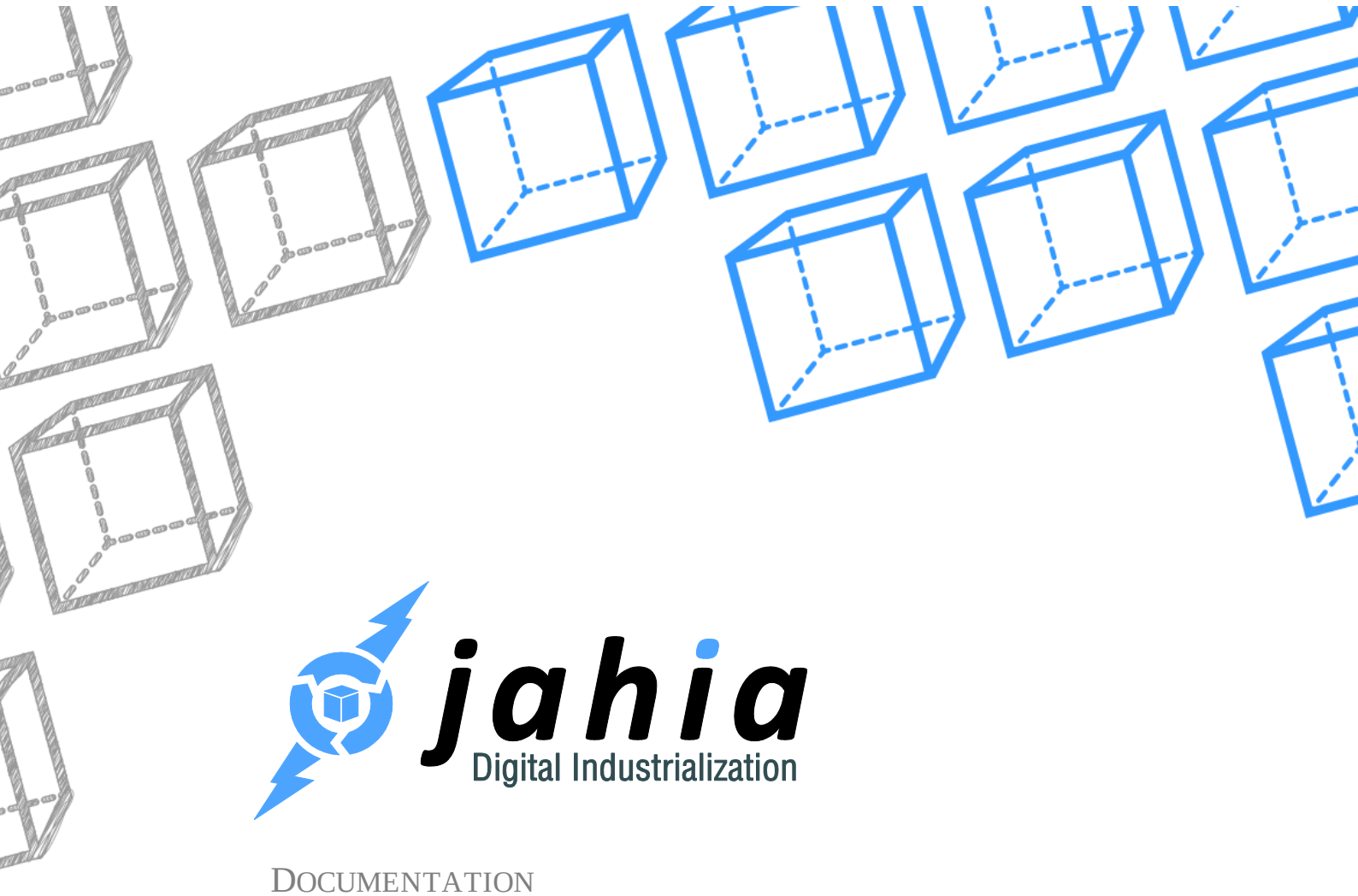


jahia
Digital Industrialization

DOCUMENTATION

Configuration and fine tuning Guide - Digital Factory 7.0

Rooted in Open Source CMS, Jahia's Digital Industrialization paradigm is about streamlining Enterprise digital projects across channels to truly control time-to-market and TCO, project after project.

Jahia Solutions Group SA

9 route des Jeunes,
CH-1227 Les acacias
Geneva, Switzerland

http://www.jahia.com

Summary

1 Overview

1.1 Introduction

Rooted in Open Source CMS, Jahia's Digital Industrialization paradigm is about streamlining Enterprise digital projects across channels to truly control time-to-market and TCO, project after project.

Putting an end to "the Tunnel effect", the Jahia Studio enables IT and marketing teams to collaboratively and iteratively build cutting-edge online business solutions.

These, in turn, are securely and easily deployed as modules and apps, reusable across any digital projects, thanks to the Jahia Private App Store Software. Each solution provided by Jahia stems from this overarching vision: Digital Factory, Workspace Factory, Portal Factory and eCommerce Factory.

Founded in 2002 and headquartered in Geneva, Switzerland, Jahia Solutions Group has its North American headquarters in Washington DC, with offices in Chicago, Toronto and throughout Europe. Jahia counts hundreds of global brands and governmental organizations among its loyal customers, in more than 20 countries across the globe.

For more information, please visit http://www.jahia.com

1.2 What's in this documentation?

This document is intended to give an overview of the various aspects of advanced installation, configuration and the fine-tuning of Digital Factory v7.0 - Enterprise Distribution.

It is intended for system administrators and advanced users.

This guide is structured in the following way:

Chapter 2: Prerequisites and system requirements

Chapter 3: Installation of Digital Factory on various platforms

Chapter 4: Configuring main Digital Factory features

Chapter 5: Fine tuning your Digital Factory server

Chapter 6: Monitoring your server for performance

Chapter 7: FAQ

Should you have questions, please do not hesitate to contact us as mentioned on our website (http://www.jahia.com).

2 Prerequisites

2.1 Minimal system requirements

Please find below the minimum system requirements in order to properly run Digital Factory v7.0 - Enterprise Distribution.

OS:

- Windows
- Linux
- Solaris
- Mac OSX

Suggested Min. Development Configuration:

- Dual Core 2GHz or +
- 2 GB RAM
- 5 GB HDD

Suggested Min. Production Environments:

- Quad Core (64 bit CPU and OS)
- 4 GB RAM
- 100 GB HDD

Warning: 32 bit JVM are limited in max memory (1.5 GB under Windows - 2 or 3 GB under Linux/Solaris). Digital Factory v7.0 tries to cache a maximum of data in order to boost performance. So we highly recommend 64 bit environments with enough memory available at least for all production environments.

2.2 Java Virtual Machine (JVM)

In order to run Digital Factory, you first need to install a Java SE (Java Platform, Standard Edition) 7 on your system. Digital Factory requires the JDK (Java Development Kit) package to run. The JRE (Java Runtime Environment) only won't be sufficient.

To check if Java is already installed on your system, type the following command line at the prompt of your system:

```
java -version
```

You should get a message indicating which Java version is installed on your system. Please note that the same message will be displayed if you only have a JRE installed. If an error is returned, you probably don't have a Java Platform installed.

If you have installed other versions of the Java Platform, Java Runtime Environment or other Java servers on your system, we recommend that you run a few checks before starting the installation in order to be sure that Digital Factory will run without problems.

If you need to obtain and install a new Java SE, you can find both Linux and Windows versions on the Oracle Web site: http://www.oracle.com/technetwork/java/javase/downloads/index.html.

To install a Java Virtual Machine on a Windows system, you need to have administrator rights on your computer. Please contact your system administrator if you don't have sufficient permissions.

It is recommended that the installation path of the Java Platform does not contain any spaces (not like in the default C:\Program Files\Java\jdk1.7.0_xx, where "xx" is the release number – so please change it to a path without spaces, like C:\Java\jdk1.7.0_xx).

After the installation, you have to set the `JAVA_HOME` environment variable to the directory where you have installed the Java SE. Note that at run time Digital Factory will check that this variable is correctly set, and will stop if it is not the case.

To setup this variable, follow the steps, described in next sections.

2.2.1 Under Windows

i) Open the Control Panel, and the System option. In Windows 7 and Vista it is: Control Panel → System and Security → System → Advanced System Settings. Then, depending on your system:

- Select the Advanced tab and click on the Environment Variables button (Windows 7/Vista/XP/2000)
- Select the Properties tab and click on the Environment button (Windows NT)

ii) Click on New in the "System variables" section to add a new environment variable. Enter the following information:

- Variable name: `JAVA_HOME`
- Variable value: `c:\Java\jdk1.7.0_xx` (replace this value with the correct path)

Click on OK to validate your entry. The Java Virtual Machine should now be correctly set-up. Please note that on Windows NT you will need to restart your computer to apply the changes.

2.2.2 Under Linux

Set the `JAVA_HOME` variable to the root directory of your JDK installation. Both examples below suppose you have installed the JDK version 1.7 in your /usr/java directory. The classpath is usually set by typing:

In bash or ksh:

```
export JAVA_HOME=usr/java/jdk1.7.0_xx
```

In csh or tcsh:

```
export JAVA_HOME usr/java/jdk1.7.0_xx
```

2.2.3 Under Solaris

Set the `JAVA_HOME` variable to the root directory of your JDK installation. Both examples below suppose you have installed the JDK version 1.7 in your /usr/java directory. The classpath is usually set by typing:

In ksh:

```
export JAVA_HOME=/usr/java
```

In sh:

```
JAVA_HOME=/usr/java;export
```

In csh or tcsh:

```
setenv JAVA_HOME /usr/java
```

2.3 Database

Digital Factory v7.0 Enterprise Distribution is by default distributed with the Sun Java DB / Apache Derby database engine. If you wish to get started rapidly or for rapid prototyping purposes, you can use the provided database as is.

But in production, and also for developing a serious project, you should use a standalone database instead. This section addresses only the mandatory configurations. Please refer to the “Fine tuning” section, before going live.

Your database should be UTF-8 compliant! Have this in mind when creating a new database for Digital Factory.

Default settings are currently already predefined to allow Digital Factory to run on Sun Java DB / Apache Derby, PostgreSQL, MySQL and the Enterprise Distribution also supports Microsoft SQL

Server and Oracle. During the Digital Factory installation you will have to provide the URL to the database you have created for Digital Factory. These connection strings are different for each database.

Digital Factory may have also detected bugs in certain DB versions, which would cause errors in Digital Factory, so we integrated validations during installation, which will not allow installing Digital Factory with these database versions.

2.3.1 MySQL

The default database URL (the connection string) for MySQL is:

```
jdbc:mysql://localhost/jahia?useUnicode=true&characterEncoding=UTF-8&useServerPrepStmts=false
```

where `localhost` should be replaced by the fully qualified domain name (e.g. mysql.mydomain.com) or IP address of the MySQL server if it is not located on the same machine as the Digital Factory server, and `jahia` is just the default name of the database where Digital Factory tables will be created.

If your MySQL server is not running on the standard port (3306), you should add "`:port`" after the domain name where `port` is the port number.

Digital Factory is using InnoDB engine for its database engine on MySQL, so be sure that you have configured your MySQL for InnoDB. Here are some default configuration options for your database to be put in your `my.cnf` or `my.ini` file:

```
#
# * InnoDB
#
# InnoDB is enabled by default with a 10MB datafile in /var/lib/mysql/.
# Read the manual for more InnoDB related options. There are many!
#

# You can write your other MySQL server options here
```

```
# ...
# Data files must be able to hold your data and indexes.
# Make sure that you have enough free disk space.
innodb_data_file_path = ibdata1:100M:autoextend
#
# Set buffer pool size to 50-80% of your computer's memory
innodb_buffer_pool_size=1024M
innodb_additional_mem_pool_size=256M
#
# Set the log file size to about 25% of the buffer pool size
innodb_log_file_size=256M
innodb log buffer size=64M
#
innodb_flush_log_at_trx_commit=1
```

`max_allowed_packet` has to be at least set to 100M, otherwise Digital Factory will prohibit installation. In case you have chosen to store the files in the database, it should be at least the same size as the biggest file that will be uploaded on your server. Said differently, your users won't be able to upload any file bigger than the size you specify here. You should also configure `jahiaFileUploadMaxSize` in `WEB-INF/etc/config/jahia.properties` accordingly. The Digital Factory limitation should not be bigger than the database limitation, otherwise the Digital Factory UIs will allow files to be uploaded that the database will not be able to store.

```
max_allowed_packet      = 1024M
```

2.3.1.1 MySQL on Mac OS X

Please note that for MySQL versions from 5.5.9 to 5.5.12 on MacOSX, you must set the value of `lower_case_table_names` to 1 (http://bugs.mysql.com/bug.php?id=60309).

2.3.2 PostgreSQL

The default database URL (the connection string) for PostgreSQL 9.x is:

```
jdbc:postgresql://localhost:5432/jahia
```

where `jahia` is the default name of the database where Digital Factory tables will be created. If your PostgreSQL server is located on a distant computer and/or on a non-default port (5432), please, adjust the connection URL accordingly.

Make sure your PostgreSQL server is accepting TCP connections. Please refer to your database documentation for detailed instructions on how to configure PostgreSQL to accept TCP connections.

Please know that an issue has recently been identified on the Digital Factory / Digital Experience Manager line of products when using PostgreSQL database. The issue comes up when using the maintenance and cleanup command "vacuumlo" on the database side. This action is supposed to free some space inside the database by removing unreferenced objects inside large objects fields table "pg_largeobject".

Because of the way the database creation schema is designed, it may - in some cases - incorrectly identify some large objects inside the table "pg_largeobject" as unreferenced, whereas these objects are actually in use. By running the "vacuumlo" command, PostgreSQL may delete from the database these large objects if they are identified as not referenced anymore from any of the other tables, even though they actually are in use. This can have an unexpected effect on the internal functioning of Jahia / Digital Factory / Digital Experience Manager.

We are working on identifying the best course of action to address this behavior; in the meantime, we STRONGLY recommend that you do NOT run a "vacuumlo" command on the PostgreSQL database schema of your Digital Experience Manager instance.

2.3.3 Oracle

Digital Factory v7.0 Enterprise Distribution also comes with JDBC drivers for Oracle. These drivers work with Oracle 11g and above.

The default database URL (the connection string) for Oracle is:

```
jdbc:oracle:thin:@localhost:1521:jahia
```

where `localhost` should be replaced by the fully qualified domain name (e.g. oracle.mydomain.com) or the IP address of the Oracle Server if it is not located on the same machine as the Digital Factory server, and `jahia` is the default name of the database where Digital Factory tables will be created.

1521 is the standard port for Oracle. If you Oracle server is running on a different port, please change it here.

2.3.4 Microsoft SQL Server

Enterprise Distribution is provided with JDBC drivers for Microsoft SQL Server.

