Note:** the "Auto create a new cache consumer job..." check box has now been **removed** and the cache consumer job is visible as a hyperlink.

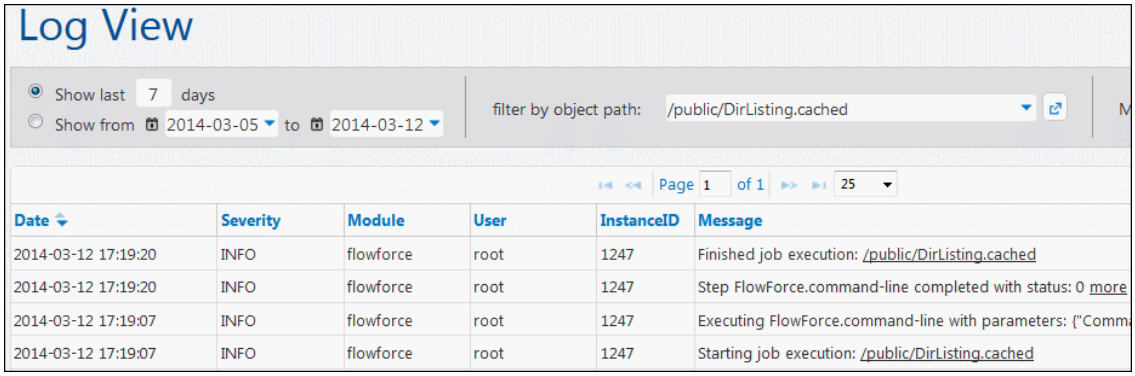



4. Click the /public/DirListing.cached hyperlink to open the calling job in FlowForce.



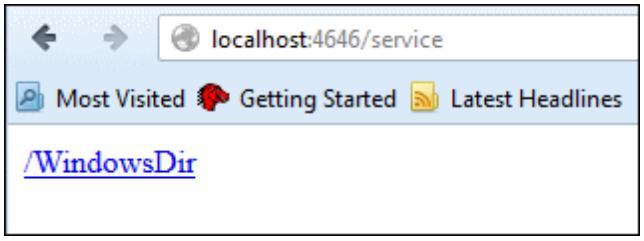

The job will execute every 10 minutes and produce a listing of all files on the computer.

6. Click the View Log button to see the log files.



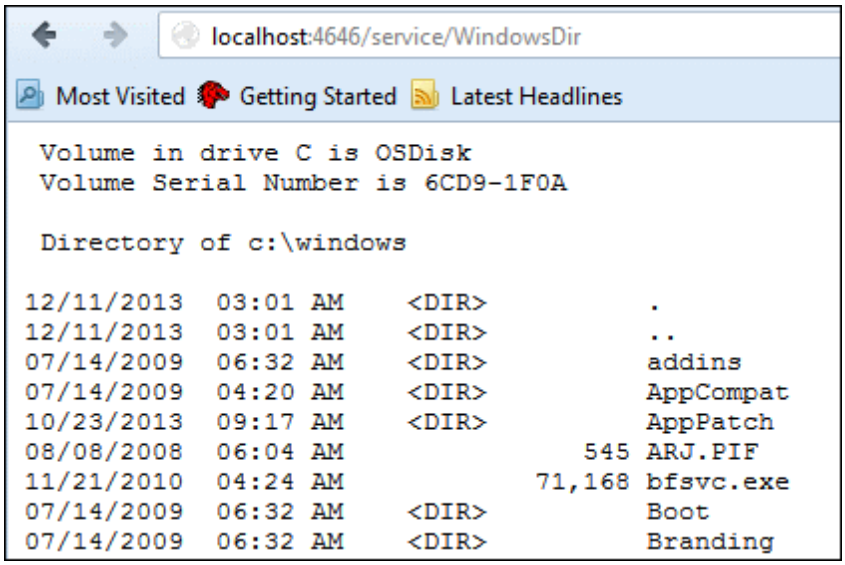

**Viewing the output:**

1. Click in the Browser address window and enter "localhost:4646/service".




The currently active services are now visible in the browser window.

2. Click the WindowsDir link to see the output.




Note:
You could also click the "more" link in the Log View window to see the result.

### 4.3.6 Triggers

Three types of triggers can currently be defined: Timer, File system triggers, and HTTP triggers.

**Timer** trigger
This type of trigger allows you to schedule your jobs. Timer triggers have a Start date/time, Expire date/time and period of recurrence (daily, weekly etc.).

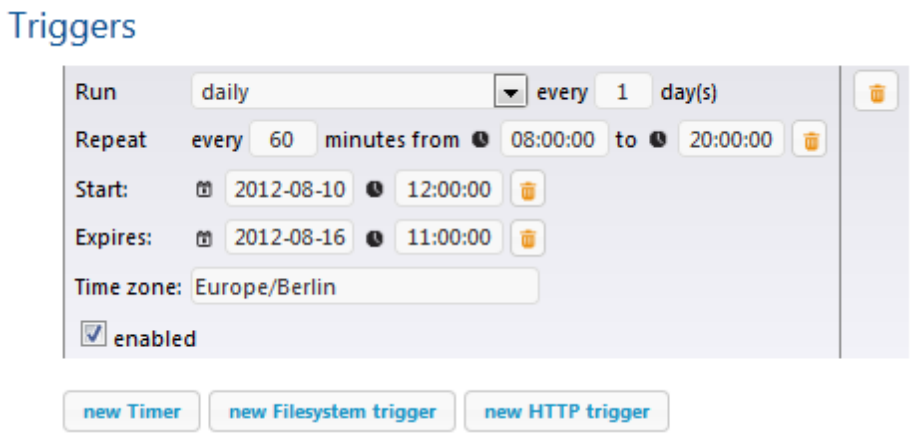
**File system** trigger
This type of trigger lets you check a specified directory, as well as check the content of a specific file(s).

**HTTP** trigger
This type of trigger lets you poll a specified URI for changes.

You do not need to define any triggers if you intend to make the job available as a service via HTTP.

#### Timer trigger types & common settings

Multiple triggers can be defined per job allowing maximum flexibility. This means that several triggers can be active simultaneously, and that whenever any of the triggers is fired, all execution steps of the job associated with the trigger are processed.




**Run**
The "Run" combo box allows you to define the specific days that the trigger can be activated. This option only refers to dates! There is no time component when you make this selection.

Run period options:

- Once
- Daily
- On days of week
- On days of months
- On days of weeks of months

**Common trigger properties:**

**Repeat**
The Repeat options define the interval between successive trigger firings, per day. The days when this will occur, are defined by the selection made with the "Run" combo box.

The "every" field lets you define the period between the job runs, in minutes.

The "from" and "to" fields define the time range between which the triggers will fire.

**Start** - date and time
Start date/time entries are only mandatory for a timer trigger that uses the "Run - Once option.