The default database URL (the connection string) for Microsoft SQL Server is:

```
jdbc:sqlserver://localhost;databaseName=jahia
```

where `localhost` should be replaced by the fully qualified domain name (e.g. sqlserver.mydomain.com) or the IP address of the Microsoft SQL Server if it is not located on the same machine as the Digital Factory server, and `jahia` is the default name of the database where Digital Factory tables will be created.

If your Microsoft SQL Server is not running on the standard port (1433), you should add "`:port`" after the domain name, where `port` is the port number, i.e.:

```
jdbc:sqlserver://localhost:port;databaseName=Jahia
```

2.4 Other preparations and checks

Check that you have no `TOMCAT_HOME` and no `CATALINA_HOME` environment variable set.

3 Installation

Digital Factory's official and nightly builds are distributed as installation packages, which contain the entire software suite (Digital Factory, Jahia Core Content Platform, Studio) as well as the ACME-Space demo, several template sets and dozens of composite modules.

3.1 Main installation steps

- Download the latest stable Digital Factory 7.0 build from http://www.jahia.com by choosing the right downloadable package for your operating system
- Double-click on the downloaded installation package, which will start the installation wizard.
- On Unix servers with graphical environment, you can start the installation wizard running `java -jar <your-downloaded-digital-factory-jar>`
- On Unix servers where you have no graphical environment, you can start the installation also in the Console Mode: `java -jar <your-downloaded-digital-factory-jar> -console`
- In case you would require running the wizard in Console Mode on Windows, you will need to open your command prompt with administrator privileges.
- Follow the installation wizard. See next sections for a detailed description of the settings.
- At the end, you can let the wizard launch Digital Factory (if the bundled Apache Tomcat server was selected as an option). Otherwise, you can launch Digital Factory using the generated shortcut or within the created installation folder using a console window launch the command "`./startDigitalFactory.sh`" (on Linux/MacOSX) or "`startDigitalFactory.bat`" (on Windows).
- **Important:** the first start of your Digital Factory may take up to 3 minutes, depending on your hardware (initial templates publication and modules deployment). The next starts will be much faster.

3.2 Settings during installation

3.2.1 Installation path

There shouldn't be any spaces in your folder naming. For example C:\DigitalFactory-7.0\ is OK while C:\Digital Factory 7.0\ is not.

3.2.2 Installation type – Discovery install

This option allows to discover Digital Factory without specific configuration thanks to the installation of an Apache Tomcat 7 server & Sun Java DB / Apache Derby DBMS bundle. This installation also provides and deploys all interesting and available modules, applications and templates.

3.2.2.1 Default application server

The default Digital Factory v7.0 is distributed with an Apache Tomcat 7.0.52 application server.

No manual configuration of the server is required, as it will be directly setup during the Digital Factory installation. By default Tomcat will use standard ports (8080, 8009 and 8005). Please ensure that you do not have any other servers/services running and using those ports. Optionally, you can change Tomcat ports during the "Custom install" installation type (see "3.2.3 Installation type – Custom install").

3.2.2.2 Default database

Digital Factory v7.0 is installed with the embedded Sun Java DB / Apache Derby database engine with the "Discovery install" option. If you wish to get started rapidly, you can use the provided database as is. With the "Custom Install" option you can choose to install Digital Factory to another more robust standalone database during the configuration wizard of Digital Factory.

Please note that you cannot simply switch the database at a later stage on the same installation. You will have to export the content and import it into a new Digital Factory installation configured with the different database.

3.2.3 Installation type – Custom install

If you want to install Digital Factory on a custom environment (application server, database, mail server configuration, different port numbers), choose particular operating mode (development, production, distant publication server), configure clustering or LDAP providers, you need to choose the "Custom Install" option.

3.2.3.1 Application server

Digital Factory v7.0 Enterprise Distribution can be installed with an Apache Tomcat 7.0.52 application server. If you want to install into your own server, you need to deselect the "Apache Tomcat" checkbox on Step 5 of the installation wizard and click Next. On the next page you will be able to choose whether the installation is targeted into one of these application servers:

- Apache Tomcat 7.0.x (in case you want to deploy Digital Factory yourself into an existing Tomcat server other than the one bundled by default)
- Red Hat JBoss AS 7.x / EAP 6.x

The installed Digital Factory will then include some specific configurations, which are needed to make it run smoothly in the targeted application server. See the next chapter "3.7 Application server specific installations" for further information.

3.2.3.2 Database

The embedded Sun Java DB / Apache Derby database engine, which is used with "Discovery install" option is not suited for production. During installation you can choose between:

- Microsoft SQL Server

- MySQL 5.x
- Oracle 11g
- PostgreSQL 9.x
- Sun Java DB / Apache Derby (standalone)

Please note, that you cannot simply switch the database at a later stage on the same installation. You will have to export the content and import it into a new Digital Factory installation configured with the different database.

During installation you will be asked to provide the connection URL (see chapter "2.3 Database" for details) and the user/password for accessing the database.

Furthermore you also will be able to set whether binary data should be stored in the database or directly on a file system (for clustered Digital Factory setup the file system need to be shared by all cluster nodes). By default, the binary files are stored on the file system, which in most cases results in a better performance as the file content can be directly streamed from the file system (utilizing low level OS mechanism) and a higher level of concurrency can be achieved. There is also an option present to define if the Digital Factory DB structure (tables, indexes, sequences) has to be created first (this option needs to be unchecked e.g. when running the installation wizard for installing second, third, etc. cluster nodes).

3.2.3.3 Application and server settings

3.2.3.3.1 Apache Tomcat configuration

This section is available only if you have chosen to use the bundled Tomcat application server.

Here you have the possibility to configure the different ports used by Tomcat.

3.2.3.3.2 Web application settings

Here you have the possibility to specify the context path for Digital Factory Web application. If you want to deploy it into the root context ("/"), just leave the field blank.

You also need to specify a login and password that will be required to access the Tools Area: monitoring and debugging tools embedded in Digital Factory.

3.2.3.4 Operating mode

Here you have to choose in which mode you want to install Digital Factory.

- **Development** – enables development mode for Digital Factory including access to Studio.
- **Development + Modules/JahiApps/Demos** – same as "Development" mode. Additionally includes the set of all optional modules, template sets and pre-packaged demo sites.
- **Production** – includes the "core" set of Digital Factory modules. Disables development mode for template deployment. Studio mode access is also disabled.
- **Distant publication server** – Same as "Production". Additionally, content editing activities are limited to the Live content only.

Just take care that even if you can switch later between the modes (you can reconfigure it in `jahia.properties`), some modules will be packaged only when you perform the installation in "Development + Modules/JahiApps/Demos" Mode. Installing in Production Mode, and then switching to Development Mode will activate the development dedicated features (like the Studio), but will not deploy the additional modules. You will have to deploy them using Module Management Panel in Digital Server Administration. Please refer to the "3.8 Modules" section for more information.

3.2.3.4.1 Differences between Development and Production modes

Here we will list the differences in terms of available features and Digital Factory behavior between the Development and Productions modes. From the packaged modules point of view, there are no differences between plain Development (not the second option, which is "Development + Modules/JahiApps/Demos") and Production mode.

	Development mode	Production mode

Studio	Yes	Not accessible
Cache	Display extra information directly in the rendered page by passing request parameter "`cacheinfo=true`" in the page URL	n/a
Rendering	Display extra view/area rendering information by passing request parameter "`moduleinfo=true`" in the page URL	n/a
Error handling	Exception stacktraces are rendered in the error page. Additional (more verbose) error reporting using ErrorFileDumper in the rendering of views.	n/a
Rules	Watch for changes in rule files under `<digital-factory-web-app-dir>/WEB-INF/etc/repository/rules` and automatically rebuild the rule base	n/a
Job scheduling (from Spring)	If a background job is scheduled from a Spring definition file, the job is recreated (all the job data is deleted) and rescheduled on each Digital Factory restart.	Spring-based configured jobs are never deleted. If the change is detected in the trigger configuration the job is re-scheduled on Digital Factory startup.
URL rewriting rules	Scanned for changes each 5 seconds. The rule base is reloaded if changes are detected.	No implicit scanning for changes.
Groovy patcher	Scans for new patches each 5 seconds and executes them.	Scan interval is configurable at is set to 5 minutes by default.

		Scanning can be disabled completely.

3.2.3.4.2 LDAP configuration

In case you will use LDAP directory as a provider for application users or/and groups, you can choose to configure LDAP provider settings during installation. If you check this option, you will then access an additional screen, where you can setup your configuration for user and group providers.

If you do not configure them during the installation process, you will still be able to do it later from the configuration files. Please refer to the "4.4 LDAP " section for more information.

3.2.3.4.3 Cluster configuration

You can also configure Digital Factory to be run in cluster mode. If you check this option, you will then access an additional screen where you can setup your cluster configuration.

Here, you will have to specify if the node you are installing is the processing server. Remember that only one node of this type is allowed in the same cluster. Please refer to the "4.3 Clustering" section for more information.

You will also have to specify a unique server identifier (or leave the `<auto>` value for it to be auto-generated) and declare the IP and listening port.

3.2.3.5 System administrator settings

You need to at least provide the password for the root user, who, like a super-user, always has all of the privileges in Digital Factory. So you should choose a strong password and keep it secret.

3.2.3.6 Mail server

Mail server: this field contains the SMTP host name, with advanced options.

Digital Factory uses the Apache Camel framework for messaging, and the format of the mail endpoint should conform to the one, required by the Camel Mail Component (http://camel.apache.org/mail.html), i.e.:

```
[smtp|smtps]://[username@]host[:port][?options]
```

All parts except the `host` are optional. See use cases below.

Mail administrator: the field contains a single e-mail address or multiple addresses (separated by a comma) of users who will receive system-level notifications (e.g. about errors, if this option is enabled).

Mail from: the default sender e-mail address for an e-mail message.

Here are several use cases for "Mail server" field values:

1. SMTP server does not require authentication and uses the standard port 25:

```
smtp.acme.com
```

2. SMTP server requires authentication and uses non-standard port 11019:

```
smtp.acme.com:11019?username=myuser&password=secretpassword
```

3. GMail example: SMTP server requires authentication and SSL enabled (or TLS):

```
smtps://smtp.gmail.com?username=acme@gmail.com&password=mypassword
```

or

```
smtp.gmail.com:587?username=acme@gmail.com&password=mypassword&mail.smtp.starttls.enable=true
```

4. Enable the mail server debugging option to see the details of e-mail server communication:

```
smtp.acme.com?mail.debug=true
```

3.2.3.7 Configuration externalization

The last step in the Digital Factory Installer provides an optional possibility to externalize the configuration. What this means is that it is possible to avoid storing Digital Factory's properties and custom settings inside the deployed web application. This may be useful for many reasons, such as proper separation of the configuration and software, JEE non-exploded deployment, ease cluster deployments, etc.

By default the configuration externalization is not activated, which means that Digital Factory will store the configuration in the `WEB-INF/etc/config` directory, in the `jahia.properties` file.

3.3 Folder structure after installation with bundled Tomcat

Here is a brief overview of the folders structure in Digital Factory along with the important files that will be used throughout this guide. The files and folders in the Web application (here under `webapps/ROOT`) should be the same as what is on the other application servers.

```
tomcat
|-- bin
|   |-- catalina.bat
|   |-- catalina.sh
|   |-- shutdown.bat
|   |-- shutdown.sh
|   |-- startup.bat
|   `-- startup.sh
|-- conf
|   |-- server.xml
|   `-- web.xml
|-- lib
|-- logs
|   |-- jahia-errors
|   |-- jahia-threads
|   |-- jahia.log
|   |-- jahia access.log
|   `-- jahia_profiler.log
```

```
|-- temp
|   |-- jahia-caches
|   `-- jahia-jsps
|-- webapps
|   |-- ROOT
|   |   |-- css
|   |   |-- engines
|   |   |-- errors
|   |   |-- gwt
|   |   |-- icons
|   |   |-- iphone
|   |   |-- javascript
|   |   |-- META-INF
|   |   |   `-- context.xml
|   |   |-- tools
|   |   |-- WEB-INF
|   |   |   |-- classes
|   |   |   |-- etc
|   |   |   |   |-- config
|   |   |   |   |   |-- jahia.properties
|   |   |   |   |   |-- jahia.advanced.properties
|   |   |   |   |   |-- log4j.xml
|   |   |   |   |   `-- urlrewrite.xml
|   |   |   |   |-- repository
|   |   |   |   |   |-- export
|   |   |   |   |   |-- jackrabbit
|   |   |   |   |   |   `-- repository.xml
|   |   |   |   |   |-- nodetypes
|   |   |   |   |   |-- rules
|   |   |   |   |   |-- root.xml
|   |   |   |   |   |-- root-mail-server.xml
|   |   |   |   |   |-- root-permissions.xml
|   |   |   |   |   |-- root-roles.xml
|   |   |   |   |   |-- root-user.xml
|   |   |   |   |   |-- site.xml
|   |   |   |   |   |-- template-root-mail-server.xml
|   |   |   |   |   |-- template-root-user.xml
|   |   |   |   |   |-- user.xml
|   |   |   |   `-- spring
|   |   |   |-- lib
|   |   |   |-- notifications
|   |   |   |-- var
|   |   |   |   |-- db
|   |   |   |   |   `-- sql
|   |   |   |   |       `-- schema
|   |   |   |   |-- dbdata
|   |   |   |   |-- modules
```

```
|   |   |   |   |-- prepackagedSites
|   |   |   |   |-- repository
|   |   |   |   |   |-- datastore
|   |   |   |   |   |-- workspaces
|   |   |   |   |   `-- indexing_configuration.xml
|   |   |   |   |   `-- indexing_configuration_version.xml
|   |   |   |   |-- scripts
|   |   |   |   |   `-- groovy
|   |   |   |   `-- shared_modules
|   |   |   `-- web.xml
`-- work
```

Here is a brief overview of the important folders:

bin/: Contains Tomcat startup and shutdown scripts.

confg/: Tomcat configuration files.

logs/: Tomcat and Digital Factory log files.

logs/jahia-erros: Folder where Digital Factory error dumper service writes error reports into.

logs/jahia-threads: Folder where Digital Factory thread dumper service writes thread dump files into.

temp/jahia-jsps: This directory will contain complied JSPs of the Digital Factory modules. It will include both compiled class and Java file for each JSP. This can prove helpful in case you have an error in a template showing in the Tomcat logs, for instance: sitemap_jsp.java:984: illegal start of expression. If you want to make sure that all JSP files of the templates are recompiled after a change, you may want to delete the `jahia-jsps` directory and also the `Standalone` directory in `work`. Next time you access a page, Tomcat will recompile all JSP files used by the page.

webapps/ROOT/engines: This directory contains all the JSP, images and JavaScript files of Digital Factory engines (Content Manager, Content Picker, Live Content Picker etc.).

webapps/ROOT/META-INF/context.xml: Database connection information. This configuration is applicable only for Apache Tomcat server.

webapps/ROOT/WEB-INF/classes: Besides some configuration files, here you will find mainly resource bundle files used to translate the Digital Factory interface in other languages. There are normally at least 2 files for each language: `JahiaInternalResources.properties` and `JahiaTypesResources.properties`.

webapps/ROOT/WEB-INF/etc: The etc directory contains most of the configuration files of Jahia. The config sub-directory contains the main configuration file(s), jahia.properties, in EE there is also thejahia.advanced.properties and the error logging log4j.xml. These are the main configuration files you will need to modify in order to adapt Jahia to your environment. Note that if you have used the Configuration Externalization option in the Installer, the configuration files will be located inside a jahia-config.jar at the location you have specified (by default in tomcat/lib).