Start date/time are optional for file system and HTTP triggers. Clicking in the Date field opens a pop-up calendar from which you can select the start date.

E.g. Repeat every "60" minutes from "08:00" to "20:00" with start time at 09:33. This means that the trigger will become active at 09:33, and as the repeat interval is 60 minutes, it will fire for the first time at 10:00, with repeats at every full hour.

**Expires** date - time.
The Expires fields allows you to define the date/time from when the job is to expire. The trigger will not fire after this date/time.

**Time Zone**
This field allows you to define timers that will fire at the same time of day, even if there are daylight saving time switches. Clicking in the field opens a pop-up time zone picker. The default time zone is defined in the server administration settings.

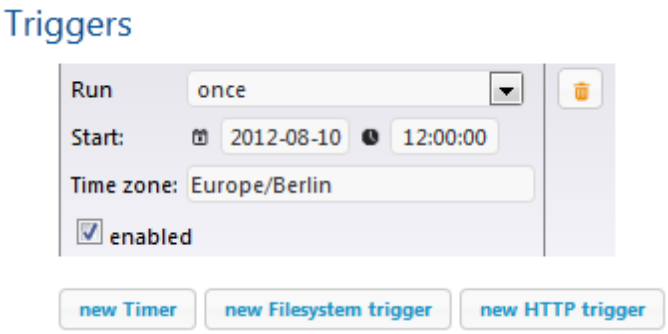
**Enabled**
The "enabled" check box allows you to enable/disable each individual trigger in the trigger list. This option is useful when creating and testing new jobs.

Waste basket 
The waste basket allows you to delete the whole trigger, or any of the sub elements that are part of it.

Note: Triggers and defaults
If you use job parameters with triggers, make sure that all parameters have defaults or the job will not execute.

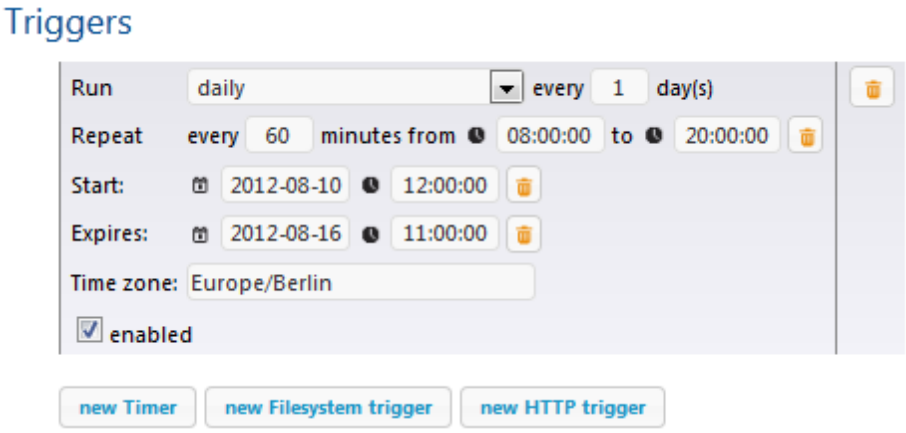
**Run Once**

This type of trigger will fire once on the day specified, at the exact time given in the time field.



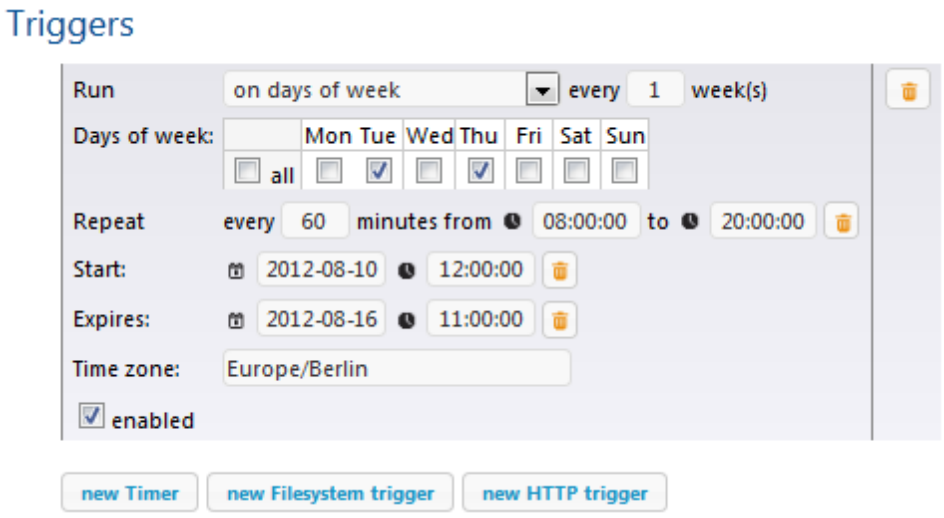

**Run Daily**

This type of trigger will fire every day between the dates specified, with the first firing at 12:00, and repeat every full hour.



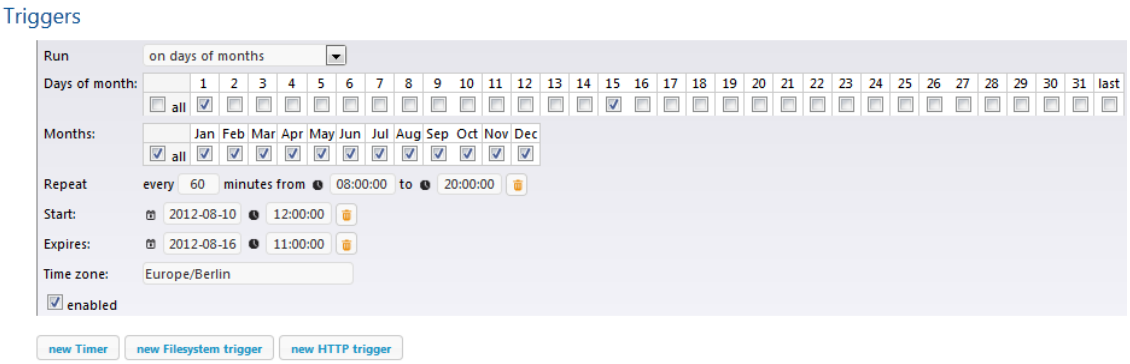

**Run On days of week**

This type of trigger will fire every week on Tuesday and Thursday between the dates specified. The first time it fires will be at 12:00, and repeat every full hour.