The repository directory contains the configuration files for Jackrabbit repository.

The spring directory may contain multiple Jahia service configurations, but is empty by default. The files have been moved inside Jahia's JARs as normally they shouldn't be modified. It is still possible to override them by placing a copy of a file in this location.

webapps/ROOT/WEB-INF/var/db: The database scripts to create the DB schema of Jahia and to connect to the corresponding database can be found here.

webapps/ROOT/WEB-INF/var/repository: The Jackrabbit repository home, where the workspace configuration, and version storage is located as well as search indexes.

webapps/ROOT/WEB-INF/var/repository/datastore: The Jackrabbit datastore folder where the binary resources will be stored.

webapps/ROOT/WEB-INF/var/repository/index

and **webapps/ROOT/WEB-INF/var/repository/workspaces/*/index**: The search indexes will be stored in these directories.

webapps/ROOT/WEB-INF/var/modules: Modules and template-sets located in that directory will be deployed to the server on startup or whenever a file changes during runtime. Template-sets will be available in the drop-down list when you create a new virtual site, and modules will be seen in the left panel of the Studio or in the Edit mode.

3.4 Discovering Digital Factory - first usage

This applies only if you want to discover Digital Factory 7.0, using the prepackaged demonstration site. It assumes that you have installed Digital Factory using "Discovery install" or selecting "Development + Modules/JahiApps/Demos" Mode, so that the example templates and the modules they require have been automatically deployed.

- Open a browser and go to http://localhost:8080/start.Use the root user credentials set up during the installation process. You will discover the new Digital Factory landing page. Click on the "Create new Web-Projects" button and you're ready to create your first site.
- Import the new "ACME Space Website Demo 7.0" package. After successful import, click on the "Go to Edit Mode" tab to see the Edit Mode for this ACME Space Web site.
- Switch to the Live or Contribute Mode and enjoy!

3.5 Installing a production server – additional steps

This applies when you install your production server, and assumes that you have installed Digital Factory in Production Mode.

Before being able to create your first website, you will have to deploy your custom set of templates and modules. But during the development process, you may have used some Digital Factory standard modules, automatically available on your installation. Notice that most of those modules were available because you installed your development server using the development mode. As

your production server uses the production mode, only the core modules will be available. So, you also need to deploy yourself the standard modules you want to use.

- Prepare all the JAR files for your custom templates and modules, and the one for each standard module you want to use. For the standard modules, you can either download them from the Jahia Private App Store (http://store.jahia.com/), or retrieve them from your development server (they are available in `WEB-INF/var/modules/`). In case you download the modules from the Jahia Private App Store, take care to download the same version of the module as the one you have tested during your validation process.
- In order to deploy additional modules you could use a dedicated screen in the Digital Factory installer, where you are offered to provider a folder to additional modules, which have to be deployed to the Digital Factory instance, you are installing. Alternatively, after the installation you could use Module management screen in Digital Factory Administration or manually copy the required modules to `WEB-INF/var/modules` folder.
- The modules will be automatically deployed
- Now you can either import your site data from an export of your integration/development platform, or create a new empty site.
- Now let your users enter content on their site.

3.6 Different types of environment

During the life-cycle of a project you will need different types of environments:

- Development environment - each of your developers will have their own environment. Those developer environments are normally much lighter than the one needed for production. Your developers can either use the integrated DBMS (Apache Derby) or use another DBMS (MySQL, Microsoft SQL Server, PostgreSQL, Oracle).
- Integration environment - this environment will help you integrate the work of all your developers on the same platform and prepare the site(s) you are going to deploy in production.

- Production environment - this one is the last step in the development life-cycle of your project.

3.7 Application server specific installations

3.7.1 Apache Tomcat 7.0.x

In order to deploy Digital Factory into an existing Apache Tomcat 7.0.x installation a number of required steps has to be completed.

Next subsections describe all those steps, which are all mandatory, except the last one (Digital Factory configuration externalization), which is optional.

3.7.1.1 Installation

The installation procedure for an existing Apache Tomcat 7 is as follows:

- Launch the Installer.
- Choose the *Custom Install (advanced)* installation type.
- Select only *Digital Factory + Jahia Core Content Platform* pack, unselecting the *Add Apache Tomcat* one
- On the next screen choose the *Apache Tomcat 7.0.x* as the target application server
- Follow the next steps of the Installer.

Once the Installer is finished in your installation directory you should find among others the `tomcat` folder.

3.7.1.2 Deployment

Further, it is assumed that your target Apache Tomcat server is installed in the `<tomcat>` folder and `<install-dir>` will reference the folder, where you've installed Digital Factory into using the installer.

1. Copy the content of the `<install-dir>/tomcat/lib` folder into your `<tomcat>/lib` directory.
2. In case ROOT was configured as the Web application context name, please, remove or rename the default Tomcat's ROOT Web application at `<tomcat>/webapps/ROOT`, if it exists, to e.g. `tomcat-root` or similar.
3. Copy the content of the `<install-dir>/tomcat/webapps` folder into your `<tomcat>/webapps` directory.
4. Adjust the `serverHome` variable value in the `<tomcat>/webapps/ROOT/WEB-INF/etc/config/jahia.properties`[1] file to point to your `<tomcat>` folder path.
5. If you chose to externalize the configuration into a JAR file, either copy the `<install-dir>/jahia-config.jar` file into the `<tomcat>/lib` directory, or modify the `catalina.sh/bat` files to add it to the classpath.
6. Adjust the JVM, connector and servlet container options appropriately (see next sections).

3.7.1.3 JVM tuning options

The default JVM options in the Tomcat's startup script (`<tomcat>/bin/catalina.bat` or `<tomcat>/bin/catalina.sh`) should be adjusted to use server JVM ("`-server`" option), have at least 1 GB[2] heap size (`-Xms1024m -Xmx1024m`) and at least 256 MB[2] as a limit for the permanent generation heap size (`-XX:MaxPermSize=256m`), if applicable, also adding other tuning options.

---

[1] The name of the directory (ROOT in this case) corresponds to the configured Web application context name

[2] For production systems the memory options should be adjusted accordingly to achieve high performance and scalability.

This can be done by adding the following line into your `<tomcat>/bin/catalina.bat` file (Windows OS):

```
set CATALINA_OPTS=%CATALINA_OPTS% -server -Dsun.io.useCanonCaches=false
-verbose:gc -XX:+HeapDumpOnOutOfMemoryError -
Djava.net.preferIPv4Stack=true -Xms1024m -Xmx1024m -XX:MaxPermSize=256m
```

or into the `<tomcat>/bin/catalina.sh` file (non-Windows OS):

```
CATALINA_OPTS="$CATALINA_OPTS -server -Djava.awt.headless=true -
verbose:gc -XX:+HeapDumpOnOutOfMemoryError -
Djava.net.preferIPv4Stack=true -Xms1024m -Xmx1024m -XX:MaxPermSize=256m"
```

3.7.1.4 HTTP/AJP connector tuning options

The following configuration for the HTTP and AJP connectors (configured in the `<tomcat>/conf/server.xml` file) is recommended[3], which includes UTF-8 URI encoding, compression of the response content etc.

```
<Connector port="8080" protocol="HTTP/1.1"
           connectionTimeout="20000"
           redirectPort="8443"
           maxThreads="300" acceptCount="100"
           enableLookups="false"
           URIEncoding="UTF-8"
           compression="on"

compressableMimeType="text/plain,text/html,text/xml,text/css,text/javasc
ript,application/x-javascript,application/javascript" />
```

[3] Connector settings, especially maxThreads and acceptCount values, should be adjusted accordingly to achieve high performance and scalability in production run.

```
<Connector port="8009" protocol="AJP/1.3" redirectPort="8443"
enableLookups="false" URIEncoding="UTF-8" maxThreads="300" />
```

3.7.1.5 Session cookie path

The following attribute needs to be set on the `<Context/>` element in the `<tomcat>/conf/context.xml` file for Tomcat:

```
<Context sessionCookiePath="/">
...
</Context>
```

3.7.1.6 JSP Compiler/Servlet tuning options

JSP Servlet parameters, configured in the `<tomcat>/conf/web.xml` file, can be optimized in the following way:

```
<servlet>
    <servlet-name>jsp</servlet-name>
    <servlet-class>org.apache.jasper.servlet.JspServlet</servlet-class>
    <init-param>
        <param-name>fork</param-name>
        <param-value>true</param-value>
    </init-param>
    <init-param>
        <param-name>trimSpaces</param-name>
        <param-value>true</param-value>
    </init-param>
    <init-param>
        <param-name>genStrAsCharArray</param-name>
        <param-value>true</param-value>
    </init-param>
    <init-param>
        <param-name>development</param-name>
        <param-value>true</param-value>
    </init-param>
    <init-param>
        <param-name>checkInterval</param-name>
        <param-value>300</param-value>
    </init-param>
    <init-param>
```

```
        <param-name>xpoweredBy</param-name>
        <param-value>false</param-value>
    </init-param>
    <load-on-startup>3</load-on-startup>
</servlet>
```

In production, you can set the `development` parameter to "`false`" to prevent the compiler from checking for JSP modifications too often and enables background compilation with `checkInterval` seconds.

3.7.1.7 Digital Factory configuration externalization

This section focuses on how to manually build and deploy an externalized configuration in Tomcat, and how to reference it by the deployed Digital Factory application. For more information about the externalized configuration itself, please refer to the "4.11 Configuration files externalization" section. If you have used the Installer's option to create an externalized configuration, you can also skip this section, although it might be interesting to read to see an alternative to the JAR configuration deployment.

1. Create a folder on your server's filesystem for your configuration files (for example `/app/jahia/externalizedConf/`).
2. In this folder, create the following subfolder structure: `org/jahia/config/` (to have `/app/jahia/externalizedConf/org/jahia/config/`).
3. Choose one of the 2 following options:
    a. Add the externalized folder to the Tomcat classpath: in the `<tomcat>/bin/setclasspath.sh` file, add the custom folder to the classpath variable: `CLASSPATH=$CLASSPATH:<My externalized folder>` (`CLASSPATH=$CLASSPATH:/app/jahia/externalizedConf` for example).
    b. Add the externalized folder to the Tomcat common loader: in `<tomcat>/conf/catalina.properties` file, add your externalized configurations path to the `common.loader` property.
4. You can now put your externalized configurations inside the `/app/jahia/externalizedConf/org/jahia/config` folder.

3.7.2 Red Hat JBoss AS 7.x / EAP 6.x

In order to deploy Digital Factory into an existing Red Hat JBoss AS 7.x / EAP 6.x installation a number of required steps has to be completed.

Note, please, here we assume the deployment into a JBoss instance, running in a standalone mode with a default configuration profile.

Next subsections describe all those steps, which are all mandatory, except the last one (Digital Factory configuration externalization), which is optional.

3.7.2.1 Installation

The installation procedure for an existing JBoss server is as follows:

- Launch the Installer.
- Choose the *Custom Install (advanced)* installation type.
- Select only *Digital Factory + Jahia Core Content Platform* pack, unselecting the *Add Apache Tomcat* one
- On the next screen choose the *Red Hat JBoss AS 7.x / EAP 6.x* as the target application server
- Follow the next steps of the Installer.

Once the Installer is finished in your installation directory you should find among others the `jboss` folder.

3.7.2.2 Deployment preparation

Further, it is assumed that your target Red Hat JBoss server is installed in the `<jboss>` folder and `<install-dir>` will reference the folder, where you've installed Digital Factory into using the installer.

1. Copy the content of the `<install-dir>/jboss` folder into your `<jboss>` directory.
2. Adjust the `serverHome` variable value in the `<jboss>/standalone/deployments/jahia.ear/jahia.war/WEB-INF/etc/config/jahia.properties` file to point to your `<jboss>` folder path.
3. If you chose to externalize the configuration into a JAR file, either copy the `<install-dir>/jahia-config.jar` file into the `<jboss>/standalone/deployments` directory, or modify the JBoss startup scripts to add it to the classpath.
4. Continue with the steps, described in the next sections.

3.7.2.3 JVM tuning options

The default JVM options in the JBoss' startup script (`<jboss>/bin/standalone.conf.bat` or `<jboss>/bin/standalone.conf`) should be adjusted to use server JVM ("`-server`" option), have at least 1 GB[4] heap size (`-Xms1G -Xmx1G`) and at least 256 MB[2] as a limit for the permanent generation heap size (`-XX:MaxPermSize=256M`), if applicable, also adding other tuning options.

This can be done by adjusting the corresponding line in your `<jboss>/bin/standalone.conf.bat` file (Windows OS):

```
set "JAVA_OPTS=-server -Xms1G -Xmx1G -XX:MaxPermSize=256M"
```

or in the `<jboss>/bin/standalone.conf` file (non-Windows OS) – here we use larger values as an example:

[4] For production systems the memory options should be adjusted accordingly to achieve high performance and scalability.

```
JAVA_OPTS="-server -Xms2G -Xmx2G -XX:MaxPermSize=384M -
Djava.net.preferIPv4Stack=true"
```

The following lines needs to be added to:

- have temporary data (Digital Factory caches, errors, thread and heap dumps) inside JBoss' directory structure
- in case the embedded Apache Derby DBMS is used, a Derby home must be set properly
- further GC, thread and heap dump options, which we recommend

On Windows OS:

```
set "JAVA_OPTS=%JAVA_OPTS% -Djava.io.tmpdir=%JBOSS_HOME%\standalone\tmp"
set "JAVA_OPTS=%JAVA_OPTS% -
Dderby.system.home=%JBOSS HOME%\standalone\deployments\jahia.ear\jahia.w
ar\WEB-INF\var\dbdata"
set "JAVA OPTS=%JAVA OPTS% -verbose:gc -XX:+HeapDumpOnOutOfMemoryError -
XX:+PrintConcurrentLocks"
```

And for non-Windows OS:

```
JAVA_OPTS="$JAVA_OPTS -Djava.io.tmpdir=$JBOSS_HOME/standalone/tmp"
JAVA_OPTS="$JAVA_OPTS -
Dderby.system.home=$JBOSS_HOME/standalone/deployments/jahia.ear/jahia.wa
r/WEB-INF/var/dbdata"
JAVA_OPTS="$JAVA_OPTS -verbose:gc -XX:+HeapDumpOnOutOfMemoryError -
XX:+PrintConcurrentLocks"
```

3.7.2.4 Server configuration (JBoss should be running)

The next steps have to be performed on a started JBoss server instance.

Please, start your JBoss server instance from `<jboss>/bin` folder by using:

On Windows OS:

```
standalone.bat -b 0.0.0.0
```

On non-Windows OS:

```
./standalone.sh -b 0.0.0.0
```

The `0.0.0.0` value after `-b` switch means that JBoss will be bound to all available network interfaces. You could use particular one instead, e.g. `192.168.1.101`.

When omitted the JBoss will bind to the loopback address (127.0.0.1) only.

After the JBoss instance is started continue with the next steps.

3.7.2.4.1 Create management user

When JBoss is running you could create a server management user (for accessing JBoss Management UI) by using `<jboss>\bin\add-user.bat` (Windows platform) or `<jboss>/bin/add-user.sh` (non-Windows platform). Provide the required information to add the user. Alternatively you could add a user in a non-interactive mode:

On Windows OS:

```
add-user.bat -u manager -p manager_123
```

On non-Windows OS:

```
./add-user.sh -u manager -p manager_123
```

3.7.2.4.2 Apply Digital Factory specific configuration

For configuring JDBC driver, DB datasource and also deactivating default JBoss ROOT application (in case Digital Factory will use ROOT Web application context), the following script has to be executed against running JBoss server instance from `<jboss>/bin` folder:

Windows OS:

```
jboss-cli.bat --file=jahia-config.cli
```

Non-Windows OS:

```
./jboss-cli.sh --file=jahia-config.cli
```

3.7.2.4.3 Deploy and start Digital Factory

The configuration is ready now and we can deploy and start the Digital Factory.

To trigger the deployment, you need:

On Windows OS: create an empty file (deployment marker)

```
<jboss>\standalone\deployments\jahia.ear.dodeploy
```

On non-Windows OS execute:

```
touch <jboss>/standalone/deployments/jahia.ear.dodeploy
```

This fill trigger the deployment and startup of the Digital Factory Web application.

3.8 Modules

3.8.1 Module deployment

Modules are extensions to Digital Factory, which are packaged as JAR files and can be deployed on a server. A module can contain different kinds of resources: JSPs, definitions in CND files, CSS and images, resource bundles, XML or ZIP import files, rules definitions, libraries, Spring files etc.

Modules are deployed by using the built-in module management screen in Server Settings or by dropping them into the `WEB-INF/var/modules` folder.

3.8.2 Cluster deployment

In cluster environments, we must differentiate between cold deployment and hot deployment of modules.

3.8.2.1 Cold deployment

Cold deployment means that modules are being deployed when the cluster is completely shut down. Simply copy the jar file of the module on each cluster node in the *WEB-INF/var/modules* folder. When starting up the cluster, **it is critical that the processing server be started first**, and that it's initialization is completed before starting the other nodes.

3.8.2.2 Hot deployment

For hot deployments of modules (when the cluster is up and running), installation on different cluster nodes should be done in sequence, but **the processing server must be the last one on which the module is deployed**. Modules will be available only when they have been deployed on the processing server. The main difference with previous versions is that, thanks to Osgi, the servers do not need to be restarted anymore even if the module(s) contains classes or libraries.

3.8.3 Deployment on sites

Once the JAR file has been deployed, modules become available. They can then be deployed to Web projects via module management screen in Server Settings or via Studio.

If a new version of the module is uploaded on the server, it will be automatically deployed on all sites that are currently using it. All updates will be immediately available in the site.

4 Configuring some Digital Factory features

4.1 Personalizing URLs

4.1.1 URL Rewriting

Please refer to the URL rewriting section in the Developers TechWiki for more information:

http://www.jahia.com/documentation-and-downloads/developers-techwiki/urls-managment/url-rewritting

4.1.2 Removing jsessionid from URLs

Digital Factory requires that the user's session is correctly handled. Usually, applications use cookies to track the session. If cookies are not available on the client or the client connects for the first time, the application server adds a parameter in all links to handle session tracking. This parameter can create issues when indexing links by search engines. Digital Factory can automatically remove it from all links. This feature can be enabled in the `jahia.properties` file:

```
# Disable the jsessionid parameter added by application server to track
session when no cookie is present
disableJsessionIdParameter = true
```

By default, the session ID parameter removal is enabled, and it won't appear in links. If you need to support browsers which do not handle cookies, you can disable this feature.

4.1.3 Changing context and port number

4.1.3.1 During the installation

Changing the Digital Factory Web application context path (the default one is ROOT) as well as default Apache Tomcat port numbers – in case Tomcat pack is selected – is possible during the installation via Installer UI, by choosing and completing the "Custom install" option at the

beginning. See the “3.2.3.3.1 Apache Tomcat configuration” and “3.2.3.3.2 Web application settings” sections for more details.

4.1.3.2 After the installation

Once you have installed Digital Factory, you will still be able to change those values if required.

To change the port, you just need to configure it at application server level. Please refer to your application server documentation.

If you need to change the context path, you will need to redeploy your Jahia application using this new context path. Refer to your application server documentation if you need some additional information about how to do this.

4.1.4 Permanent move for vanity URLs

In Digital Factory, you can define SEO friendly vanity URLs. There can be more than one URL for the same resource, whereas only one can be set as the default one. With the `permanentMoveForVanityURL` setting in the `jahia.properties` configuration file you can control access with a non-default vanity URL. Digital Factory should inform the client that the resource has permanently moved (HTTP status code 301). This is the default behavior. If you set the parameter to false, then Digital Factory will serve the request without changing the URL to the new default one.

4.2 Caching

4.2.1 Introduction

Caches are essential to high-performing web systems such as Digital Factory in order to be able to avoid recreating dynamic content under large system loads. In the graph above, we can see the basic architecture of the cache sub-system.

The main focus in Digital Factory v7.0 lies on the Module Cache (HTML content output cache) which is using the Ehcache implementation.

Digital Factory uses multiple cache layers to optimize the performance of page delivery:

- the browser cache
- front-end HTML caches (skeleton/module cache)
- object caches
- content repository/database caches

Each of these cache layers plays a different role in making sure values are only computed once.

4.2.2 The browser cache layer

While not integrated in Digital Factory, but in the browser, the browser cache plays a critical role in guaranteeing good performance for the end-user.

For example, Digital Factory's usage of the GWT framework makes it possible for AJAX source code to be aggressively cached in the browser cache; therefore making sure we don't reload script code that has not changed. Digital Factory also properly manages the browser cache to make sure it does not cache page content that has changed. It also controls expiration times for cached content, so that the browser does not request content that is rarely changed.

4.2.3 The front-end HTML cache layer

Historically, Jahia has had many front-end HTML cache layer implementations. The first was the full-page HTML cache. While very efficient when a page was already available in the cache, it did not degrade very well for pages that had a fragment of the HTML that changed from page to page, or from user to user (for example, displaying the user name on the page). Digital Factory v6.5 changed that and it combines the sheer efficiency of the embedded full-page cache with the fragment handling of a page.

This new cache implementation is called the "Module Cache" (previously Container Cache) and integrates fragment caching at a module level, making the interaction with templates very natural. Template developers usually do not have to add any markup in order to have their fragments correctly cached. Even when they need to control the fragment generation, this is much easier to do than in previous versions of Digital Factory.

The HTML code of each module is aggregated on runtime to render the page for the end user. For each module we try to maximize its sharing by building complex keys, taking into account several parameters like roles/templates/etc. That way we can share this rendering with a maximum number of other users that have the same rights.

We also detect cases where more than one parallel request tries to obtain the same fragment, which is not yet cached. In such cases, to not waste resources we let just one request do the work

and make the other request(s) wait for it. If rendering the module takes too long, the waiting request gets cancelled with an exception saying “Module generation takes too long due to module not generated fast enough (>10000 ms)”. As such errors should be taken seriously see chapter “7.4 How to handle module generation timeouts?” for hints how to solve such issues.

4.2.4 Object caches

The next layer below the front-end HTML cache sub-systems are the object caches. This layer handles all Digital Factory objects that represent sites, users, groups, etc. It serves as a layer on top of the content repository/database caches in order to avoid reconstructing objects for each model request. This is all handled internally by Digital Factory and it is only important to interact with these caches if integrators are directly calling Digital Factory’s API to perform object changes that do not automatically update the caches scheduling / batching.

4.2.5 Database caches

The last layer of caches is the database cache layer that makes sure that only minimal interaction with the database happens. Database communication requires object (de-)serialization and network communication so the overhead of a database query can be quite substantial. This layer in Digital Factory is completely handled by the Hibernate ORM layer.

4.2.6 Content repository caches

As we moved all content objects to the Java content repository, the object and database caches are used less than in previous Digital Factory versions. Retrieving content objects from the JCR does not require as many additional caches as before. The content repository optimizes the performance with some internal caches. See section “5.7 Increasing bundleCacheSize” for how to tune the content repository bundle caches for optimized performance.

4.2.7 Ehcache configuration

Expiration and management storage of cache entries is configured in the following resource in case of standalone Digital Factory instance:

```
<digital-factory-web-app-dir>/WEB-INF/classes/ehcache-jahia.xml
```

And in the following resource in case of a clustered Digital Factory instance:

```
<digital-factory-web-app-dir>/WEB-INF/classes/ehcache-jahia-cluster.xml
```

The cache configuration resource can be explicitly specified in `jahia.properties` file as follows:

```
jahia.cache.configuration.resource=classpath:/ehcache-jahia-no-disk.xml
```

In the example above the `ehcache-jahia-no-disk.xml` resource (from classpath, e.g. under `WEB-INF/classes`) is used for cache configuration.

The page http://www.ehcache.org/documentation/user-guide/configuration explains in details how the storage and configuration can be done.

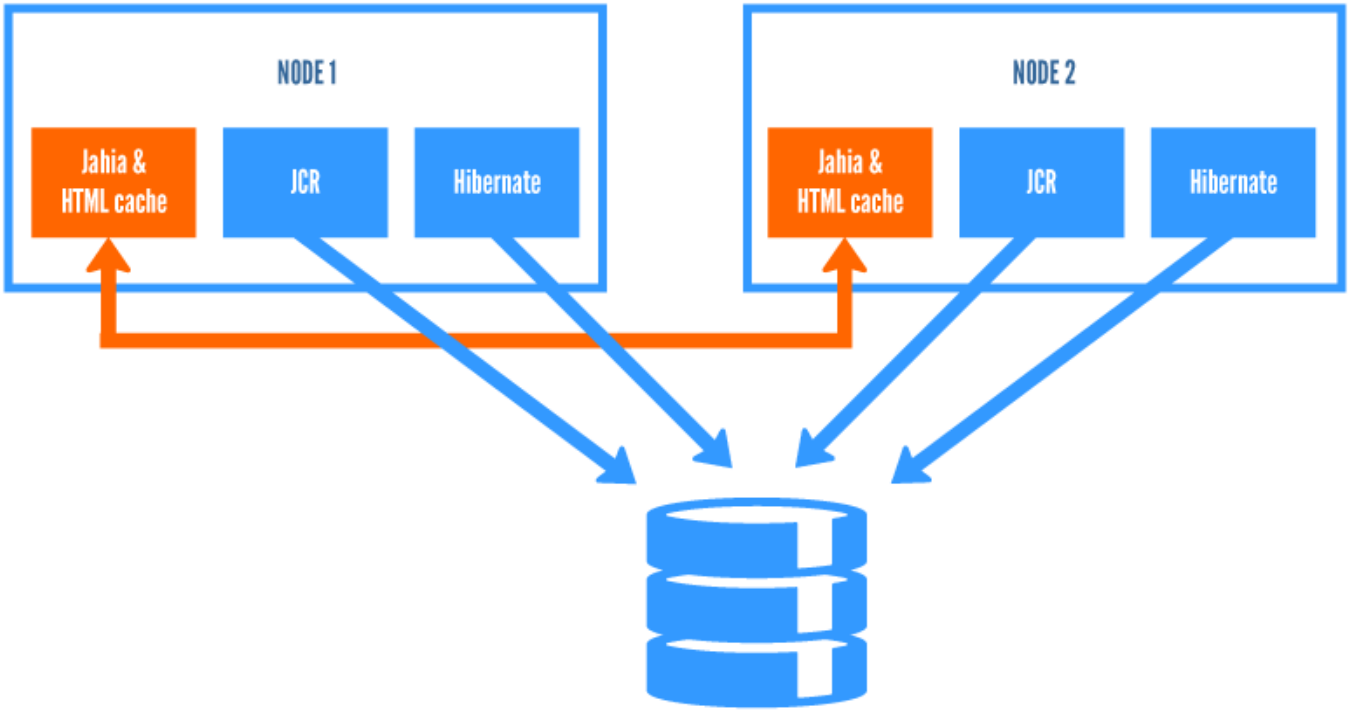
Note, please, if you activate the cluster for Digital Factory instance, by default the cache configuration is read from `ehcache-jahia-cluster.xml` and you need to apply your custom changes to that configuration resource also.

4.3 Clustering

4.3.1 Introduction

Deploying Digital Factory in a cluster is a very powerful way of distributing CPU and memory load to handle larger traffic sites.

A typical Digital Factory cluster installation is illustrated in the graph below.



All Digital Factory nodes, belonging to the same cluster, share the same database schema to have a common data storage.

Digital Factory v7.0 is largely based on Apache Jackrabbit and thus relies on its clustering capabilities and configuration. See http://wiki.apache.org/jackrabbit/Clustering for more details. In Digital Factory uses Jackrabbit's DataStore (see http://wiki.apache.org/jackrabbit/DataStore for more details of how it works). This way it is now possible and recommended to store large files on a shared file-system, while storing everything in the database is still an option.

Indexes in Jackrabbit have to be local to each cluster node and cannot be shared.

For Jackrabbit, every change made by one cluster node is reported in a journal (database table). Cluster nodes read the journal and update their state at a configurable synchronization interval.

Ehcache is another component, which needs communication between nodes. We are using JGroups as a communication channel, by default.

4.3.1.1 BROWSING nodes

"Browsing" nodes are specialized Digital Factory nodes that only serve as content publishing nodes. They also interact with portlets to render pages. Using this node specialization allows to separate the browsing load from authoring and background processing loads.

4.3.1.2 AUTHORING nodes

Digital Factory "authoring" nodes are cluster nodes that can be used to either browse or edit Digital Factory content. This is the most common usage of Digital Factory nodes, and therefore it is interesting to have multiple instances of these nodes in order to distribute the load.