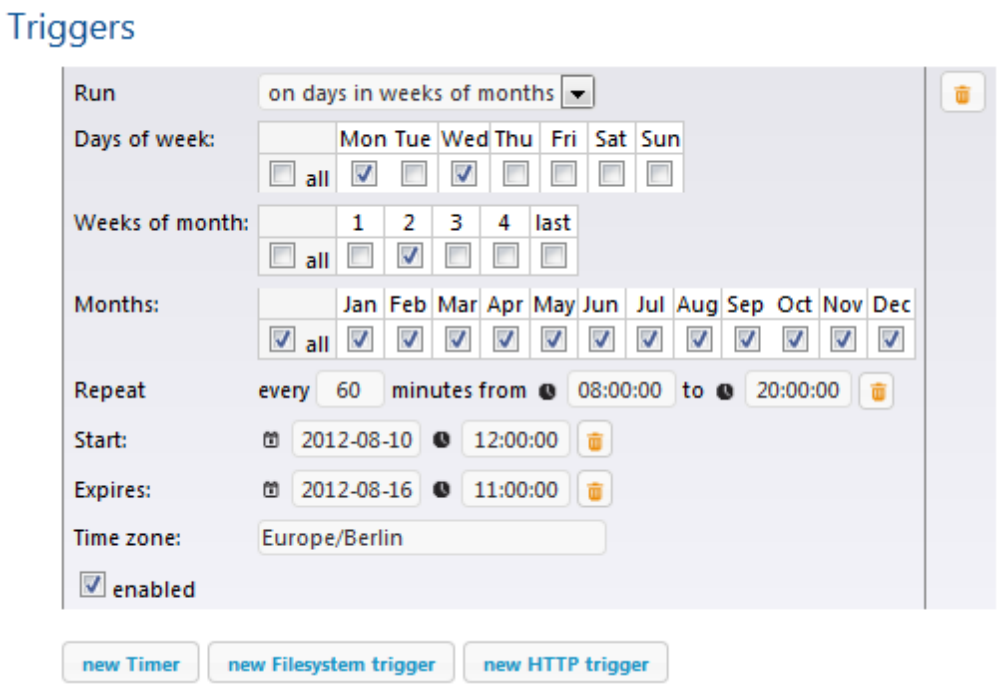

### Run On days of months

This type of trigger will fire on the 1st and 15th every month between the dates specified. The first time it fires will be at 12:00, and repeat every full hour.




### Run On days in weeks of months

This type of trigger will be fired on Monday, and Wednesday of every second week, of every month between the dates specified. The first time it fires will be at 12:00, and repeat every full hour.




**File system trigger**

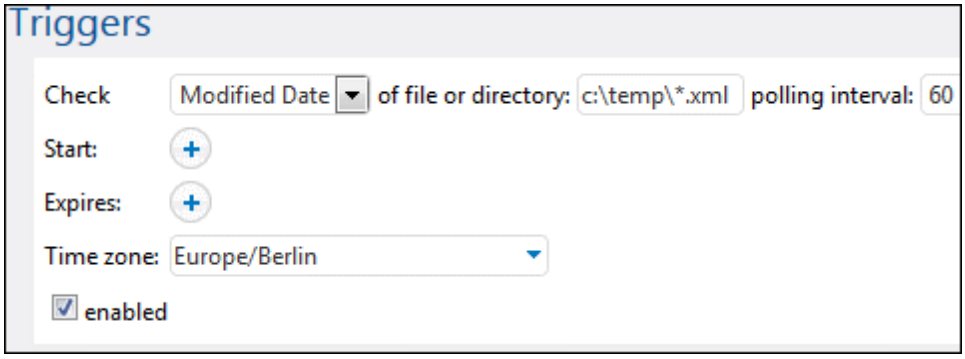
**File system** trigger:
This type of trigger lets you check a specified directory, as well as check the content of a specific file(s). A directory can be checked for updated or new files (you cannot check for deleted files). Wildcards can be used to filter specific files of the directory.

Check - Modified date:
The trigger checks the last modification timestamp of all the specified files. If any dates have changed, or a new file has been added, then the trigger fires.

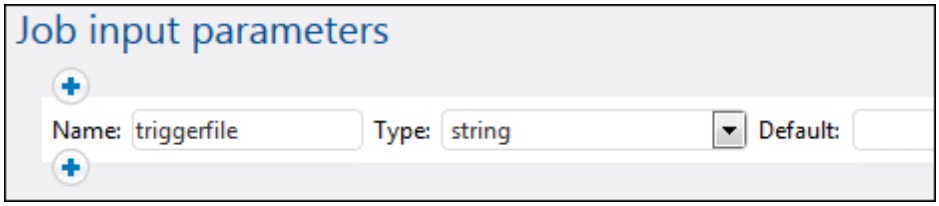
Check - Content:
This option computes and stores a hash code for the specified file. After the polling interval has passed, the hash code is recomputed and compared to the stored value. If there is a difference then the trigger fires. Note that this can place considerable load on the server.

If any dates have changed, or a new file has been added, then the trigger also fires.

Wait 'S' seconds to settle:
Defines the time in seconds that the server will wait before starting the next job.




When adding a file system trigger, FlowForce Server automatically adds the "triggerfile" parameter to the job. This parameter is set at runtime to the name of the file that triggered the job execution. This file name can then be passed to an execution step to process the file.

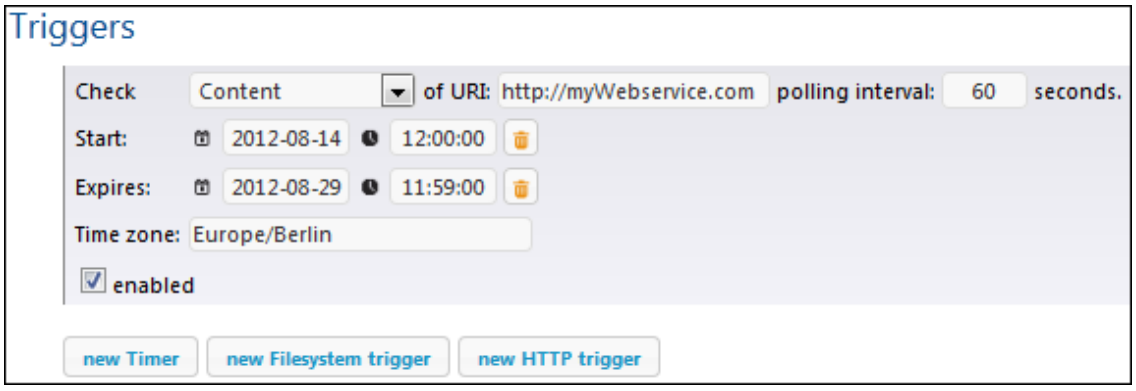



**HTTP trigger**

**HTTP** trigger
This type of trigger lets you poll a specified URI for changes.

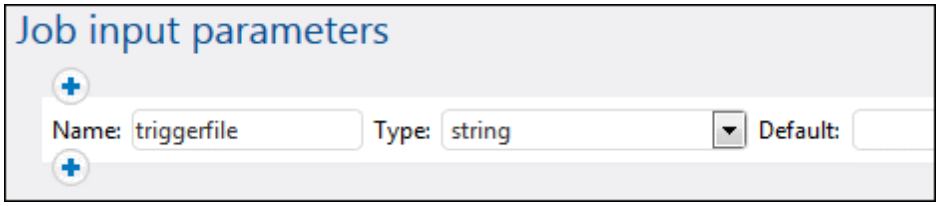
Check - Modified date: If a URI is being polled, then the "Last-Modified" HTTP header is checked. If the HTTP header is missing, then "Check Content" is used.