4.3.1.3 PROCESSING node

In Digital Factory, long-running tasks such as workflow validation operations, copy and pasting, content import and indexing are executed as background tasks, which can be resource intensive. This way, while these long operations are executed, other nodes are still able to process content browsing and editing requests.

There can be only one processing node in Digital Factory cluster.

4.3.2 Configuration

It is essential that when binary data is stored on a file system (the default and preferred option), all cluster nodes should point to the same shared directory to store binary data in a common file data store. During installation of a cluster node you will be asked to enter the "Path to Data Store files" (on the step for configuring database: see section "3.2.3.2 Database").

To install your Digital Factory cluster, you will have to install your cluster nodes one after the other.

- For the first one, proceed as if you were installing a standalone Digital Factory, excepted that you need to specify that you are installing a cluster at the "Operating mode" step. If you

have chosen to use the bundled Tomcat as application server, do not start it at the end of the wizard.

- For the other nodes, execute the wizard again, connecting to same database. This time just specify that the schema does not have to be created (uncheck “Create required database tables” checkbox). On the screen where you configure your cluster, take care to define a new server ID or keep <auto> for an auto-generated value. If you have already set a node to be the processing server, uncheck the option as only one node can have this role in your cluster.

The cluster configuration is by default located in the `WEB-INF/etc/config/jahia.advanced.properties` file under:

```
#########################################################################
### Cluster settings  ###################################################
#########################################################################
```

Even if the configuration is generated in this embedded default file, we recommend that you externalize it. Refer to the “4.11 Configuration files externalization” section for how to do it. It will ease the maintenance operations, and also allow you to deploy a generic EAR if you are using an application server with a deployment cluster feature. If you use this configuration externalization feature, you can also skip the cluster configuration step in the configuration wizard from the second node. In this case, after having extracted your specific configurations from the first node, just adapt and apply it on the other nodes.

Note, please, that with the Digital Factory v7.0 there is no longer needed to configure a fixed list of IP addresses of all cluster nodes. We switched to a DB-based member discovery mechanism (all Digital Factory cluster nodes share the same DB schema) to make the configuration much simpler.

4.3.3 Sharing webapps

Web applications need to support clustering on their own to be able to fully work in a clustered Digital Factory environment.

You have to deploy the webapp on each node of the Digital Factory cluster. If this webapp stores some data, you will have to ensure that each instance of your webapp shares the same data, and do not duplicate it, otherwise you may encounter some functional issues. Refer to your webapp documentation to perform this.

4.3.4 Sticky sessions

If you are using a hardware or software load balancer in front of Digital Factory to handle the distribution of load among all Digital Factory nodes in the cluster, you will need to activate "sticky sessions" on your application server and the load balancer. This is required to force an open session to make all requests on the same server for the time of the session.

On Tomcat, this is done by adding a unique `jvmRoute` attribute in the `server.xml` file:

```
<Engine name="Catalina" defaultHost="localhost" jvmRoute="jvm1">
```

where `jvm1` is the name of the worker as declared in the load-balancer.

The `jvmRoute` attribute value can be specified during the installation of Digital Factory instance on the screen with cluster configuration settings.

You can also see the reference guide for the configuration of the load balancer on the Apache web site: http://tomcat.apache.org/connectors-doc/reference/workers.html.

4.3.5 Starting up

The first time the cluster is started, the processing server must be started first and standalone. Once the initialization process is completely finished, you can start the other cluster nodes.

4.4 LDAP

LDAP is an application protocol for querying and modifying directory services running over TCP/IP. Digital Factory has default connectors to retrieve users/groups from an LDAP server.

Digital Factory supports most LDAP servers right out of the box, including OpenLDAP and ActiveDirectory. It is most commonly used with SSO technologies to provide a seamless experience to end-users.

The LDAP configuration is deployed as an OSGi configuration, bound to the “Jahia LDAP connection (ldap)” module bundle, available in the Digital Factory 7.0 Enterprise Distribution.

The LDAP user and group providers can be configured during the Installation Wizard by activating “Configure an LDAP user/group provider” option and providing your LDAP server specific parameters.

Please visit the following documentation for more details: http://www.jahia.com/documentation-and-downloads/developers-techwiki/users-and-groups/ldap-connector#70

4.5 Authentication

4.5.1 Single Sign-On: CAS

The Central Authentication Service (CAS) is a single sign-on protocol for the web. Its purpose is to permit a user to access multiple applications while providing their credentials (such as user id and password) only once.

When the client visits Digital Factory and wants to authenticate, Digital Factory redirects the user to the CAS server. CAS validates the client's authenticity, usually by checking a username and password against a database (such as LDAP or Active Directory).

If the authentication succeeds, CAS returns the client to Digital Factory, passing along a security ticket. Digital Factory then validates the ticket by contacting CAS over a secure connection and providing its own service identifier and the ticket. CAS then gives the application trusted information about whether a particular user has successfully authenticated.

Digital Factory uses Jasig CAS 3.1 Java client, which adds support for CAS 2.0 specification features (http://www.jasig.org/cas/protocol), like multi-tier proxy authentication etc.

The following section gives an overview of configuration options.

4.5.1.1 Digital Factory side

Step 1 - The first file to configure is:

```
<digital-factory-web-dir>\WEB-INF\etc\config\jahia.advanced.properties
```

Here the values that you would want to change are:

```
################################################################
### CAS Authentication config ##################################
################################################################
# Enable CAS authentication valve
auth.cas.enabled                                    = false
# URL prefix of the CAS server
auth.cas.serverUrlPrefix                            =
https://localhost:8443/cas
# Redirect URL to the CAS server for login
auth.cas.loginUrl                                   =
${auth.cas.serverUrlPrefix}/login
# Logout URL to invalidate the user session on the CAS server
auth.cas.logoutUrl                                  =
${auth.cas.serverUrlPrefix}/logout
```

Please note, the CAS server should be accessed using HTTPS protocol. See “4.5.1.2 Configuring ticket validator” section for advanced configuration.

Step 2 - Add the login link in a Digital Factory view:

In the Studio mode you can use the “Login” component to place a link for the login page into your template.

Alternatively, in your template code you can use the following expression to have a proper link (considering CAS server login page):

```
<%@ taglib prefix="c" uri="http://java.sun.com/jsp/jstl/core" %>
```

```
<a href="<c:url value='${url.login}'/>">Log in</a>
```

To add only a logout URL, you can use:

```
<%@ taglib prefix="c" uri="http://java.sun.com/jsp/jstl/core" %>

<a href="<c:url value='${url.logout}'/>">Log out</a>
```

The page https://wiki.jasig.org/ contains some information in order to configure your CAS server. The following "How-To" can be also helpful: http://jira.jahia.org/browse/JKB-22.

A good architecture would separate the CAS server from the other application servers.

4.5.1.2 Configuring ticket validator

By default, Digital Factory uses the `org.jasig.cas.client.validation.Cas20ServiceTicketValidator` implementation for ticket validation, which validates Service Tickets in compliance with the CAS 2 (using `/serviceValidate` service endpoint).

The validator implementation is pluggable and can be replaced with e.g. the `org.jasig.cas.client.validation.Cas20ProxyTicketValidator` one (`/proxyValidate` endpoint), which also supports ticket validation using configured list of proxies.

To override the default implementation the following configuration option should be added into `jahia.advanced.properties` file with the ID of the Spring bean, representing the validator (implementation of the `org.jasig.cas.client.validation.TicketValidator` interface), for example:

```
auth.cas.ticketValidator=Cas20ProxyTicketValidator
```

And the corresponding bean can be defined in a new Spring file, e.g. `<digital-factory-web-dir>\WEB-INF\etc\spring\applicationcontext-cas.xml`, or in a custom module as follows:

```
<bean id="Cas20ProxyTicketValidator"
class="org.jasig.cas.client.validation.Cas20ProxyTicketValidator"
scope="prototype">
<constructor-arg index="0" value="${auth.cas.serverUrlPrefix}" />
<property name="acceptAnyProxy" value="true"/>
<property name="allowedProxyChains">
<value>
                http://proxy1 http://proxy2
                http://proxy3 http://proxy4
</value>
</property>
</bean>
```

The bean defines a list of proxy chains and can accept other supported parameters, like `renew`, `encoding`, `proxyCallbackUrl`, `proxyGrantingTicketStorage`, etc.

4.5.1.3 Troubleshooting

If you have errors of the form:

```
org.jahia.exceptions.JahiaException: User message=Cannot validate CAS
credentials, System message=Cannot validate CAS credentials, root
```

It is most probably due to your SSL certificate, and that the JVM that runs the Jahia does not recognize it.

Refer to https://wiki.jasig.org/display/CAS/Solving+SSL+issues for more details.

4.5.2 SSO with Kerberos

Digital Factory is able to plug-in different authentication policies via HTTP filters and a pipeline of authentication valves. Some filters and valves are provided and can be activated by configuration, like NTLM or the integration of a CAS (Central Authentication Service) server.

We also provide a filter and valve for integration with SPNEGO (Simple and Protected GSSAPI Negotiation Mechanism) to negotiate with the client and use either Kerberos or NTLM as a fallback. This way a non-interactive login is possible, which takes the user logged in to the operating system running the browser.

Such a secure solution is especially interesting for intranets running with Windows servers. This document describes how to configure such an environment.

4.5.2.1 Prerequisites

If using **Windows Server 2008**, then at least **Service Pack 2** needs to be installed (otherwise only simple Kerberos user logons, e.g. via CAS, work, but checks against a Service Principle Name, SPN, will not work, as this one contains slashes, see Microsoft KB article: 951191).

For this guide, we assume that you are using the Windows Active Directory server. If you want to use Kerberos, then all clients and servers need to be joined in the same AD domain. If this requirement is not met, then SPNEGO will fall back to NTLM. It should also be possible to use other directory servers supporting Kerberos and you can take this guide to get some useful information also relevant for alternative environments.

In the guide all terms in angle brackets <> should be replaced by terms fitting your environment or your choice. Notice also that realm names are case-sensitive and recommended to be used in UPPER CASE. Also with Kerberos you will not be able to use IP addresses or `localhost` but rather you will have to use the server name (DNS must be properly set up).

4.5.2.2 Set up the Active Directory

A Service Principal Name (SPN) account needs to be created for the Jahia server. Note that this account can't be used to log in.

1. Start the **Active Directory User and Computers** from the **Administration Tools** menu.
2. Right click on the **Users** repository and select **New > User**.

3. Enter the user information (by example `<your-spn-account>` for user login), press **Next**.
4. Enter the `<password>` and select **Password never expires**, click on **Next** and then on **Finish**.

Now in Windows server 2008 there is an extra step, which is not required in Windows server 2003:

In a console enter the command:

```
setspn -a http/<your.jahia.server.name><your-spn-account>
```

4.5.2.3 Create the Keytab file

The Keytab file enables a trust link between the Digital Factory server and the Key Distribution Center (KDC). This file contains a cryptographic key. The ktpass tool, which comes from the Windows Resource Kit (http://go.microsoft.com/fwlink/?LinkId=62270), is used to generate this file (in Windows Server 2008 the tool is already part of the product).

In a console, enter the command:

```
ktpass.exe /out <your-spn-account>.keytab /princ
HTTP/<your.jahia.server.name>@<YOUR.AD.REALM> /pass * /mapuser<your-spn-
account> /ptype krb5_nt_principal /crypto rc4-hmac-nt
```

This command will generate the `<your-spn-account>.keytab` file, which has to be copied to a secret place on the Jahia server, which only the Jahia server application can read.

4.5.2.4 Create Kerberos configuration file (krb5.conf)

On the Digital Factory server create the Kerberos configuration file (`krb5.conf`) and place it somewhere on the Digital Factory server. In the startup script of the Digital Factory server you need to add the following parameter to pick up this file:

```
set JAVA_OPTS=%JAVA_OPTS% -Djava.security.krb5.conf=<path>\krb5.conf
```

Here is an example:

<YOUR.REALM> is the same as the domain in caps. With evolving versions you may, for instance, have to change the enctypes settings.

```
[libdefaults]
    ticket_lifetime = 24000
    default realm = <YOUR.REALM>
    default_tkt_enctypes = rc4-hmac des3-cbc-sha1 des-cbc-md5 des-cbc-
crc
    default_tgs_enctypes = rc4-hmac des3-cbc-sha1 des-cbc-md5 des-cbc-
crc
    permitted_enctypes   = rc4-hmac des3-cbc-sha1 des-cbc-md5 des-cbc-
crc

[realms]
    <YOUR.REALM> = {
        kdc = <hostname.of.your.kdc>.<your.domain>
    }

[domain_realm]
    .<your.domain> = <YOUR.REALM>
    <your.domain> = <YOUR.REALM>

[logging]
    kdc = FILE:/var/log/krb5kdc.log
    admin_server = FILE:/var/log/kadmin.log
    default = FILE:/var/log/krb5lib.log
```

4.5.2.5 Create JAAS login configuration file (jaas-login.conf)

On the Digital Factory server create the JAAS login configuration file (jaas-login.conf) and place it in a secret place accessible for the Digital Factory server only. In the startup script of the Digital Factory server you need to add the following parameter to pick up this file:

```
set JAVA OPTS=%JAVA OPTS% -Djava.security.auth.login.config=<path>\jaas-
login.conf
set JAVA OPTS=%JAVA OPTS% -
Djavax.security.auth.useSubjectCredsOnly=false
```

Here is an example of the content:

```
com.sun.security.jgss.accept {
    com.sun.security.auth.module.Krb5LoginModule
    required
    storeKey=true
    keyTab="<path>/<your-spn-account>.keytab"
    doNotPrompt=true
    useKeyTab=true
    principal="HTTP/<your.jahia.server.name>@<YOUR.REALM>"
    isInitiator=false
    debug=false;
};
```

4.5.2.6 Test the SPN account

As it is quite easy to make mistakes in the Kerberos configuration, you should test your configuration with the tools provided by Java, before starting Digital Factory.

In order to have those tests work, you have to copy your `krb5.conf` file in your windows system directory and rename it `krb5.ini` (most often `c:\windows\krb5.ini`)

Verify that you are able to read the keytab file:

```
%JAVA_HOME%/bin/klist -k FILE:<path>/<your-spn-account>.keytab
```

and

```
%JAVA_HOME%/bin/kinit -k -t FILE:<path>/<your-spn-account>.keytab
HTTP/<your.jahia.server.name>@<YOUR.REALM>
%JAVA_HOME%/bin/klist
```

4.5.2.7 Set up the browser

4.5.2.7.1 Internet Explorer (min 5.0.1)

1. In Internet Explorer, click **Internet Options** on the **Tools** menu.

2. Click on the **Advanced** tab, click to select the **Enable Integrated Windows Authentication (requires restart)** check box in the **Security** section, and then click **OK**.
3. Click on the **Security** tab, click to select **Local Intranet**, then click on Sites, lastly click on **Advanced**.
4. Enter `https://<your.jahia.server.name>` and validate it by clicking on **Add** and **OK**.
5. Restart Internet Explorer.