Check - Content: If a URI is being polled, then the "Content-MD5" optional header field is checked. This is a 128 bit "digest" used as a message integrity check. If the MD5 header has changed after the polling interval has passed, then the trigger fires. If the header is not provided by the server, the content is retrieved and hashed locally.




When adding an HTTP trigger, FlowForce Server automatically adds the "triggerfile" parameter to the job. This parameter is set at runtime to the name of a temporary file that contains the downloaded content at the URI that triggered the job execution. This file name can then be passed to an execution step to process the file.


Job input parameters
Name: triggerfile
Type: string
Default:

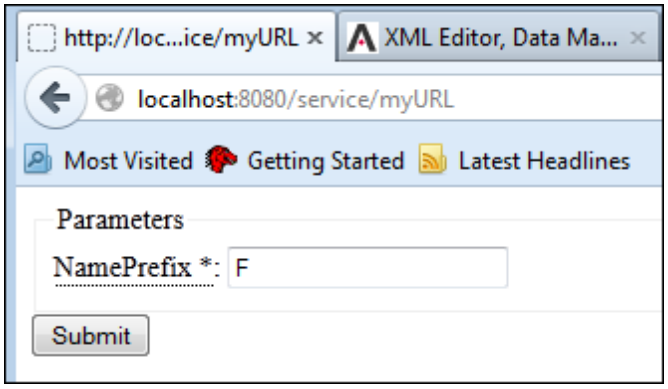
### 4.3.7 Service

FlowForce Server permits exposing jobs as web services via the HTTP protocol. This allows programmatic and interactive access to these jobs, making it possible to use them on-demand.


All job parameters automatically become parameters for the service. If a job parameter does not have a default, it is mandatory and must be provided when invoking the service; otherwise it is optional and can be provided, taking the default value if it is not provided.

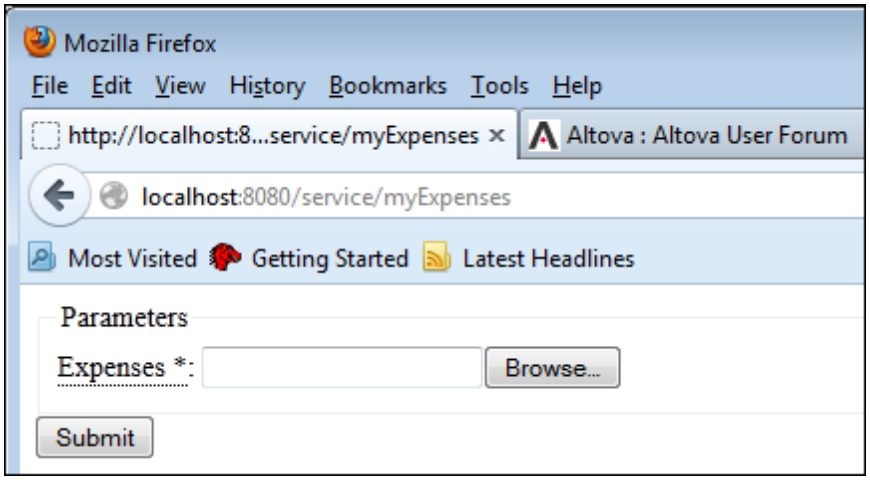
FlowForce Server checks if all mandatory parameters are provided when the service is invoked. If some are missing the service execution fails. For testing purposes FlowForce Server supplies a simple HTML form allowing parameters to entered manually. Note: When using Internet Explorer 9 as your browser, please disable the option "Show friendly HTTP error messages" in the Advanced tab, to view the form.

This form allows you to enter a value for all parameters.




Please see the tutorial example: Using parameters to query a database.

Streams need a file to be uploaded using the "Browse" button. When clicking "Submit" the data is transferred to FlowForce, and if accepted, FlowForce Server starts the job and waits for the result.



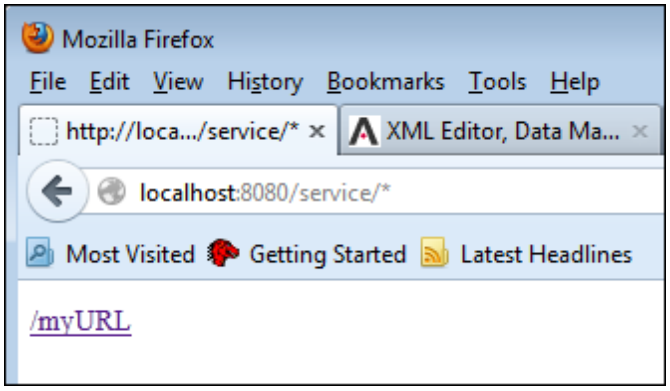

After the job has finished executing FlowForce Server delivers a response. If the job failed for any reason, FlowForce Server will return an error message, otherwise it will return the first result file of the last execution step executed, or the last execution step's standard output, if no result file is available.

Services remain active as long as FlowForce server is running.

Please see the tutorial example: Using a deployed mapping as a web service.

**To access FlowForce Server services through your browser:**

1. Open your browser and enter http://localhost:4646/service/* in the URL text box. If you are using a remote FlowForce server installation, make sure it accepts connections from other machines.
   This command shows all the services currently running on the server.




See also:
Technical details

**Technical details**

The service interface is primarily meant for machine consumption. At the request URL specified, FlowForce Server starts a listener service which accepts HTTP GET and POST requests.

It then runs the job execution steps specified and returns the first result file of the last step or the

standard output of the last step, if no result files are produced (e.g. for FlowForce Server system commands).

A valid result is returned with a HTTP 200 status, with the Content-Type header set according to the result.

The Content-Type header depends on the actual result. A MapForce mapping will result in text/xml if it has XML output, or text/plain for text output. Standard output of other functions is also returned as text/plain. The result is returned as the response body, without any embellishments.

**Authentication:**
FlowForce Server uses HTTP Basic authentication as the means of user authentication. If you want a service available without credentials, you have to grant "use service" permission to the default "anonymous" user. Any other user credentials are checked against the FlowForce Server user database (so you can use the same usernames and passwords you use for logging into the FlowForce Server configuration GUI).

You can still supply HTTP credentials when a service is available for anonymous use. The credentials are then checked against the FlowForce Server user database and the service execution is attributed to the authenticated user instead of user anonymous.

**Invalid credentials**
If you supply invalid credentials, the request interface will return an HTTP status of 401. If you did not supply credentials and service use has not been granted to anonymous on this service, the request interface will also return an HTTP status of 401.