4.5.2.7.2 Firefox (min 0.9)

1. In Firefox, enter `about:config` as the URL and click on **Go**.
2. On the line `network.negotiate-auth.trusted-uris`, right-click on **Modify** and enter `https://<your.jahia.server.name>`

4.5.2.8 Activate the SPNEGO HTTP filter and authentication valve in Digital Factory

Kerberos authentication in Digital Factory 7.0 is only supported with Enterprise Distribution. To activate it, you need to set the `auth.spnego.enabled` property in `jahia.advanced.properties` to `true` and restart the server.

4.5.2.9 Related links

Here are some links for further reading and troubleshooting:

Title	URL
Kerberos with Java Troubleshooting	http://java.sun.com/j2se/1.5.0/docs/guide/security/jgss/tutorials/Troubleshooting.html
Advanced Security Programming in Java SE ... Single Sign-On	http://java.sun.com/javase/6/docs/technotes/guides/security/jgss/lab/

Kerberos Authentication problems – Service Principal Name (SPN) issues	http://blogs.technet.com/b/askds/archive/2008/05/29/kerberos-authentication-problems-service-principal-name-spn-issues-part-1.aspx
Setting up CAS with SPNEGO Authentication Handler	https://wiki.jasig.org/display/CASUM/SPNEGO

4.5.2.10 Tips and Tricks

First of all, we recommend you to take a look at http://blogs.technet.com/b/askds/archive/2008/03/06/kerberos-for-the-busy-admin.aspx for information about how Kerberos works.

This Article shows how to resolve common errors

4.5.2.10.1 ERROR [ErrorLoggingFilter] - Unexpected exception occurred

```
ERROR [SpnegoParser] - Failed to parse: 32
INFO  [SpnegoParser] - [0,APPLICATION_CONSTRUCTED_OBJECT,0x4e] Expected
type identifier
INFO  [SpnegoParser] - Expected length 84 mismatch against actual 30
INFO  [SpnegoParser] - [2,OID,0x4c] Expected oid identifier
ERROR [ErrorLoggingFilter] - Unexpected exception occurred
java.lang.NullPointerException
```

This error means that the Kerberos authentication is not done on the client browser.

Resolution: Check your Kerberos configuration with `klist` and `kinit` tools. Look at http://support.microsoft.com/default.aspx?scid=kb;EN-US;262177 to activate Kerberos event logging.

4.5.2.10.2 KrbException: Clock skew too great (37)

This error occurs when there is more than 5 minutes between the Kerberos' domain controller and the Digital Factory server times.

Resolution: Check time and time zone.

4.6 Document converter

Digital Factory Document Converter Service delegates conversion tasks to an OpenOffice/LibreOffice instance, either to a local one or a remote service. To use the converter service you need OpenOffice/LibreOffice v3 or higher installed (the latest stable 4.x version is recommended). Further in this document, we refer to OpenOffice or LibreOffice as “OpenOffice” for the sake of simplicity.

In order to enable the service the following setting should be set to true in the `jahia.properties` file:

```
#########################################################################
### Document Converter Service ##########################################
#########################################################################
# Set this to true to enable the document conversion service
documentConverter.enabled = true
```

4.6.1 LocalOpenOffice instance

The converter service is capable of creating an OpenOffice process and using it, in case Digital Factory and OpenOffice are located on the same machine.

In such case, the converter service starts a local instance of the OpenOffice service for processing conversion tasks.

The configuration in this case is pretty simple: a service needs to be enabled (see above) and a path to the OpenOffice folder has to be provided in the `jahia.properties` file:

```
#########################################################################
### Document Converter Service ##########################################
#########################################################################
# Set this to true to enable the document conversion service
documentConverter.enabled = false
```

```
# The filesystem path to the OpenOffice
# Usually for Linux it is: /usr/lib/openoffice
# for Windows: c:/Program Files (x86)/OpenOffice 4
# and for Mac OS X: /Applications/OpenOffice.org.app/Contents
documentConverter.officeHome = /usr/lib/openoffice
```

4.6.2 RemoteOpenOffice service

The converter service is capable of using an OpenOffice process started as a service on a local or remote machine.

This connection is configured as given below in the snapshot of the `applicationcontext-doc-converter.xml` file:

```
<bean id="DocumentConverterService"
class="org.jahia.services.transform.DocumentConverterService"
init-method="start" destroy-method="stop">

<property name="enabled" value="true"/>
<property name="officeManagerBeanName"
value="remoteOfficeManagerFactory"/>
</bean>

<bean name="remoteOfficeManagerFactory"
class="org.jahia.services.transform.RemoteOfficeManagerFactory"
lazy-init="true">

<property name="host" value="192.168.1.101"/>
<property name="portNumber" value="19001"/>
</bean>
```

OpenOffice in this case should be started as a service on the 192.168.1.101 machine.

A sample command for starting OpenOffice as a service looks like:

```
soffice -headless -accept="socket,host=192.168.1.101,port=19001;urp;" -
nofirststartwizard
```

More details can be found on the JODConverter Web Site (http://artofsolving.com/node/10), including the HowTo for:

- Creating an OpenOffice.org Service on Windows (http://artofsolving.com/node/11)
- Creating an OpenOffice.org Service on Unix-like systems (http://artofsolving.com/node/12).

4.7 Document viewer

Digital Factory offers a built-in support for previewing various types of documents (PDF, Office, etc.) as a SWF flash using a player in a Web page. The direct conversion to flash is available for PDF documents only. To have a preview for non-PDF files (Microsoft Office, OpenOffice etc.) the document converter service (see section "4.6 Document converter" above) should be enabled to perform an intermediate conversion of documents to PDF files.

The viewer service requires the pdf2swf utility (from SWFTools: http://www.swftools.org/) to be installed. The installation guidelines are available on the corresponding Wiki pages: http://wiki.swftools.org/wiki/Installation.

The following two configuration parameters in `WEB-INF/etc/config/jahia.properties` file are responsible for enabling and configuring the document viewer service:

```
#######################################################################
### Document Viewer Service ###########################################
#######################################################################
# Viewer service enables previewing of documents of various formats
# (PDF, Office, etc.) as a SWF flash.
# The direct conversion to flash is available for PDF files only.
# In order for this service to work with non-PDF files a document
# converter service (see section above) should be enabled to perform
# an intermediate conversion of documents to PDF files.
# Set this to true to enable the document viewer service
jahia.dm.viewer.enabled = false
# Viewer service requires the pdf2swf utility (from SWFTools) to be
installed
# The following specifies the path to the pdf2swf executable file
# Usually for Linux it is: /usr/bin/pdf2swf
# for Windows: C:/Program Files (x86)/SWFTools/pdf2swf.exe
# If the SWFTools installation folder is present in your PATH, you can
# specify only the executable name here
jahia.dm.viewer.pdf2swf = pdf2swf
```

The `jahia.dm.viewer.pdf2swf` parameter should contain an absolute path to the pdf2swf executable file or, in case the corresponding folder is included into the PATH environment variable, just the executable name, i.e. `pdf2swf`.

4.8 Document thumbnails

In Digital Factory we are pleased to offer an out-of-the-box support for automatic creation of image thumbnails for uploaded documents that significantly improves the usability and user experience when working with Jahia Document Manager or document-related components.

The service is enabled by default for all PDF documents. A thumbnail is automatically created for the first page of an uploaded document.

To have thumbnails for non-PDF files (Microsoft Office, OpenOffice etc.) the document converter service (see section "4.6 Document converter" above) should be enabled to perform an intermediate conversion of documents to PDF files.

The following entry in the `WEB-INF/etc/config/jahia.properties` file is responsible for enabling/disabling the document thumbnails service:

```
##########################################################################
### Document Thumbnails Service ##########################################
##########################################################################
# Document thumbnails service enables automatic creation of thumbnail
# images for uploaded documents.
# The direct creation of a thumbnail is available for PDF files only.
# In order for this service to work with non-PDF files a document
# converter service (see section above) should be enabled to perform
# an intermediate conversion of documents to PDF files.
# The following enables/disables the document thumbnails service
jahia.dm.thumbnails.enabled = true
```

4.9 Video thumbnails

For an improved media experience Digital Factory offers a possibility of automatic thumbnail generation for uploaded video files.

The video thumbnails service requires the ffmpeg utility (http://ffmpeg.org/) to be installed.

The following two configuration parameters in `WEB-INF/etc/config/jahia.properties` file control the service:

```
##################################################################
### Video Thumbnails Service ###################################
##################################################################
# Video thumbnails service enables automatic creation of thumbnail
images
# for uploaded video files.
# Set this to true to enable the video thumbnails service
jahia.dm.thumbnails.video.enabled = false
# Video thumbnails service requires the ffmpeg utility to be installed
# The following specifies the path to the ffmpeg executable file
# Usually for Linux it is: /usr/bin/ffmpeg
# for Windows, for example: C:/Program Files (x86)/ffmpeg-20120503-git-
c1fe2db-win64-static/bin/ffmpeg.exe
# If the ffmpeg/bin folder is present in your PATH, you can
# specify only the executable name here
jahia.dm.thumbnails.video.ffmpeg = ffmpeg
```

The `jahia.dm.thumbnails.video.ffmpeg` parameter should contain an absolute path to the ffmpeg executable file or, in case the corresponding folder is included into the PATH environment variable, just the executable name, i.e. `ffmpeg`.

4.10 Image service

The Digital Factory Image Service is here to manipulate images from Digital Factory itself. For licensing reasons the service is by default using a Java native API named ImageJ, but this is not a really powerful API nor really efficient.

So if you want to boost the quality of your thumbnails or the result of your other image manipulation operations, Digital Factory allows you to define the path to your ImageMagick installation so that we can use it instead of the ImageJ API.

4.10.1 How-to Install ImageMagick?

Follow the instructions for your system on the Image Magick Binary Releases page: http://www.imagemagick.org/script/binary-releases.php

Once ImageMagick is installed, modify your `jahia.properties` file to activate ImageMagick instead of the ImageJ API.

```
###################################################################
### Image conversion Service ######################################
###################################################################
# The image service to use
# Native java service : "ImageJImageService"
# Set to "ImageMagickImageService" to use ImageMagick. You'll then have
to set
# theimageMagick path
imageService = ImageJImageService
# The path to image magick and exiftools
# For windows : C:\\Programs\\ImageMagick;C:\\Programs\\exiftool
imageMagickPath = /usr/bin:/usr/local/bin:/opt/local/bin
```

4.11 Configuration files externalization

4.11.1 Feature functional description

The files externalization will allow:

- The isolation of the Digital Factory application as a bundle. This same bundle could be deployed in an identical manner over an environment using the application server's deployment tools.
- The ability to configure cluster nodes independently from one another.

This feature is meant to ease the maintenance or e.g. the process of deployment in a clustered environment.

4.11.2 Feature technical description

The feature will externalize the following files. Those files contain most of Digital Factory's settings: licensing, clustering, LDAP, etc.

- jahia.properties
- jahia.advanced.properties
- applicationcontext-*.xml (these files are optional, thus not externalized by the Installer)
- license.xml

4.11.3 Configuration

4.11.3.1 jahia.properties / jahia.advanced.properties

In order to externalize the `jahia.properties` / `jahia.advanced.properties` files, the Digital Factory settings (Properties) have the following lookup order with later resources overriding the previous, if they are found:

- **classpath:org/jahia/defaults/config/properties/jahia*.properties**: This is the standard properties file, as provided by the Digital Factory developers. This is the default file from which the values are going to be merged. You will never need to modify this file as it may be overridden in multiple locations.
- **/WEB-INF/etc/config/jahia.properties**: This is the standard location for the configured properties file, located in the Digital Factory Web application folder. Most of the properties in this file are commented out and loaded from the default `jahia.properties` file located in the above classpath. You may of course uncomment any property you need to change, but we recommend that you leave them commented out if you don't change them, as this will make it possible for Jahia updates to deliver new default properties (or simply new values).

- **classpath:org/jahia/config/jahia*.properties**: This file is fetched from the CLASSPATH matching the following pattern: `org/jahia/config/jahia*.properties`. If this pattern is found in the CLASSPATH directories, this file will overwrite (the corresponding property keys, not the whole file content) the parameters from the properties file located in the Digital Factory Web application folder (i.e. the CLASSPATH needs to be updated with your custom directory).
- **file:${jahia.config}**: This is a lookup for a file, specified with the Java system property "`jahia.config`" (e.g. `-Djahia.config=/opt/jahia/custom.properties`).

4.11.3.2 Spring bean definitions

Spring beans can also be externalized. A bean definition has a unique ID or name which acts like a key in eth registry (Map). So overriding the Spring bean definition is done by its ID/name.

The lookup sequence (similar to properties in the previous section) is as follows:

- **classpath*:org/jahia/defaults/config/spring/**/applicationcontext-*.xml**: These are the default spring files containing the Digital Factory Spring beans.
- **WEB-INF/etc/spring/applicationcontext-*.xml**: If you put files at this location they will override (the beans by ID, not the whole file content) or expand the default Spring configuration files.
- **classpath*:org/jahia/config/**/applicationcontext-*.xml**: Similar to `jahia.properties`, Spring is going to fetch the following pattern in the CLASSPATH: `org/jahia/config/**/applicationcontext-*.xml`. (i.e the CLASSPATH needs to be updated with your custom directory). Spring Beans present in those files will overwrite the Digital Factory default ones. (e.g. `CUSTOMCLASSPATH/org/jahia/config/test/applicationcontext-custom.xml` file).

4.11.3.3 Licence file

Finally, this feature allows the externalization of the License file. The lookup sequence is listed below and it stops on the first found license file:

- **file:${jahia.license}** : This is a lookup for a file, specified in with the Java system property "`jahia.license`" (e.g. `-Djahia.license=/opt/jahia/license-pro.xml`)
- **classpath:org/jahia/config/license*.xml**: Similar to the other ones, Spring is going to fetch the following pattern in the CLASSPATH: `org/jahia/config/license*.xml`. (i.e. the CLASSPATH needs to be updated with your custom directory).
- `WEB-INF/etc/config/license.xml`: the standard location of the Digital Factory license file.

4.12 Error and thread dump directories

4.12.1 Error file dumper server

Digital Factory's error file dumper service is used to automatically create reports when an error occurs.

The location of those files is by default: `${jahia.log.dir}/jahia-errors`. In case the `jahia.log.dir` system property is not set explicitly or detected automatically by Digital Factory (for Apache Tomcat and JBoss EAP / AS servers) the following location is used: `${java.io.tmpdir}/jahia-errors`.

Effectively, for Apache Tomcat this is by default under: `<tomcat-home>/logs/jahia-errors`.

And for the JBoss EAP / AS: `<jboss-home>/standalone/log/jahia-errors`.

It is possible to override the error folder location with a system property named `jahia.error.dir`, e.g. by adding `-Djahia.error.dir=/var/logs/jahia/errors` to the JVM options (`CATALINA_OPTS` for Apache Tomcat).

4.12.2 Thread dumps

Via a “System Health -> Memory and thread dumps” panel in Server settings or via Jahia Tools Area it is possible to perform single thread dumps as well as a series of thread dumps into a file.

The location of those files is by default: `${jahia.log.dir}/jahia-threads`. In case the `jahia.log.dir` system property is not set explicitly or detected automatically by Digital Factory (for Apache Tomcat and JBoss EAP / AS servers) the following location is used: `${java.io.tmpdir}/jahia-threads`.

Effectively, for Apache Tomcat this is by default under: `<tomcat-home>/logs/jahia-threads`.

And for the JBoss EAP / AS: `<jboss-home>/standalone/log/jahia-threads`.

It is possible to override the error folder location with a system property named `jahia.thread.dir`, e.g. by adding `-Djahia.thread.dir=/var/logs/jahia/threads` to the JVM options (`CATALINA_OPTS` for Apache Tomcat).

5 Fine Tuning

After having implemented all your templates, and you are satisfied with your website, there may be some modifications to be done in order to enhance the performance of your server.

Before changing any values on your production server, you should ask yourself the following questions:

- How many editors do you have working simultaneously on the system?
- What is the number of authenticated users that can log into your system (in general, not necessarily at the same time)?
- What is the number of pages that you have in your system, and if they contain a lot of resources (PDF files, etc.)?

As a general rule, in order to test the performance of any system running Digital Factory, here are the issues that need to be addressed:

1. Tomcat and the amount of virtual memory (typically the Xmx part in the catalina.sh/bat file)
2. The database and its default settings
3. Digital Factory properties configuration

The values given here are the high values and have been tested, but that does not mean that this corresponds to the values you should set. The way to find the proper values that will fit your system is to increase progressively, and set the values here one at a time (except for the server.xml and database pool size, they go by pair). Then run a load test (bearing in mind the answers to the questions at the beginning of this section) to see if it corresponds to your expectations.

5.1 Tomcat

5.1.1 bin/catalina.sh or bin/catalina.bat

We usually recommend raising the amount of virtual memory (`-Xms` and `-Xmx` parameters) in your `bin/catalina.sh` or `bin/catalina.bat` (on Windows) file to 2048, 4096 or even higher.

It is not necessarily true that the more virtual memory you give to your system, the faster you get, as sometimes having a lot of memory can benefit you in the beginning, but then garbage collection may take longer, which will make your server unavailable for a longer period of time.

5.1.2 conf/server.xml

Here you can increase the amount of `maxThreads` as well as the amount of `acceptCount`. These settings are the ones handling the connections to your server. `maxThreads` is the maximum number of threads processing requests in Tomcat, whether serving pages from Digital Factory cache or not. If this one is exceeded, then errors will be sent to the client. In case you need to modify those settings, do it in the HTTP connector, the AJP connector or both, depending how you access your application server.

On the other hand, raising this number may not bring the wanted effect. For example, if you leave `maxModulesToGenerateInParallel` at 50 in `jahia.properties`, as no more than that number will do the real work, while the other threads will queue. But we will talk about that configuration in chapter “5.3 Module generation queue”.

5.2 Database

As we have increased the amount of threads in Tomcat, we have to tune the database connection pool on Digital Factory side and also eventually the maximum number of connection your DBMS is allowing.

Note please that the maximum number of active DB connections in your pool should be in any case higher than maximum number of HTTP or AJP threads, your application server is processing at a time. And in turn your DBMS server should allow that maximum number of DB connections (also considering other applications, which access the same DBMS).

5.3 Module generation queue

The queue can be configured in:

```
<digital-factory-web-app-dir>/WEB-INF/etc/config/jahia.properties
```

Here you should increase the following value for your server:

```
#######################################################################
### Concurrent processing options ###################################
#######################################################################
# This variable controls how many threads are allowed to do heavy weight
# processing (module creation not served from the cache)
maxModulesToGenerateInParallel = 50
```

This value controls how many parallel threads will be allowed to start rendering modules not coming from cache, meaning that they will open JCR and DB connections to obtain the content from there.

maxModulesToGenerateInParallel in jahia.properties should not be bigger than the maxThreads value in server.xml.

The factor between `maxModulesToGenerateInParallel` and `maxThreads` (HTTP or/and AJP) should be around 2-3, meaning:

```
maxThreads = maxModulesToGenerateInParallel * (2-3)
```

For example:

```
maxModulesToGenerateInParallel = 100, maxThreads = 300
maxModulesToGenerateInParallel = 200, maxThreads = 600
```

5.4 Operating mode

Setting the operating mode to “production” enhances the performance of your server as when set to “development”, we check more often, which resources (templates, rules) on the server changed in order to redeploy or reinitialize them. The Development Mode will also write more debug information or not compress certain data in order to have it readable.

The Distant Publication Server Mode provides similar performances as the Production Mode, but deactivates some authoring features, as you are not supposed to perform authoring actions directly on this server.

This mode is configured in `WEB-INF/etc/config/jahia.properties`:

```
# This setting can be used to activate particular profile:
#   - development
#   - production
#   - distantPublicationServer
operatingMode                                          = development
```

5.5 JCR DataStore garbage collector

The goal of the JCR DataStore garbage collector is to clean the DataStore up by removing the no longer referenced binaries, i.e. entries which are no longer referenced from any workspace (live, default and versioning). As the nature of the DataStore is append-only (meaning it does not update or delete binaries automatically), this maintenance task should be run periodically (once a week, month or quarter).

As the process could be resource intensive, the operation should be planned for times when the processing node is not under stress. The job can be triggered manually from the Jahia Tools Area -> JCR DataStore garbage collection (http://localhost:8080/ tools/jcrGc.jsp).

5.6 Storing binary files

During the installation process when setting the database connection settings an option allows you to either check or uncheck the box “Store binary data in the database”.

According to the Apache Jackrabbit wiki (http://wiki.apache.org/jackrabbit/DataStore#File_Data_Store), “FileDataStore is usually faster than the DbDataStore, and the preferred choice unless you have strict operational reasons to put everything into a database.”

We recommend you leave the “Store binary data in the database” checkbox unchecked.

You cannot switch between the store implementation at a later time, unless one makes an export-import of the repository data.

When using a FileDataStore in cluster, a shared file system needs to be used, where all cluster-nodes point to.

The path to the FileDataStore should not be located under WEB-INF as this can very much increase server startup and JSP compilation times. While the installer lets configure that path only for cluster installation, you can manually modify it for standalone servers.

To do that:

- Stop the server
- Move …/`WEB-INF/var/repository/datastore` to a different location not under `WEB-INF`
- Edit …/`WEB-INF/etc/repository/jackrabbit/repository.xml` and change the path value within the DataStore element on the bottom of the file to point the new location
- Start the server

5.7 Increasing bundleCacheSize

Another recommendation is to increase the value of the `bundleCacheSize` settings. There are three PersistenceManagers using bundle caches: one for default workspace, one for live workspace and one for the version space. Each is on default just 8MB small. For large production systems you should increase the values, so that they together occupy around 1/10th of the JVM maximum heap space.

More information about this, can be found at this link:

https://www.jahia.com/community/extend/technical-blog/performance-sizing-the-jackrabbit-bundle-cache-properly

At that linked article you get some information how to read the bundleCache related log output in the console. Based on the miss to access ratio in your environment you can decide whether you should dedicate more or less memory to either default, live or the version bundle cache. In cluster it also depends whether a cluster node is used for authoring/processing content or just for serving the published live content. So you should adapt the setting to the cluster node role, and if for instance it is just used to serve live content, then the live bundle cache should get most of the 1/10th of heap.

Usually the versioning bundleCache can be 2-4 times smaller than the default/live bundleCache, but it depends on the environment and usage, so you can decide on your own by checking the bundleCache lines in the console output.

Let's take as example that we have a system using 3GB of heap, we may set the bundleCache to the following values: default: 128MB, live: 128MB, version: 64MB.

To increase the `bundleCacheSize` parameter of the different PersistenceManagers you have to do this in the following files:

For the version bundleCache open `WEB-INF/etc/repository/jackrabbit/repository.xml` and in the section Versioning/PersistenceManager adjust the value for the the `bundleCacheSize` parameter:

```
<param name="bundleCacheSize" value="64">
```

For the default bundleCache open `WEB-INF/var/repository/workspaces/default/workspace.xml` and in the Workspace/PersistenceManager edit the following parameter value:

```
<param name="bundleCacheSize" value="128" />
```

For the live bundleCache open `WEB-INF/var/repository/workspaces/live/workspace.xml` and in the Workspace/PersistenceManager edit the value for the `bundleCacheSize` parameter:

```
<param name="bundleCacheSize" value="128" />
```

A Digital Factory server restart is needed for changes to be effective.

6 Monitoring

There are multiple ways of monitoring a Digital Factory installation's behavior in real-time; we will present it in this chapter.

Also, if you have identified an issue with a Digital Factory installation and want to communicate it back to us, we have a section below that describes what is required to efficiently provide us with the data that will help us assist you in a timely manner.

6.1 Stack trace dumps

Stack trace dumps are a very useful way of figuring out exactly what the JVM is executing at a specific point in time. Basically the JVM has a way of dumping onto the console output a list of all the threads currently executing with, for each thread, a detailed stack trace of where in the code each thread is currently

If errors occur, Digital Factory automatically generates thread dumps. To create thread dumps on demand you can also use the “System Health -> Memory and thread dumps“ panel in the Server Settings or a “Thread State Information” Tool available in Jahia Tools Area (see chapter “6.4 Tools”), which can also automatically create multiple thread dumps in an interval. If you want to analyze the thread dumps created by Digital Factory with a tool, you may have to switch the `useJstackForThreadDumps` in `jahia.properties` to `true`, provided that the `jstack` command (from Oracle Java Platform SE package) is available in your `PATH`. That allows you to generate more accurate thread dumps (although the generation process is slightly slower), and it is guaranteed that in this case a dump can be read by any thread dump analyzer tool available on the market.

You may also trigger such standard thread dumps manually in a Java standard way. Performing a stack trace dump is different on various platforms:

6.1.1 Unix

On UNIX platforms you can send a signal to a program by using the kill command. This is the quit signal, which is handled by the JVM. For example, on Linux you can use the command `kill -QUIT process_id`, where `process_id` is the process number of your JVM. Don't be alarmed by the fact that the command is called "kill", despite the name, all this command will do is perform a stack trace dump and the JVM will continue executing. Alternatively you can enter the key sequence `<ctrl>\` in the window where the JVM was started (this works only if the java process is running in foreground in this window, not if you are doing a tail on the log file). Sending this signal instructs a signal handler in the JVM to recursively print out all the information on the threads and monitors inside the JVM.

6.1.2 Windows

To generate a stack trace on Windows platforms, enter the key sequence `<ctrl><break>` in the window where the Java program is running

The output of the stack trace will go to the console output, so under Windows it will be displayed in the JVM window, and under UNIX it will be usually in `tomcat/logs/catalina.out`.

Once the dump has been performed, you can look for threads that are blocked, or see the amount of threads that are performing some operations, which might not be expected.

6.1.3 Tools

A more convenient way to generate the stacktrace on all platforms is to use the JVM's "`jstack <pid>`" command if you are using an Oracle Java. This will render the thread dump in your console or you could redirect an output into a file.

6.2 Memory dumps

In order to analyze the memory usage of a JVM, it is possible to perform memory dumps that can then later be analyzed to determine if the application is behaving as expected, or if a data structure is eating up too many resources.

There are two ways of performing memory dumps with the JVM:

- via Java VM parameters:
  - `-XX:+HeapDumpOnOutOfMemoryError` writes heap dump on OutOfMemoryError (recommended)
  - `-XX:+HeapDumpOnCtrlBreak` writes heap dump together with thread dump on CTRL+BREAK
- via tools:
  - Oracle JMap: `jmap.exe -dump:format=b,file=HeapDump.hprof<pid>`
  - Oracle JConsole: Launch `jconsole.exe` and invoke operation `dumpHeap()` on `HotSpotDiagnosticMBean`

The heap dump will be written to the working directory.

Once you have the heap dump, you can use a Java profiler (see below) to load up the dump, but they usually have problems analyzing large files.

You could use dedicated tools, like e.g.:

- Eclipse Memory Analyzer Tool: http://www.eclipse.org/mat/
- SAP Memory Analyzer: http://wiki.scn.sap.com/wiki/display/Java/Java%20Memory%20Analysis?original_fqdn=wiki.sdn.sap.com&bc=true
- etc.

What you will be looking for in memory dumps is the largest structures in memory. Usually these will be cached objects, but they may also be objects referenced from the sessions.

6.3 Java profilers

The most powerful tool to analyze in real-time what is going on inside a Digital Factory installation is a JVM profiler. There are multiple tools that exist, but we recommend YourKit Java Profiler (http://www.yourkit.com/), which is a commercial tool that can be used even in production with lesser performance impacts.

You can find a more extensive list of profilers here:

- Free Profilers: http://www.javaperformancetuning.com/resources.shtml#ProfilingToolsFree
- Commercial Profilers: http://www.javaperformancetuning.com/resources.shtml#ProfilingToolsNotFree

6.4 Tools

Digital Factory provides several tools as JSP's files that you can call to run certain commands on your server (activate Maintenance Mode, get information about the system, display thread dump, view the cache, cluster statistics etc.)

Those tools are password protected by a security realm with the Jahia Tool Manager user. Its username and password are configured during the installation wizard (defaults are: jahia/password).

The list of tools can be found after Jahia installation at http://localhost:8080/tools (adapt the URL, if you use other domains, ports or server contexts).

6.4.1 System and Maintenance

The tools under system and maintenance allow you to see the status of your platform. They also allow you to put your system under maintenance. This mode will display a nice page of information while you update your server (Jahia needs to be running, otherwise use a HTTP server in front to deliver a static maintenance page). The JSP pre-compiler should be run after deploying new

releases of modules in order to pre-compile the JSPs, so that this will not happen once the server is already under load.

Tool	Description
System information	gather system information to analyze all the current settings
Thread state information	create one or multiple thread dumps
Memory information	show the current memory status
JCR sessions information	displays the information about currently running JCR sessions
System maintenance	set system into Maintenance mode to block access
JSP pre-compilation	trigger the precompiling of JSPs after deployment
System benchmarks	this tool will benchmark the database read performance as well as perform both read and write performance checks for the filesystem

6.4.2 Logging

These tools are here to manage your log4j configuration (change the log level for certain categories) over a user interface. Notice that these settings then only apply to the current runtime – they are not persistent, so on the next server startup the settings will be taken from log4j.xml.

You can also control the activation of the error file dumper.