If you supplied valid credentials, but the authenticated user is not granted "use" access on this service, the request interface will return an HTTP 4xx failure status . If you try accessing a service that does not exist, an HTTP 4xx failure status is returned.

When the client is permitted to use the service, FlowForce Server will verify the supplied request parameters against the defined parameters of the job. Every parameter that does not have a default must be specified, parameters having a default may also be specified. If parameter validation fails, FlowForce Server will return a 5xx HTTP status. For debugging and testing purposes FlowForce Server also returns a simple HTML parameter form in this case.

The built-in parameter named **showform**, when present (regardless of value), will display the testing HTTP form regardless of any parameter validation errors.

Requests can generally be sent as both HTTP GET or HTTP POST (with multipart/form-data Content-Type), with the exception of parameters of type **stream**, which are only supported for HTTP POST requests.

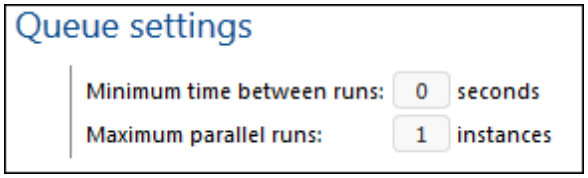
Service execution behaves like execution via trigger, and is subject to the same queue constraints. You should set the queue limits accordingly.

Execution errors are reported as HTTP 5xx status with a generic error message; detailed information can be found in the FlowForce Server log.

### 4.3.8 Queue settings

Each Job has a queue assigned to it allowing you to define how many instances of the same job can be run in parallel.




**Maximum parallel runs:**
Enter the number of times the same job may be executed in parallel on the server.

**Minimum time between runs:**
Enter the time in seconds that must pass after each of the parallel jobs starts before another one may start.

Also see: Runtime information Functions

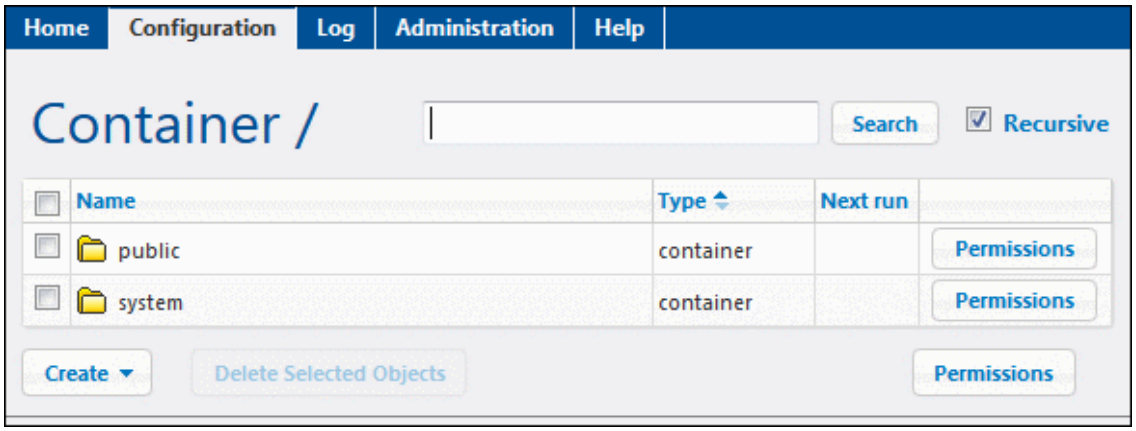
## 4.4 Credentials

Credentials are stored login data used to execute FlowForce Server jobs. Credentials can be defined as standalone "objects" and be assigned to various jobs, or they can be manually entered for a specific job.

Jobs are started automatically by FlowForce Server when the defined trigger conditions are met. FlowForce Server then runs these jobs using a specific operating system user account, ensuring that job steps do not access unauthorized data. Note that file watch triggers are also assigned credentials.

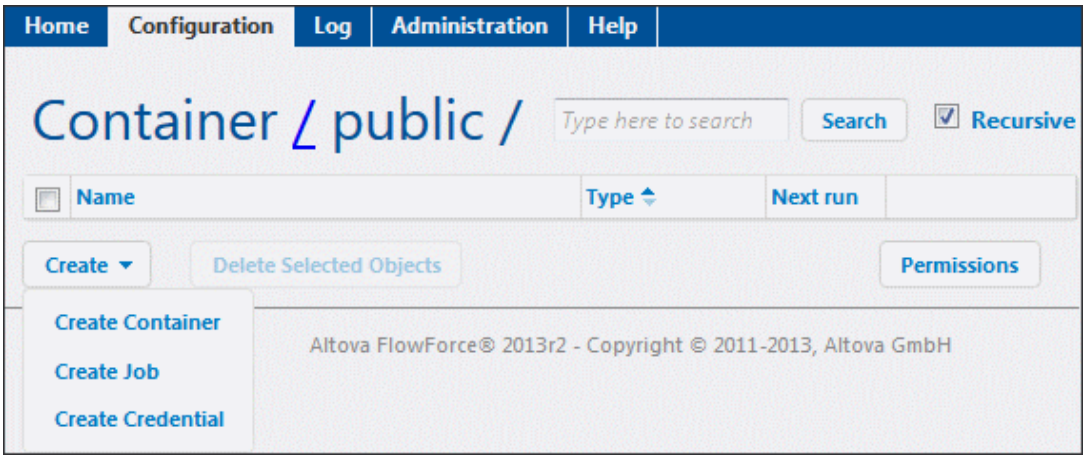
Credentials can be created, or deleted, on the Configuration (Container) page. Note that job credentials, i.e. username and password, can also be entered for individual jobs on the Job page.

Any user that has "write" access to the "Configuration" permission, can edit or remove credentials.



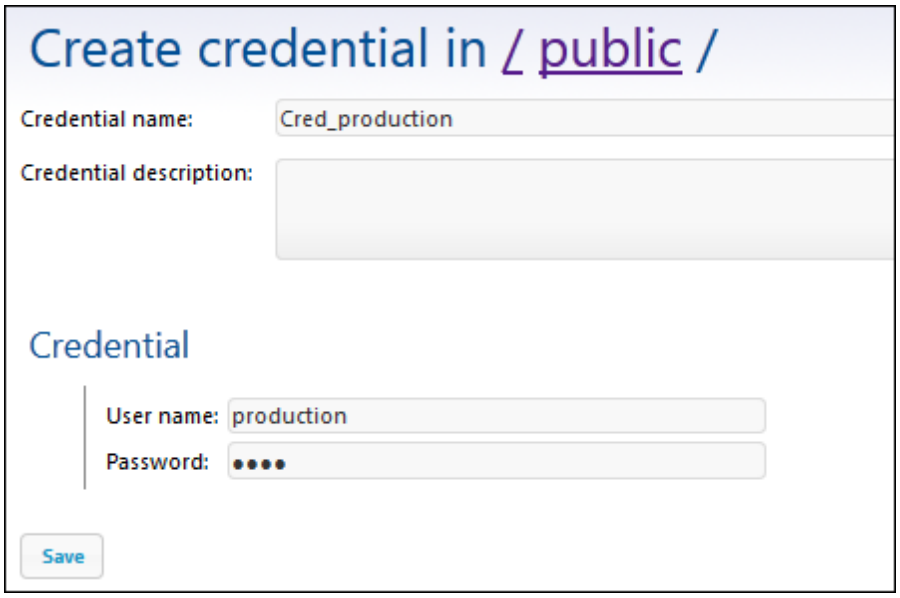

**To add a credential to FlowForce Server:**

1. Click the container you want to create the new credential in, e.g. public.
2. Click the "Create" button and select the "Create Credential" entry.