Tool	Description
Log4j administration	tool to change log levels immediately
Error file dumper	ability to switch on/off error dumping to files

6.4.3 Administration and Guidance

The tools in this section give you an overview of the currently running or scheduled background jobs in Digital Factory, allow you to trigger re-indexing of the content and run SQL statements or Groovy scripts. As you may update a runtime database with that, you have to be very cautious and do backups before manipulations.

Tool	Description
OSGi console	The management and monitoring tool for the OSGi bundles
Background job administration	view active or scheduled background jobs
Search engine management	various indexing related actions and integrity checks
DB query tool	run SQL queries/updates using a connection from the configured Jahia data source
Groovy console	paste Groovy code you would like to execute against Digital Factory
Workflow monitoring	View currently running workflow processes

6.4.4 Enterprise Tools – Cluster view

This section in the Jahia Tools Area is only available when the clustering is activated for Digital Factory.

Tool	Description
Cluster view	Shows the current cluster membership, communication statistics and configuration

6.4.5 JCR Data

The data tools contain a JCR repository browser that can be really helpful to browse your JCR content and have all data displayed in a particular node. You can also run JCR queries and Groovy scripts within a `JCRTemplate`.

Furthermore, there are housekeeping tools to clean-up the version history and to run the data store garbage collector.

Tool	Description
JCR repository browser	browse the JCR content tree in a simple UI.

JCR query tool	run JCR queries with SQL-2, XPath or SQL syntax
JCR query statistics	provides information about slow queries and most popular queries
JCR console	paste Groovy code to execute in a JCRTemplate against the JCR repository
JCR DataStore garbage collection	run the JCR DataStore garbage collector
JCR version history management	perform cleanup tasks on the version store
JCR integrity tools	perform some integrity checks on the JCR repository, and also implements some fixes
JCR external providers	Lists active external providers and current mount points
JCR components and nodetypes integrity tools	perform integrity checks and fixes for component nodes and node types

6.4.6 JCR Rendering

Some tools to display information about the installed modules, definitions and render filters:

Tool	Description
Installed modules browser	display details of installed modules
Installed definitions browser	display details of installed node/property definitions
Render filters	display details of installed render filters
Actions	list of registered render actions
Choicelist initializers & renderers	Information about registered choicelist initializers and renderers

6.4.7 Cache

Cache monitoring and management tools. You can also access the content of the HTML output caches if needed by accessing the following tools.

Tool	Description
Cache management	view the statistics of all available caches; flush particular caches or all at once
Output cache statistics	view the stats of the HTML cache
Output cache	view and search HTML cache elements
Output dependencies cache	view and search HTML dependencies cache elements

6.4.8 Miscellaneous Tools

These are various tools that could not be classified into the other categories.

Tool	Description
Password encryption	tool to encrypt passwords
Document converter	convert documents into other formats if the conversion service is active
Document text extractor	check the text extraction from documents
WCAG checker	paste HTML to validate against Web Content Accessibility Guidelines
URL rewriting rules	view the rules for the UrlRewriteFilter

6.5 Other Issues

The best way to get support for your issues is to contact us for a support agreement. Please see the following page for more information: http://www.jahia.com/services/technical-assistance

If you have a commercial support contract, you will get your own space to submit issues that will be handled according to our SLA (https://support.jahia.com/). Otherwise, you can report issues to the general JIRA projects (https://jira.jahia.org/), but here there will be no guarantee as to how and when the issue will be handled. When submitting an issue to our JIRA Issue tracker, make sure you include as much information as possible, including:

- A detailed description of your environment with the version number and patches (J2EE server, JDK, OS) as well as memory and architecture (32-bit, 64-bit).
- A detailed (or complete) log file, including date and times at which the problem occurs, to be able to corroborate with log file.
- A list of steps to reproduce the problem (if not random).
- A stack trace dump or, in case of performance issues, multiple thread dumps in intervals (see chapter “6.1 Stack trace dumps”).
- If dealing with an OutOfMemory issue, please include a memory dump (see chapter “6.2 Memory dumps”).

A convenient way to get all the relevant system, Digital Factory and environment information is to use the “Jahia Tools Area -> System information -> download as a file” action, which will allow you to download and later attach to the JIRA ticket the relevant information.

As a basic rule, we also prefer to have too much information than too little.

7 Frequently asked questions (FAQ)

7.1 How to backup Digital Factory?

Backing up your system is useful in many cases as it minimizes the risk of losing all of your data, whether it is on the database or server side.

7.1.1 Database

A database dump contains a record of the table structure and/or the data from a database, and it is usually in the form of a list of SQL statements. A database dump is useful for backing up a database so that its contents can be restored in the event of data loss (or in our case reusing an environment). It can be performed anytime (even when the Digital Factory server is running), but it is usually preferable to shut down your Digital Factory before dumping your database.

There are many software products (proprietary or Open Source) that can perform a database dump for all types of databases. Here, we will use the example of MySQL:

```
mysqldump -urootUser -p  digitalFactory7 > digital_factory_7_v1.sql
```

7.1.2 Digital Factory core data files

You should backup the JCR repository folder, which contains search indexes and a data store if you have chosen the filesystem storage for binary content in your configuration:

```
<digital-factory-web-app-dir>/WEB-INF/var/repository/
```

If during the configuration wizard you've chosen filesystem-based binary storage and alternative location for the datastore folder (in a clustered installation), you should backup also that folder.

7.1.3 Module and template sets

Your modules are located in the following folders, which also need to be backed up:

```
<digital-factory-web-app-dir>/WEB-INF/var/bundles-deployed
<digital-factory-web-app-dir>/WEB-INF/var/modules
```

7.1.4 Web applications/portlets

If you have no additional Web applications (or portlets) used inside your Digital Factory server, you can skip this part.

All the additional Web applications, you may have deployed, will be usually located on Apache Tomcat under:

```
<tomcat-home>/webapps
```

You can backup all web applications or only the one you use. If you installed some third party portlets, be sure to check on their respective documentation. Depending on wetheror not the webappis storing information, the way you backup the webapp will be different. If the webapp stores nothing, you can either backup the .war file you had used to deploy the portlet, or the subfolder of “webapps/” in which the webapp has been deployed. If the webapp stores some data, you will also have to backup it.

7.1.5 Configuration files

All major configuration files are situated under the folder below:

```
<digital-factory-web-app-dir>/WEB-INF/etc/
```

If you have chosen to externalize your configuration, the backup will be easier as you will only need to backup your additional files. Refer to the “4.11 Configuration files externalization” section if you want to know how to externalize your configuration.

If you are under UNIX, for regular backup of you Digital Factory data, you can create a script file and run it through a Cron job. A typical example of this script could be:

```
DAY=`date +%u`
/bin/tar cvfz /home/backup/tomcat_$DAY.tar.gz /home/jahia/tomcat/ #list
of folders to copy
```

7.2 How to restore an environment from a backup?

7.2.1 Restore your database dump

Please refer your database documentation for specific instructions of how to perform this.

7.2.2 Reinstall Digital Factory

During the configuration wizard, instead of connecting to a new empty database, connect to your newly restored database. Uncheck the option to create the tables inside this database.

Take care to specify the same value as you did for your former installation regarding the storage of the binaries (inside the database or on the filesystem).

If you do not remember, open `<digital-factory-web-app-dir>/WEB-INF/etc/repository/jackrabbit/repository.xml` and check the DataStore element, which could either be a `DbDataStore` or a `FileDataStore`.

Do not start the application server at the end of the install process.

7.2.3 Apply your specific configurations on your new installation

- If you had externalized your configurations, you just need to reapply your additional configuration files.
- Otherwise, you need to edit the different configuration files you had customized and reapply your specific configurations. When going from one service pack to another, some configuration files may have changed (see the change log for this). This means that when

migrating from an old version of Digital Factory to a newer one, simply copying and pasting the configuration files may not work, or may lead to startup errors. You will save time if you document your specific configurations, so that you can easily apply it on a new installation.

7.2.4 Deploy your templates and modules

Deploy your templates set(s) and modules.

7.2.5 Restore the binaries stored on the filesystem

If you have chosen to store the binaries in your database, just skip this step.

Copy your `WEB_INF/var/repository/` folder from your backup to your new installation. You will have the following structure:

```
repository
   |_____datastore
   |_____index
   |_____version
   |_____workspaces
   |          |___default
   |          |      |____index
   |          |      |____lock
   |          |      |____repository.xml
   |          |___live
   |                 |____index
   |                 |____lock
   |                 |____repository.xml
   |_____indexing_configuration.xml
   |_____indexing_configuration_version.xml
```

If you have chosen an alternative location of the datastore folder during the Digital Factory configuration wizard (cluster installation), please restore it at the appropriate location.

Remove the 2 “lock” files. If possible, we also recommend you to also remove the 3 “index” folders. Those folders store the JCR indexes, which will be regenerated at first startup if missing. Regenerating it will improve the performances, but this operation will take a variable amount of

time, depending on the amount of data you have. If you are doing an emergency restore of a production server, you can keep the former indexes to save time.

7.2.6 Restart the Digital Factory server

For the last step you must restart your reinstalled Digital Factory application.

7.3 Modifying the Logging Level

The following instructions apply to modify logging levels permanently. If you want to only change the level for a short time, you can use the runtime tool, described in chapter “6.4.2 Logging”.

When you install a release of Digital Factory, the logging level is set to the minimum to avoid slowing down the platform. If you need to increase it for debugging purpose, you need to modify the file `log4j.xml` which is in the following directory:

```
<digital-factory-web-app-dir>/WEB-INF/etc/config
```

Log4J defines the logging levels as follows (from the more to the less verbose):

ALL < DEBUG < INFO < WARN < ERROR < FATAL < OFF

At the bottom of the file, you have the `<root>... </root>` part. Change the:

```
<level value="info"/>
```

To

```
<level value="debug"/>
```

for example, to have more debugging information in the console. You can also change this parameter for some specific part of Digital Factory like Jackrabbit or Lucene. You can even add your own logger on a specific set of classes, for example:

```
<logger name="org.quartz">
      <level value="info"/>
</logger>
```

By default logs are redirected to the standard out, which is normally the console. Under Windows, logs will be displayed in the DOS window where Tomcat is running. On Linux, logs will be redirected to the `catalina.out` file. As Digital Factory uses Apache Log4J for its logging system, you can use tools like Chainsaw (part of the Log4J project) to better work with logging messages.

You can change the log-level of Digital Factory "on-the-fly" without having to shutdown and restart it. This is very useful when you need to have extra logs on a production server, but do not want to restart it just for this. Digital Factory watches for changes in the `log4j.xml` file every 60 seconds, so once you have changed the log level, you will need to wait a few seconds before the changes will be effective.

Do not forget to change the values of INFO back, as the DEBUG log level has a pretty important impact on performance.

7.4 How to handle module generation timeouts?

As mentioned in chapter "4.2.3 The front-end HTML cache layer", you may sometimes get exceptions saying, "Module generation takes too long due to module not generated fast enough (>10000 ms)." This happens when two requests try to get the same module output at the same time. To save resources, Digital Factory decides to let just one request render the output and the other request wait for it. The maximum wait time is configured in `jahia.properties` with the parameter `moduleGenerationWaitTime`. If rendering the module takes longer than this time, the waiting request gets cancelled with the exception.

The reasons for this exception are various. It could either be an indication that sufficient configured resources are lacking (number of database connections, heap memory, maximum number of file handles, etc.), bottlenecks (slow disk, locks, unnecessary synchronization, etc.), problems with

modules (JSPs getting compiled, modules opening sockets and waiting for response without timeout, etc.) or bugs/performance issues in the code.

The best way to identify the issue is to analyze thread dumps. Along with the exception, Digital Factory should have automatically created a thread dump (unless the server load is too high), which already is a good start. If the scenario is reproducible, it would also be good to create multiple thread dumps in short intervals of a few seconds (see Thread dump Management tool mentioned in chapter “6.4.1 System and Maintenance”, which is able to create multiple thread dumps).

The thread dump may, for instance, show that the JSP compilation is the cause of the problem. In this case you have to ensure that JSPs are getting precompiled after deployment (see JSP Pre-Compilation tool in chapter “6.4.1 System and Maintenance”) before the server is exposed to public requests (e.g. keep it in the Maintenance Mode). In the error log you should be able to see the URL of the request leading to the timeout, and you should see the cache-key of the module, that is not getting rendered quickly enough. You can also watch out for the other thread, which is rendering the same module and see whether, for instance, it is stuck in some slow or non-responding methods, locks etc.

You should also analyze the error log file from that time to see if there are other exceptions before or after the incident that indicate that the server is running out of resources. In such a case, you may have to utilize or configure more resources for the server.

It could also be an indication that the server is overloaded and not able to serve the number of requests. In such a case, you should think of running Digital Factory in cluster or add more cluster nodes to handle the expected load.

7.5 How to clean referencesKeeper nodes?

The `/referencesKeeper` node is used during the import of content/sites. Whenever there is a reference property in the imported content, where the value cannot be resolved immediately, because e.g. the path or UUID does not exist yet, we create(d) a `jnt:reference` entry under

`/referencesKeeper` in order to resolve the reference at a later time, when this path or UUID gets available (e.g. after importing other related content). After the path gets available, the reference is correctly set and the node from referencesKeeper gets removed. Digital Factory can't know whether these references will be resolvable in future, that's why we do not delete them. On the other side the problem is that this list can grow and grow.

If the number of referencesKeeper nodes is growing in your environment, you need to look at the nodes and identify from the `j:node` reference, the `j:propertyName` and `j:originalUuid` if the reason is an unresolvable reference found in one of your import files. In that case you need to fix the `repository.xml` (or `live-repository.xml`) in the import file and delete the corresponding `jnt:reference` nodes manually.

Since Digital Factory 6.6.2.3, meaning also in 7.0.0, we have reduced the cases, where we make use of the referencesKeeper node, as we saw that on customer's sites the number of sub-nodes could grew to hundred thousands, causing performance degradation on import and module deployment. We now also started to log a warning when the number of sub-nodes exceeds 5000. In that case it is necessary to clean the nodes manually.

For that please go to the JCR query tool (see "6.4.5 JCR Data"), set limit to 10000 and use the SQL-2 request:

```
SELECT * FROM [jnt:reference]
```

You could also add a where clause if you want to delete just specific nodes, for which you know that they are unresolvable, but most of the time it will be seen that all of them are unresolvable.

After entering the query and the limit activate the checkbox: "Show actions". After fetching the first 10000 results, select the link: "Delete ALL", which will remove all these 10000 entries. You will have to run the query multiple times until you get rid of all entries. You should do that at low-peak times. To run it overnight you could also raise the limit to e.g. 50000 (modify it in the URL: `...&limit=50000&offset=0&displayLimit=100`) in order to remove 50000 references in one attempt.

Jahia Solutions Group SA

9 route des Jeunes,
CH-1227 Les acacias
Geneva, Switzerland

http://www.jahia.com