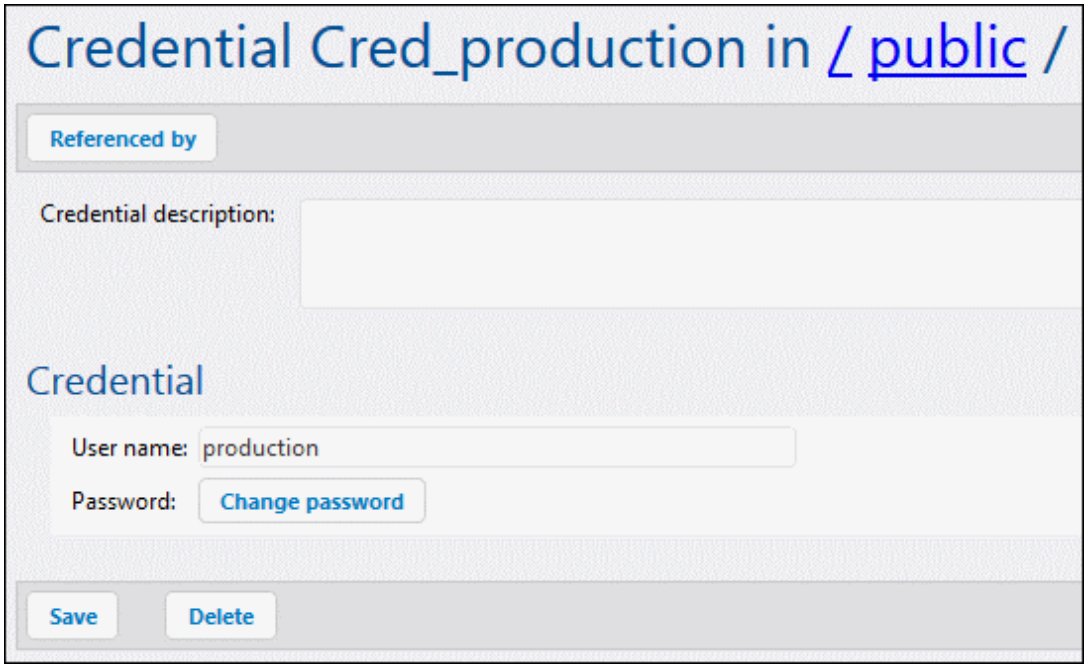



3. Enter the name of the credential as well as the **operating system** user name and

password. To specify a user name in a Windows domain, please use the form **username@domain**.




4. Click Save.
   The new credential "Cred_production" has been saved in the /public container.
5. Click the "Configuration" button to return to the Container page.



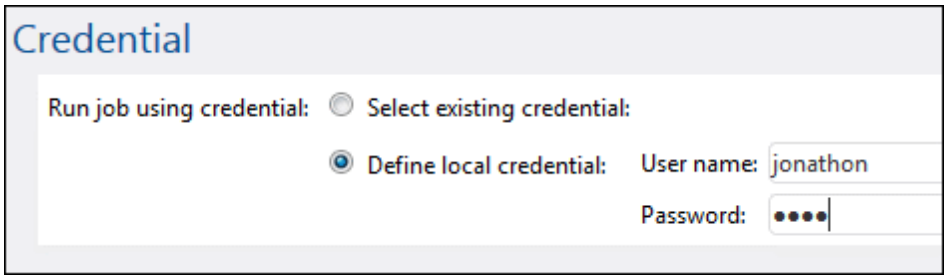

Please see Permissions for information on the container permissions that can be defined.

**Credentials and jobs**

Every job MUST have a credential assigned to it for the job steps to be executed. This defines

the **operating system** user account used to run the job steps.

A predefined credential can be selected using the "existing credential" combo box, or the local credential can be manually entered in the "User name" and "Password" fields. This is done on the "Create job..." page.




Note:
If you **manually** enter the user name and password, as shown above, you will have to update them for those specific jobs, whenever your server credentials are changed.

**Credentials:**

- Credentials can be created in any container a user has access to.
- The credential password may be an empty string.
- As the clear text password needs to be sent to the operating system's login function, passwords are stored in a reversible encrypted form in the FlowForce Server database. The administrator should make sure to restrict access to the FlowForce Server database file.

**FTP credentials**

When using FTP system functions, e.g. ftp/retrieve, in the "Execute function" field you must also enter your FTP login credentials for the FTP server. You can select an existing credential or enter a local one.

## 4.5 Built-in functions

The /system container contains various file system, ftp, and mail functions that can be used in job execution steps. This allows you to copy or move files, create directories, or execute arbitrary command lines.

Note that all file paths in job execution steps must be a path on the server machine (that runs FlowForce), not on your local machine.

### 4.5.1 filesystem - File system functions

Note that all file paths in job execution steps must be a path on the server machine (that runs FlowForce), not on your local machine.

Note:

The **working directory** is used to resolve relative paths that occur during the execution of any type of step. When a relative path is encountered, it is resolved with respect to the path of the current working directory.

If no working directory is specified, a temporary directory will be used.

**/system/filesystem/copy** - copy file(s)
Parameters:

| | |
|---|---|
| Source | Enter the path and file name of the source file that you want to copy. |
| Destination | Enter the path and file name of the destination directory. You can enter a different file name in the destination field if you want to rename it as well. |
| Overwrite | Clicking generates a check box. Activation causes destination file to be overwritten |
| Working - directory | Enter a working directory, e.g. C:\Temp. If this is empty, a temporary directory is used. |

**/system/filesystem/delete** - delete file(s)

| | |
|---|---|
| Path | The path and file name of the file you want to delete. |
| Working - directory | Enter a working directory, e.g. C:\Temp. If this is empty, a temporary directory is used. |

**/system/filesystem/mkdir** - create directory
Parameters:

| | |
|---|---|
| Path | Enter the path/location of the new directory |
| MakeParents | Clicking generates a check box. Activation allows a hierarchical path to be created in one step.<br>E.g. working directory is c:\temp, and path is temp2\temp3. Creates the new directory c:\temp\temp2\temp3. |
| Working - directory | Enter a working directory, e.g. C:\Temp. If this is empty, a temporary directory is used. |

**/system/filesystem/move** - move or rename file(s)
Parameters:

| | |
|---|---|
| Source | Enter the path and file name of the source file that you want to move. |
| Destination | Enter the path and file name of the destination directory. If you only supply the directory name in this field, then the original file name will be retained. |
| Overwrite | Clicking generates a check box. Activation causes destination file to be overwritten. |
| Working - directory | Enter a working directory, e.g. C:\Temp. If this is empty, a temporary directory is used. |

Note - Working directory:
This entry must be a path on the server machine (that runs FlowForce), not on your local machine.

**/system/filesystem/rmdir** - remove directory

| | |
|---|---|
| Path | Enter the path/location of the directory/folder you want to delete |
| Working - directory | Enter a working directory, e.g. C:\Temp. If this is empty, a temporary directory is used. |

### 4.5.2 ftp - FTP client

Allows you to use FTP commands on remote servers.

#### system/ftp/delete

Parameters:

| | |
|---|---|
| FTP server | Address of the remote FTP server, either as a URL or IP address. |
| Port | The port number used to connect to the FTP server |
| Directory on host | The name of the directory, on the host, from which you want to delete a file. |
| Login username | User name needed to connect to the host. |
| Login password | Password needed to connect to the host. |
| Use passive mode | Use the passive mode FTP connection, if connection problems occur, e.g. routers or firewalls may be set up to avoid active connections. |
| Target file | The name of the file that you want delete from the server. |
| Account | The FTP account name of the user allowed access to the files on the remote server. |

#### system/ftp/mkdir

Parameters:

| | |
|---|---|
| FTP server | Address of the remote FTP server, either as a URL or IP address. |
| Port | The port number used to connect to the FTP server |
| Directory on host | The name of the directory, on the host, from within which you want to create a new directory. |
| Login username | User name needed to connect to the host. |
| Login password | Password needed to connect to the host. |
| Use passive mode | Use the passive mode FTP connection, if connection problems occur, e.g. routers or firewalls may be set up to avoid active connections. |
| Target directory | The name of the directory that you want create on the server. |
| Account | The FTP account name of the user allowed access to the files on the remote server. |

#### system/ftp/move

Parameters:

| | |
|---|---|
| FTP server | Address of the remote FTP server, either as a URL or IP address. |

| | |
|---|---|
| Port | The port number used to connect to the FTP server |
| Directory on host | The name of the directory, on the host, from where you want to move the file. |
| Login username | User name needed to connect to the host. |
| Login password | Password needed to connect to the host. |
| Use passive mode | Use the passive mode FTP connection, if connection problems occur, e.g. routers or firewalls may be set up to avoid active connections. |
| Source file | Name of the source file that you want to move to a different location. |
| Target file | Name of the copied file at the target location. Use a different name if you want to rename the copied file. |
| Account | The FTP account name of the user allowed access to the files on the remote server. |

**system/ftp/retrieve (file from server)**
Parameters:

| | |
|---|---|
| FTP server | Address of the remote FTP server, either as a URL or IP address. |
| Port | The port number used to connect to the FTP server |
| Directory on host | The name of the directory, on the host, from where you want to retrieve the file. |
| Login username | User name needed to connect to the host. |
| Login password | Password needed to connect to the host. |
| Use passive mode | Use the passive mode FTP connection, if connection problems occur, e.g. routers or firewalls may be set up to avoid active connections. |
| Source file | Name of the source file that you want to retrieve. |
| Target file | Name the file should have once it has been retrieved (change the name to rename it). |
| Overwrite target | Clicking generates a check box. Activation causes destination file to be overwritten. |
| Working directory | Directory you want to retrieve the file from. Note that this must be a path on the server machine (that runs FlowForce), not on your local machine. |
| Account | The FTP account name of the user allowed access to the files on the remote server. |

### system/ftp/rmdir

Parameters:

| | |
|---|---|
| FTP server | Address of the remote FTP server, either as a URL or IP address. |
| Port | The port number used to connect to the FTP server |
| Directory on host | The name of the directory, on the host, from within which you want to remove a directory. |
| Login username | User name needed to connect to the host. |
| Login password | Password needed to connect to the host. |
| Use passive mode | Use the passive mode FTP connection, if connection problems occur, e.g. routers or firewalls may be set up to avoid active connections. |
| Target directory | The name of the directory that you want to remove on the server. |
| Account | The FTP account name of the user allowed access to the files on the remote server. |

### system/ftp/store

Parameters:

| | |
|---|---|
| FTP server | Address of the remote FTP server, either as a URL or IP address. |
| Port | The port number used to connect to the FTP server |
| Directory on host | The name of the directory, on the host, where you want to store the file. |
| Login username | User name needed to connect to the host. |
| Login password | Password needed to connect to the host. |
| Use passive mode | Use the passive mode FTP connection, if connection problems occur, e.g. routers or firewalls may be set up to avoid active connections. |
| Source file | Name of the file that you want to store. |
| Target file | Name of the file to be stored at the target location. Use a different name if you want to rename the copied file. |
| Working directory | Directory where you want to store the transferred file. Note that this must be a path on the server machine (that runs FlowForce), not on your local machine. |
| Account | The FTP account name of the user allowed access to the files on the remote server. |

### 4.5.3 mail - Sending E-mail

Sends a mail from FlowForce Server to the specified recipients, generally the administrator.

Note: The mail server settings are global and can be defined in Administration - Settings.

**system/mail/send -** send a mail
Parameters:

| | |
|---|---|
| From | Email address from which the mail is to be sent. |
| To | Recipients email address. |
| Subject | Subject line of the message. |
| Message body | Body text of the message. |
| Attachment | File name of the attachment sent with the email. |

### 4.5.4 maintenance - archive and cleanup

Allows you to perform maintenance functions on the server.

#### /system/maintenance/archive-log

Parameters

| | |
|---|---|
| Older than, days | Archives files older than the number of days entered here. Default=30 |
| Archive directory | Archive directory name, e.g. C:\Temp. Mandatory. |
| Archive file prefix | Prefix of the archive file. Default is "flowforcelog". |
| Delete archived records | Deletes the archived records from the FlowForce database. |
| Working directory | Enter a working directory, e.g. C:\Temp. If this is empty, a temporary directory is used. |

Moves the older log records to an archive file on the server. Returns the name of the archive file that was created.

#### /system/maintenance/cleanup-files

Deletes those files that are not in use, or referenced, by any deployed mappings on the server. No parameters.

#### /system/maintenance/truncate-log

Parameters

| | |
|---|---|
| Older than, days | truncates/deletes records older than the number of days entered here. Default=30 |

Deletes log records older than the date supplied. Returns the number of records that were deleted.

### 4.5.5 shell - Command line execution

Allows you to execute a shell command line.

Note:

The **working directory** is used to resolve relative paths that occur during the execution of any type of step. When a relative path is encountered, it is resolved with respect to the path of the current working directory.

If no working directory is specified, a temporary directory will be used.

**/system/shell/commandline** - execute any command line
Parameters:

| | |
|---|---|
| Command | Enter any command line command to execute, e.g. batch files or other executables. |
| Working-directory | Enter a working directory, e.g. C:\Temp. If this is empty, a temporary directory is used. Note that this must be a path on the server machine (that runs FlowForce), not on your local machine. |

### 4.5.6 compute - Evaluating expressions

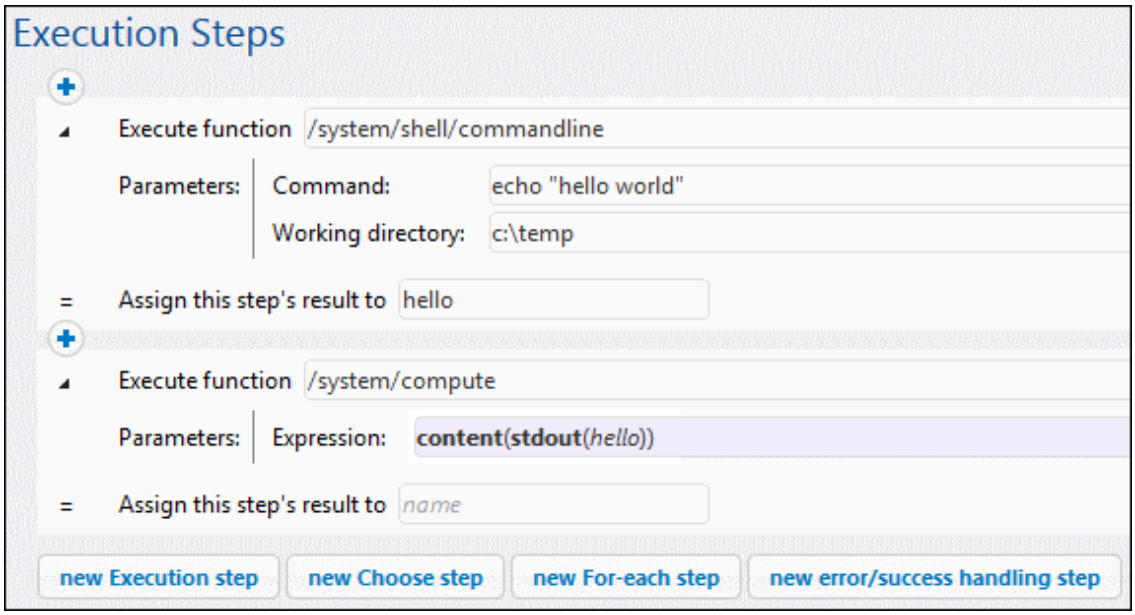
This step function computes the result of an expression and returns the computed value.

**system/compute** - compute an expression
By assigning a step result name to the compute step, the computed value can be used in parameters or expressions of following execution steps.

You can also use this function as the last step to define the output of a job that is used as a service. In the screenshot shown below the result of the first step is assigned to "hello". The compute function then evaluates the expression and outputs its value to the caller.

E.g.

| | |
|---|---|
| Using the execute function | system/shell/commandline |
| Command | echo "hello world" |
| Assign step's result to | hello |
| Execute function | system/compute |
| expression | content(stdout(hello)) |




**system/compute-string** - output an expression result as a string
This step function does essentially the same at the compute function, with the main difference being that the input format is a string template instead of an expression.

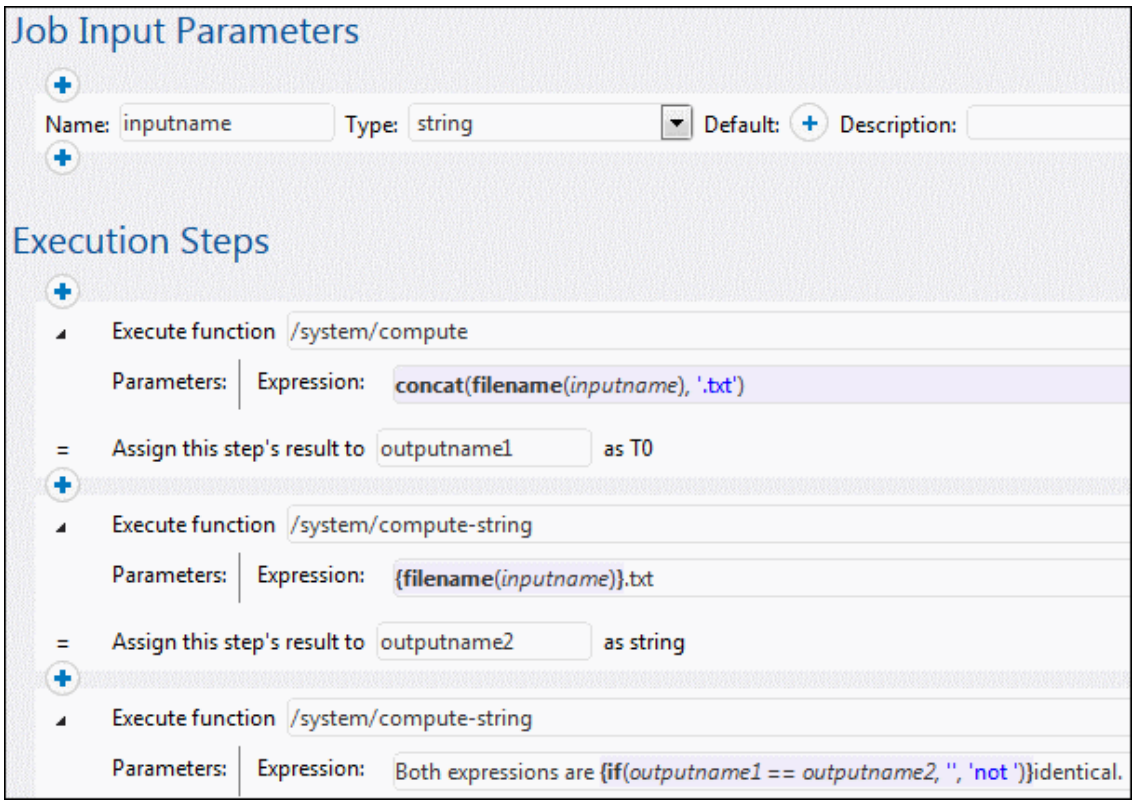
Example, the job shown in the screenshot below, evaluates the expression "Both expressions are identical".

/system/**compute-string** {filename(inputname)}.txt
compute-string is easier to use when several placeholders are needed and a string is to be

computed.

For all other cases use "compute", e.g. system/compute concat(filename(inputname),".txt")




The *inputname* parameter is supplied by the "Job Input Parameters" group.

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